

Estimating gamma: Response to ATCO Gas Australia Draft Decision, Stephen Gray, SFG Consulting November 2014

Appendix 10.1

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Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System



Estimating gamma: Response to ATCO Gas Draft Decision

Report for ATCO Gas Australia

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1. Background and conclusions

Overview and instructions

1. SFG Consulting (**SFG**) has been retained by ATCO Gas Australia (**ATCO**) to provide our views on issues relating to the estimation of the gamma parameter. In particular, we have been asked to respond to the ATCO Gas Draft Decision of the Economic Regulation Authority of Western Australia (**ERA**) insofar as it relates to gamma.

Preparation of this report

2. This report has been authored by Professor Stephen Gray, Professor of Finance at the UQ Business School, University of Queensland and Director of SFG Consulting, a specialist corporate finance consultancy. I have Honours degrees in Commerce and Law from the University of Queensland and a PhD in financial economics from Stanford University. I teach graduate level courses with a focus on cost of capital issues, I have published widely in high-level academic journals, and I have more than 15 years' experience advising regulators, government agencies and regulated businesses on cost of capital issues.
3. My opinions set out in this report are based on the specialist knowledge acquired from my training and experience set out above.
4. I have read, understood and complied with the Federal Court of Australia Practice Note CM7 *Expert Witnesses in Proceedings in the Federal Court of Australia*.
5. A copy of my curriculum vitae and my instructions are attached as appendices to this report.

Summary of conclusions

6. Our main conclusions are set out below.

Overall framework

7. The ATCO Gas Draft Decision proposes that gamma will be estimated as the product of two components: the distribution rate (F) and theta (θ) such that $\gamma = F \times \theta$. We agree with this general approach, which is standard and consistent with the approach previously adopted by the ERA and other regulators.
8. The ATCO Gas Draft Decision also proposes that gamma will be estimated as a market-wide parameter. This is consistent with the standard regulatory practice of using market-wide data to estimate both components of the gamma parameter, and we adopt that framework throughout this report.

The distribution rate

9. The ATCO Gas Draft Decision proposes to adopt an estimate of 70% for the distribution rate, F . This is consistent with the long-standing practice of every regulator other than the Queensland Competition Authority (**QCA**). Our view is that the evidence that is currently available supports a distribution rate estimate of 70%.
10. **Conclusion: Our view is that the evidence that is currently available supports a distribution rate estimate of 70%.**

The conceptual definition of theta

11. The ATCO Gas Draft Decision distinguishes between:
 - a) Estimating the proportion of corporate tax paid that will end up being redeemed by shareholders via imputation credits (the *redemption rate*); and
 - b) Estimating the *value* that shareholders obtain from their redemption of imputation credits.
12. The redemption rate can be estimated using *ATO tax data* or the *equity ownership approach*. The value of credits can be estimated empirically from financial market data via *market value studies* such as dividend drop-off analysis.
13. The ERA recognises that there is a material difference between the *redemption* estimate of theta and the *value* estimate of theta because “investors incur costs to obtain franking credits.”¹ That is, an investor will value a credit according to the net benefit that it provides – the difference between what the credit pays when redeemed and the costs incurred by the investor in obtaining and redeeming that credit.
14. The ATCO Gas Draft Decision departs from the ERA’s Rate of Return Guideline in adopting a redemption estimate of theta rather than a value estimate of theta. The ERA recognises that it is adopting an estimate of theta that exceeds the value of credits to shareholders.² We note in the body of this report that the Australian Competition Tribunal has held that “The utilisation rate (or theta) represents the per-dollar value to a shareholder of a distributed imputation credit,”³ and that “investors may not value cash dividends and franking credits to their full dollar values, or to the same dollar value for each. This is where θ (theta) comes in.”⁴
15. In our view, gamma should properly be estimated as the *value* of imputation credits for the following reasons:
 - a) The Australian regulatory framework reduces the allowed return to shareholders by $\$ \gamma$ for every \$1 of imputation credits created.⁵ If shareholders do not *value* the \$1 imputation credit at $\$ \gamma$, they will not receive an appropriate return;
 - b) The National Gas Rules and National Electricity Rules specifically define that “ γ is the *value* of imputation credits”;⁶
 - c) Any reasonable analysis of the relevant literature leads to the conclusion that gamma is intended to be a measure of the value of imputation credits. Even McKenzie and Partington (2013), state that:

Theta (θ) [one of the components of gamma] is the value to the investor of the imputation credits distributed, expressed as a fraction of face value,⁷

and:

¹ ERA ATCO Gas Draft Decision, p. 439, Paragraph 74. A description of the relevant costs is set out in Section 5 of this report.

² ERA ATCO Gas Draft Decision, p. 439, Paragraph 74.

³ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 68.

⁴ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 104.

⁵ The regulatory framework actually reduces the allowed return by $\$ \gamma$ for every \$1 of corporate tax paid, but corporate tax paid equals imputation credits created for a domestic firm, such as regulated businesses.

⁶ NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14), emphasis added.

⁷ McKenzie and Partington (2013), p. 31.

■ The standard practice has been to measure the market value of theta.⁸

and:

■ The question then is how to measure the market value of the imputation credits.⁹

- d) Lally (2013 AER) makes it clear that what he calls the *utilisation rate* (U) is the extent to which distributed imputation credits (IC) are capitalised into the stock price – the extent to which the stock price reflects the *value* of distributed imputation credits;¹⁰

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + R_f + \phi \beta_e}$$

- e) The ERA justifies their use of the redemption rate on theoretical models developed by Lally and others. However, the Lally model only applies to the special case where Australia is assumed to be completely segmented from world capital markets, in which case there is zero foreign investment.¹¹ By contrast, the ERA seeks to use the Lally model to justify its use of a redemption rate that reflects the extent to which Australian equities are owned by foreign investors. Lally (2013 AER) has advised that his model does not apply in such a setting – there is no market clearing condition and one cannot solve for any equilibrium pricing results. The ERA has either misunderstood or ignored this advice. There is no theoretical framework that supports the ERA's proposed approach.

16. **Conclusion: Gamma should be defined as the *value* of imputation credits, and should be estimated accordingly.**

Dividend drop-off analysis

17. The ATCO Gas Draft Decision reprises a number of econometric issues that were raised by Lally (2013 AER) and Lally (2013 QCA).¹² We have previously addressed all of those issues in submissions to the AER and QCA. The relevant responses are collated in the appendices to this report and remain extant.
18. The ERA draws a particular comparison between the SFG dividend drop-off analysis and that of Vo, Gellard, and Mero (2013) (the ERA study). Where the ERA study applies the standard approach of using market-adjusted prices it corroborates the results of the SFG studies. The only inconsistency between the two studies occurs when the ERA study uses raw prices and returns, contrary to the accepted practice in the literature.
19. In our March 2013 submission to the ERA, we compared the relative merits of these two studies. We noted that the Australian Competition Tribunal was effusive in its praise for the SFG study but that we are unaware of any external verification of the ERA study. We understand that the ERA has submitted its study for academic publication, but the Draft Decision does not comment on the progress of that endeavour.

⁸ McKenzie and Partington (2013), p. 32.

⁹ McKenzie and Partington (2013), p. 33.

¹⁰ Lally (2013 AER), p. 10, Equation (3).

¹¹ Lally recommends that regulators should assume complete segmentation. The model also applies in the case of perfect integration (which would lead to gamma being set close to zero), but this case is not recommended.

¹² ERA ATCO Gas Draft Decision, pp. 441-447.

20. The SFG study uses all available data and a range of accepted methods, all of which support the proposed estimate of 0.35 with reasonable precision. We have also submitted an expanded set of stability analyses to the ERA which demonstrate that our results are strongly robust to the inclusion or removal of influential observations. However, the ERA persists with its claims that dividend drop-off estimates are sensitive to “the most influential observations.”¹³ The data and estimation methods used by SFG produce results that are *not* sensitive to influential observations. The only evidence of such sensitivity comes from the ERA study when raw returns are used, contrary to the accepted practice in the literature. Logically, if the ERA’s analysis is unable to produce reliable results it should be given little weight – it should not be used to cast dispersions on *all* drop-off analyses.
21. **Conclusion: The best available dividend drop-off estimate of the value of distributed imputation credits is 0.35 – consistent with the SFG study (and with the ERA study when the standard approach of using market-adjusted prices is used).**

The Lally “conceptual goal posts test”

22. The ERA has regard to a “conceptual goal posts test” developed by Lally (2013 AER). In our view, the Lally “test” is based on such an implausible and inherently contradictory foundation that it would be an error to place any weight on it. The reasons for this conclusion are:
- a) To our knowledge, no person or entity anywhere in the world at any time has ever adopted an estimate of the utilisation rate from within the range established by the Lally test;
 - b) The test relies upon estimates of CAPM parameters as they would be in perfectly segmented and perfectly integrated worlds. The estimation of CAPM parameters in the real world (where substantial data is available to assist) is already difficult and contentious. It is simply impossible to estimate what these parameters *might be* in the theoretical worlds considered in the Lally test;
 - c) The Lally test is based upon the assumption that the market risk premium in every country is equal to the same multiple of historical stock market variance. By contrast the ERA places zero weight on this method for estimating the MRP in the real world. That is, a method that warrants no weight at all in the real world is, by itself, able to provide estimate of the MRP in two theoretical extreme worlds – to three decimal places. Moreover, the QCA has recently noted that Lally himself has previously concluded that “the statistical precision of the method is very low”;¹⁴
 - d) The first version of the test (Lally 2013 AER) relied upon government bonds having the same yield whether or not foreign investors are allowed to buy them, which is clearly unsupportable; and
 - e) The second version of the test (Lally 2014 QCA) is based on a scenario in which the market for government bonds is completely integrated while at the same time the market for all other assets is completely segmented. That is, all investors throughout the world own government bonds in all other countries in the world, whereas they are only allowed to own risky assets in their own country. This assumption is even more implausible than the one it is supposed to replace.

¹³ ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

¹⁴ QCA Market Parameters Decision, p. 74.

23. Moreover, Lally (2013 AER) concludes that the test suggests that theta must be “one or close to one.”¹⁵ The AER and QCA also conclude that the test only supports theta estimates of “one or close to one.”^{16 17} By contrast, the ERA concludes that the “test” supports theta estimates as low as 0.6. However, there is no basis for such a conclusion – the ERA appears to have misinterpreted the conclusions of the “test.”¹⁸
24. The ERA then adopts a utilisation rate (0.7) that materially fails the test.
25. **Conclusion: The ERA should apply no weight to the Lally “conceptual goal posts test”.**

[Summary of advice from Lally](#)

26. The primary recommendation from Lally (2013 AER) is that theta should be set to one on the basis of the assumption that all Australian shares are owned by resident investors who can costlessly redeem all credits that are distributed to them. This involves “ignoring foreigners” when estimating theta.¹⁹ That is, theta should be estimated not as it is, but as it would be if foreign investors were not allowed to buy Australian shares. (Apparently the “ignoring foreigners” approach only applies to the estimation of theta and not to any other WACC parameter).
27. Lally then sets out three criteria for ranking other methods for estimating theta:
- a) The estimation technique must produce an estimate of one, consistent with the “ignoring foreigners” approach;
 - b) The estimation technique must produce an estimate of one or close to one, consistent with the “conceptual goal posts test”; and
 - c) The estimation technique must produce a statistically precise estimate of whatever it is that it estimates.
28. Lally (2013 AER) reports, unsurprisingly, that no other approach satisfies either of his first two criteria – because no other approach produces an estimate close to one. Indeed he concludes that the only other approach that satisfies *any* of his criteria is the equity ownership approach which, although estimating the wrong thing, at least produces an estimate that is statistically precise.²⁰ However even that is disputed in Section 11 of this report.
29. In its ATCO Gas Draft Decision, the ERA proposes to estimate theta primarily on the basis of the equity ownership and tax statistic redemption rate approaches – based on new evidence provided by Lally (2013 AER). However, even if one accepts that the longstanding *value* interpretation of theta (and gamma) should be abandoned,²¹ Lally (2013 AER) does not recommend or support the estimation approach adopted by the ERA.
30. **Conclusion: In our view it would be an error to conclude that Lally (2013 AER) provides support for the approach adopted by the ERA.**

¹⁵ Lally (2013 AER), pp. 46-47. Note that Lally uses U rather than theta to represent the second component of gamma. The ERA uses the two terms interchangeably – ATCO Gas Draft Decision, p. 429, Paragraph 27.

¹⁶ AER Rate of Return Guideline Explanatory Statement, p. 159.

¹⁷ QCA Market Parameters Decision, p. 99.

¹⁸ To the extent that they should be relied upon at all.

¹⁹ Lally (2013 AER), p. 3.

²⁰ Lally (2013 AER), pp. 3-4.

²¹ As set out above, and throughout this report, we would consider such an abandonment of the value interpretation to be an error on economic grounds and to be inconsistent with the NGR.

2. The overall framework for estimating gamma

Gamma is the product of two components

31. In its ATCO Gas Draft Decision, the ERA confirms that it will maintain the approach to estimating gamma as the product of two components, consistent with the standard regulatory approach:

It follows that gamma can be represented by the formula set out in equation (3) below:

$$\gamma = F \times \theta.^{22}$$

The interpretation of the distribution rate

32. The ERA defines the first component, F , as the “distribution rate.”²³ Under the regulatory framework, the distribution rate is the proportion of corporate tax payments that are distributed as imputation credits. If a regulated company paid \$100 tax and distributed imputation credits with a face value of \$70, the distribution rate would be 70%.

The interpretation of theta

33. The second component of gamma is theta, θ .
34. Prior to August 2013, every Australian regulator in every determination had interpreted theta to be the value of distributed imputation credits, where “value” took its standard meaning of “worth” or “price.” Every regulator had always sought an empirical estimate of the market value of distributed credits. This approach was summarised by the Australian Competition Tribunal as follows:

The utilisation rate (or theta) represents the per-dollar value to a shareholder of a distributed imputation credit. As tax laws prevent the trade in imputation credits and there is no open market to observe their value, a value must be estimated.²⁴

35. The Tribunal also noted that it is necessary:

to allow for the fact that investors may not value cash dividends and franking credits to their full dollar values, or to the same dollar value for each. This is where θ (theta) comes in.²⁵

36. In terms of estimating the value of distributed credits, the Tribunal noted that:

One empirical method of estimating a firm’s utilisation ratio is the dividend drop-off method, which involves examining stock price changes on ex-dividend days. The amount by which stock prices change (on average) is assumed to reflect the value to investors of the dividend and franking credit. Regression analysis is then used to estimate the value of a dollar of cash dividend and the value of a dollar of imputation credits.²⁶

²² ERA ATCO Gas Draft Decision, p. 426, Paragraph 12.

²³ ERA ATCO Gas Draft Decision, p. 426, Paragraph 12.

²⁴ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 68.

²⁵ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 104.

²⁶ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 71.

and that:

There was no dispute among the parties that the Beggs and Skeels (2006) franking credit drop-off ratio estimate is an estimate of the franking credit utilisation rate used by the AER in estimating gamma.²⁷

37. In its August 2013 Draft Guideline, the AER proposed that it would no longer define theta to be the value of distributed imputation credits, but rather as the proportion of distributed credits that are redeemed by shareholders. This new interpretation of theta is referred to interchangeably as the “utilisation” or “redemption” rate.
38. In every one of its decisions to date, the ERA has adopted the standard *value* interpretation of theta. In its Draft Guideline and in its Final Guideline the ERA adopted the standard *value* interpretation of theta. However, in its ATCO Gas Draft Decision, the ERA now proposes to define theta in terms of the utilisation/redemption rate. In particular, the ERA defines theta to be:

the proportion of imputation credits distributed that are redeemed – the utilisation rate.²⁸

39. It is this material change in the ERA’s definition of theta, and the consequential material change in the ERA’s estimate of theta, that is the primary focus of this report.

Value and redemption are materially different

40. The ERA’s Guideline explains that there is a material difference between the face value of a credit that is redeemed and the value that the shareholder receives from redeeming that credit. This is because it is costly to obtain and redeem a credit. The ERA notes that redemption rates provide an indication of the number of credits that are redeemed, but no indication of the *value* of those credits to the investors who redeem them. This is because the redemption rate ignores the costs that investors must bear to obtain and redeem their credits:

The Authority considers that tax statistics, while not suffering methodology issues, are irrelevant for the direct estimation of theta because they fail to take into account the costs investors incur in obtaining franking credits. **These costs result in franking credits being valued at less than their face value.** In order to qualify for franking credits, investors must take on risk by purchasing and/or holding stocks. In addition, domestic investors forgo the benefits of international diversification and incur transaction costs by qualifying for franking credits.²⁹

41. The ERA clearly recognises the difference between the redemption rate and the value of credits to shareholders in the quote above. This also makes a material difference to the estimation of theta:
- a) The ERA adopts a theta estimate of 0.5 when estimating the value of distributed credits;³⁰ but
 - b) The ERA adopts a theta estimate of 0.7 when estimating the proportion of distributed credits that are redeemed.

²⁷ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 107.

²⁸ ERA ATCO Gas Draft Decision, p. 426, Paragraph 11.

²⁹ ERA Rate of Return Guideline Explanatory Statement, p. 213, Paragraph 932, emphasis added.

³⁰ This is the mid-point of the range set out by the ERA in its ATCO Gas Draft Decision, p. 215, Paragraph 968. In our view, a more reliable and appropriate estimate is 0.35. However, the point here is that the *value* estimate (however computed) is materially lower than the *redemption* estimate.

42. That is, the ERA recognises (correctly in our view) that the value of distributed credits to investors (as in the usual meaning of *worth* or *price*) is materially lower than the redemption rate.

Value, redemption and the regulatory framework

43. Next, we note that in the regulatory setting the return that is paid to shareholders is reduced according to the regulatory estimate of gamma. Consequently, if investors *value* a credit at 50 cents in the dollar,³¹ but the regulator sets gamma on the basis of a redemption rate of 70 cents in the dollar,³² the shareholders will be short-changed. That is, shareholders will have their allowed return reduced by 70 cents in respect of credits that are worth only 50 cents to them. In this case, shareholders will not receive a fair return commensurate with their risks.
44. Nevertheless, in its ATCO Gas Draft Decision, the ERA abandons its previous value interpretation of theta in favour of a redemption rate interpretation:

Therefore, the previous argument employed by the Authority in disregarding taxation statistics does not hold. In particular, the argument used by the Authority – that investors incur costs to obtain franking credits – is irrelevant for the calculation of the utilisation rate, as this is not required under the Lally interpretation of the gamma parameter. That is, the required gamma parameter under the Officer framework refers only to the proportion of personal taxation reduced by corporate taxation paid, and need not reflect any costs incurred to obtain the imputation credits.³³

45. In summary, the ERA is quite clear about the fact that, in relation to imputation credits, it intends to reduce the allowed return to shareholders by an amount that exceeds the value of those credits to the shareholders. This results in the shareholders being short-changed – by the ERA’s own figures. In our view, this is a clear error.
46. We address the difference between the value of imputation credits and the utilisation/redemption rate in more detail in Section 5 of this report.

Use of market-wide estimate

47. The ERA clearly states that it considers gamma to be a market-wide parameter such that the same value would be used for every firm and every industry:

It is accepted regulatory practice to adopt a market average, as this avoids regulatory gaming at the firm level, and sample issues at the industry level.³⁴

48. This is all consistent with the standard regulatory practice of using market-wide data to estimate both components of the gamma parameter, and we adopt that framework throughout this report.

³¹ According to the ERA’s own estimate, which we consider to be materially too high, as set out below.

³² According to the ERA’s ATCO Gas estimate.

³³ ERA ATCO Gas Draft Decision, p. 439, Paragraph 74.

³⁴ ERA ATCO Gas Draft Decision, p. 436.

3. The distribution rate

The ERA estimate is consistent with mainstream regulatory practice

49. In its ATCO Gas Draft Decision, the ERA proposes to adopt a distribution rate of 70%.³⁵ We note that, but for the QCA, there is universal regulatory endorsement of 0.7 as an appropriate estimate of the distribution rate. For example:
- a) The Australian Competition Tribunal uses 0.7;
 - b) The AER uses 0.7; and
 - c) IPART uses 0.7.

The Lally estimate is an estimate of the wrong thing

50. Having adopted the standard distribution rate estimate of 70%, the ERA provides some endorsement of an alternate estimate, due to Lally (2013 QCA, 2014 QCA), that has recently been adopted by the QCA. In particular, the ERA states that:

Lally has developed an alternative estimate of the distribution rate F based on the financial reports of the top 20 ASX200 firms, of 0.84. The Authority agrees with the QCA that this provides a robust estimate of the distribution rate, albeit for listed firms.³⁶

51. We do not agree that the QCA/Lally “sample of 20” approach provides a robust estimate of the distribution rate. In our view, the QCA/Lally approach does not provide an estimate of the distribution rate at all. Rather, the estimate obtained from the QCA/Lally approach is inconsistent with the QCA’s own definition of the distribution rate and it is inconsistent with the standard regulatory Post-tax Regulatory Model (**PTRM**).
52. Specifically, the QCA defines the distribution rate (in its recent Market Parameters Decision³⁷ at Equation (1); at p. 25; at Equation (34); and at p. 89) to be:

$$\frac{\text{Distributed credits}}{\text{Corporate tax paid}}$$

53. The PTRM also requires the distribution rate to be estimated according to this definition. In particular, the PTRM assumes that *every* dollar of corporate tax paid creates a dollar of imputation credits.

54. By contrast, Lally (2013, 2014) has estimated:

$$\frac{\text{Distributed credits}}{\text{Created credits}}$$

55. The denominators in the two formulas above differ materially for the 20 companies in the Lally sample. In particular, very large multinational companies, such as those in the Lally sample, pay material amounts of corporate tax to foreign governments (in relation to their overseas operations).

³⁵ ERA ATCO Gas Draft Decision, Paragraph 949.

³⁶ ERA ATCO Gas Draft Decision, Paragraph 949.

³⁷ QCA, 2014, Market Parameters Decision, *Cost of capital: market parameters*, August.

These corporate tax payments do not create imputation credits, but are available for distribution to shareholders. For the Lally sample, only 56% of corporate tax payments generate imputation credits.³⁸

56. In summary, the regulatory framework and PTRM require an estimate of $\frac{\text{Distributed credits}}{\text{Corporate tax paid}}$ whereas Lally has estimated $\frac{\text{Distributed credits}}{\text{Created credits}}$ for a sample of firms where the difference between the two quantities is substantial. In our view, it would be an error to use an estimate of some ratio Y when the regulatory framework and PTRM require an estimate of a different ratio X – particularly in the case where X and Y are materially different for the sample in question.
57. However, since the ERA ultimately decides to have no regard to the QCA/Lally approach to the distribution rate, we do not consider the issue further in this report.
58. We also note that two days after his report to the QCA recommending an 85% distribution rate on the basis of his sample-of-20 estimate, Lally (213 AER) advised the AER that a 70% distribution rate was within the reasonable range. The AER interpreted Lally's advice to them as supporting its 70% estimate.³⁹

The reliability of the 0.7 estimate

59. The ERA raises some questions about the reliability of the Australian Tax Office data that forms the basis of the standard 0.7 estimate of the distribution rate. Specifically, the ERA cites potential issues identified in the NERA (2013) report, which the AER currently uses as the basis for its 0.7 estimate. There are three issues identified in that report:
- a) The empirical estimate of 0.7 may be somewhat overstated because:
 - i) The data set effectively assumes that the franking account balances of companies that become bankrupt during the year are distributed, when they are not; and
 - ii) Credits that flow from one company to another via a trust are effectively double counted;⁴⁰
 - b) It is possible that the estimate in a given year might be affected by firms failing to report their franking account balances, but only to the extent that the non-reporting firms happened to have systematic increases or decreases in their franking account balances in that year;
 - c) There is a material change in the distribution rate for the last year of the NERA sample because that estimate is a preliminary one that has not yet been finalised by the ATO.⁴¹
60. In our view, none of these data issues are particularly concerning:
- a) The first issue is likely to be immaterial and results in a conservative *upward* bias in the distribution rate in any event;

³⁸ Source: Morningstar data, SFG calculations.

³⁹ AER (2013), Rate of Return Guideline – Explanatory Statement, p. 165.

⁴⁰ NERA (2013), pp. 5-6.

⁴¹ NERA (2013), pp. 8-9.

- b) The second issue is also likely to be immaterial in any given year (since non-reporting firms tend to be very small) and will certainly have no material effect on the cumulative distribution rate computed over many years; and
 - c) To the extent that there are any concerns about the preliminary data in the final year of the sample, that year can be omitted. The inclusion or removal of that year from the sample has no material effect on the cumulative estimate of 0.7.
61. As noted above, the AER has recently relied upon the NERA (2013) study in affirming its use of the standard 0.7 estimate. In relation to the quality of the data and the estimation techniques applied to it, the AER has concluded that:

We consider this is a reasonable approach to estimate the payout ratio. In particular, we consider it is simple, fit for purpose, transparent, replicable and based on reliable and publicly accessible data sets.⁴²

Conclusion

62. For the reasons set out above, our view is that the evidence that is currently available supports a distribution rate estimate of 70%.

⁴² AER Draft Rate of Return Guideline – Explanatory Statement, p. 236.

4. The evolution of the ERA's interpretation of theta

Prior to August 2013

63. Prior to August 2013, every Australian regulator in every determination had interpreted gamma (and consequently theta) in terms of the value of imputation credits, where “value” took its standard meaning of “worth” or “price.” For theta, regulators had always sought an empirical estimate of the market value of distributed credits, and that approach has also been endorsed by the Tribunal.⁴³

The AER Draft Guideline: August 2013

64. In its August 2013 Draft Guideline, the AER proposed that it would no longer estimate gamma in terms of the value of imputation credits, but rather in terms of the utilisation/redemption of imputation credits. In particular, the AER proposed that in relation to theta it would no longer seek an empirical estimate of the *value* (as in worth or price) of distributed credits, but would instead seek an estimate of the proportion of distributed credits that are redeemed.

65. In relation to the conceptual definition of gamma, the AER's Draft Guideline concluded that:

█ [gamma] is the proportion of company tax paid that investors redeem.⁴⁴

and elsewhere that gamma is:

█ the expected proportion of company tax which is returned to the representative investor through utilisation of imputation credits.⁴⁵

and further that:

█ the value of imputation credits is an estimate of the expected proportion of company tax which is returned to the representative investor through utilisation of imputation credits.⁴⁶

66. That is, in its Draft Guideline the AER proposed that gamma represents the proportion of company tax that is redeemed via imputation credits. Consequently, theta must be estimated as the redemption rate of distributed credits. By contrast, the previous regulatory approach was to seek an estimate of the *value* of distributed credits, rather than the proportion of them that were redeemed. This led the AER to conclude that “market value estimates” were not “conceptually appropriate.”⁴⁷
67. A key component of the AER's “conceptual re-definition” of gamma is the notion of a representative investor, which the AER's Draft Guideline defines as follows:

█ The representative investor is a weighted average of investors in the defined market. Specifically, investors are weighted by their value weight (equity ownership) and their risk aversion.⁴⁸

⁴³ See the discussion of this issue in Paragraph 36 above.

⁴⁴ AER Draft Rate of Return Guideline Explanatory Statement, p. 234.

⁴⁵ AER Draft Rate of Return Guideline Explanatory Statement, p. 118.

⁴⁶ AER Draft Rate of Return Guideline Explanatory Statement, p. 124.

⁴⁷ AER Draft Rate of Return Guideline Explanatory Statement, p. 134.

⁴⁸ AER Draft Rate of Return Guideline Explanatory Statement, pp. 119-120.

68. This definition of the representative investor, and the fact that the AER considered that market value studies were not “conceptually appropriate,” led the AER to estimate theta on the basis of its equity ownership estimate and Tax Office redemption rates.

The ERA Guideline: December 2013

69. The ERA published its Rate of Return Guideline in December 2013, approximately three and a half months after the publication of the AER’s Draft Guideline. In its Guideline, the ERA concluded that the AER’s conceptual re-definition of gamma was wrong and that the long-standing market value interpretation of gamma was correct.

70. For example, the ERA’s Guideline states that:

The Authority considers that it is appropriate to estimate gamma as the product of two components: (i) the payout ratio (F); and (ii) **the market value of imputation credits (θ)**.⁴⁹

and notes that:

The Australian Completion Tribunal (the Tribunal) has recently adopted a market value of imputation credits.⁵⁰

71. The ERA ultimately concludes that:

The Authority considers that dividend drop-off studies offer a key advantage in that they calculate an observed **market value for franking credits**.⁵¹

72. The Guideline also notes that the ERA has rejected:

The AER’s position of using taxation statistics to inform the value of theta.⁵²

73. That is, the ERA considered the AER’s conceptual re-definition of gamma and rejected it.

74. The ERA then went on to conclude that theta should be estimated using the dividend drop-off method:

The Authority considers that dividend drop-off studies offer a key advantage in that they calculate an observed market value for franking credits. The Authority therefore considers that the dividend drop-off methodology is the most appropriate methodology for estimating theta.⁵³

and it rejected the equity ownership and tax statistic redemption rate methods concluding that:

⁴⁹ ERA Rate of Return Guideline Explanatory Statement, p. 209, Paragraph 916, emphasis added.

⁵⁰ ERA Rate of Return Guideline Explanatory Statement, p. 209, Paragraph 917.

⁵¹ ERA Rate of Return Guideline Explanatory Statement, p. 209, Paragraph 920, emphasis added.

⁵² ERA Rate of Return Guideline Explanatory Statement, p. 213, Paragraph 933.

⁵³ ERA Rate of Return Guideline Explanatory Statement, p. 209, Paragraph 920.

The Authority considers that tax statistics...are irrelevant for the direct estimation of theta.⁵⁴

and that the AER's equity ownership approach is not even one of the "three methodologies [that] exist for estimating theta."⁵⁵

75. It is hard to imagine a more comprehensive rejection of the approach to gamma that was set out in the AER's Draft Guideline some three and a half months earlier.

In our view, the approach set out in the Guideline was correct in that:

- a) It interpreted gamma as the product of two components – the distribution rate and the value of distributed credits, theta;
- b) It used relevant market evidence to estimate the distribution rate; and
- c) It interpreted theta to be the value (as in "worth") of imputation credits, and sought to estimate theta on this basis using dividend drop-off analysis.

In our view, the only error made in the ERA's Guideline was its reliance on its own dividend drop-off analysis, which we consider to be unreliable.

The ATCO Draft Decision: October 2014

76. In its ATCO Gas Draft Decision, the ERA announced that it has now abandoned its "value" interpretation of gamma in favour of the AER's redemption rate approach.⁵⁶ Whereas the ERA's Guideline used dividend drop-off analysis to estimate theta and rejected the equity ownership approach and tax statistic redemption rates entirely, the reverse is true in the ATCO Gas Draft Decision.

77. In particular, the ATCO Gas Draft Decision directly defines theta in terms of a particular estimation method, stating that theta is:

the proportion of imputation credits distributed that are redeemed – the utilisation rate (θ) .⁵⁷

78. The ATCO Gas Draft Decision also precisely follows the AER's Draft Guideline in its references to a representative investor:

The benefit arising from imputation credits can be interpreted as the proportion of franking credits received that are then redeemed by the representative investor.⁵⁸

79. Indeed the ATCO Gas Draft Decision adopts language that is almost identical to the AER's Draft Guideline from August 2013:

⁵⁴ ERA Rate of Return Guideline Explanatory Statement, p. 213, Paragraph 932.

⁵⁵ ERA Rate of Return Guideline Explanatory Statement, p. 209, Paragraph 919.

⁵⁶ ERA ATCO Gas Draft Decision, beginning at p. 207.

⁵⁷ ERA ATCO Gas Draft Decision, p. 426, Paragraph 11.

⁵⁸ ERA ATCO Gas Draft Decision, p. 201, Paragraph 942.

Therefore θ 'is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion'.⁵⁹

The basis for the ERA's reversal

80. The ATCO Gas Draft Decision sets out the "new evidence"⁶⁰ that the ERA has considered and notes that:

That new evidence relates principally to two reports by Lally in late 2013:

- the first, for the Australian Energy Regulator (AER), explores the theoretical underpinnings of gamma, and evaluates the appropriateness of various methodologies for estimating the utilisation rate parameter, θ ; and
- the second, for the Queensland Competition Authority (QCA), provides new estimates of the distribution rate parameter, F .⁶¹

81. The ATCO Gas Draft Decision rejects the Lally estimate of the distribution rate that has been adopted by the QCA, so it seems that the ERA's reversal in relation to gamma is based on the Lally (2013 AER) report to the AER. In particular, the ERA attributes its new conceptual definition of theta to the Lally (2013 AER) report, rejecting its own previous "value" interpretation of theta and quoting Lally as follows:

Therefore θ 'is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion'.⁶²

82. In its ATCO Gas Draft Decision, the ERA does not itemise any specific errors in relation to gamma in its Guideline. Rather, the ERA simply re-defines theta from being a market value to being the redemption rate:

The equation set out in paragraph 926 [$\gamma = F \times \theta$] interprets the value of franking credits in the context of the Officer CAPM framework. The benefit arising from imputation credits can be interpreted as the proportion of franking credits received that are then redeemed by the representative investor. Within the context of the Officer model, this 'value' is not a market value, but instead a 'numerical value' arising out of the degree to which imputation credits are utilised.⁶³

83. However, in its August 2013 Draft Guideline, the AER had already rejected *its* previous "value" interpretation and concluded that theta should be estimated on the basis of:

A weighted average investor by summing across all investors [where] the weightings... should account for...the proportion of equity in the market that they own and their risk aversion.⁶⁴

⁵⁹ ERA ATCO Gas Draft Decision, p. 210, Paragraph 943.

⁶⁰ ERA ATCO Gas Draft Decision, p. 428, Paragraph 20.

⁶¹ ERA ATCO Gas Draft Decision, p. 428, Paragraph 20.

⁶² ERA ATCO Gas Draft Decision, p. 210, Paragraph 943.

⁶³ ERA ATCO Gas Draft Decision, p. 210, Paragraph 942.

⁶⁴ ERA ATCO Gas Draft Decision, p. 210, Paragraph 943.

84. That is, the Lally (2013 AER) report contains nothing about the conceptual definition of theta that had not already been set out in the AER's Draft Guideline in August 2013.
85. Moreover, as set out in Section 10 below, Lally (2013 AER) does *not* endorse the redemption rate interpretation of theta and advises *against* the adoption of the equity ownership and tax statistic redemption rate estimates of theta.
86. In our view, the ERA has committed two errors here:
 - a) It has misinterpreted the advice provided in the Lally (2013) report to the AER. The ERA interprets that report as supporting its conceptual definition of theta and its use of the equity ownership approach and tax statistic redemption rates to estimate theta. However, as set out in detail in Section 10 below, Lally (2013 AER) provides no such support. That is the ERA has erred in its interpretation of the Lally (2013 AER) report; and
 - b) Irrespective of what might be contained in the Lally (2013) report to the AER, the regulatory task requires theta to be estimated as the *value* of distributed credits – as explained in Sections 2 and 5 of this report. The ERA now proposes to perform a different task and has erred in that respect.

New material in the Lally (2013) report for the AER

87. Lally (2013 AER) was commissioned by the AER to provide a critical review of the approach that was proposed in its Draft Guideline in August 2013. The Terms of Reference required the consultant to:

Provide a critical review of the AER's approach to setting the value of imputation credits in the draft guideline, as set out in the explanatory statement. In your review, please provide a critical review of the reasonableness of the AER's draft guideline position on:

- a. The conceptual framework
- b. The sources of evidence, including the analysis of their strengths and weaknesses
- c. The approach to drawing on the body of evidence, as opposed to seeking definitive single sources of evidence.⁶⁵

88. Consistent with these terms of reference, Lally (2013 AER) opines on the material that had already been set out in the AER's August 2013 Draft Guideline, which the ERA had already considered and rejected in its December 2013 Guideline. Lally (2013 AER) also rejects the AER's proposed approach – in favour of his longstanding preference for setting theta to one on the basis of his own theoretical reasoning. As explained in Section 10 below, it would be an error to interpret Lally (2013 AER) as providing support for the AER's approach of using the equity ownership approach and tax statistic redemption rates to estimate theta.
89. The only new material introduced in the Lally (2013) report for the AER what Lally calls “a test for reasonableness”⁶⁶ and which the ERA now refers to as a “conceptual goal posts test.”⁶⁷ Our view is that this “test” has no foundation whatsoever, such that it would be an error to rely on it for any purpose. The reasons for this conclusion are set out in Section 0 below.

⁶⁵ Lally (2013 AER), p. 58.

⁶⁶ Lally (2013 AER), p. 38.

⁶⁷ ERA ATCO Gas Draft Decision, p. 210, Paragraph 448.

Weight applied to dividend drop-off analysis

90. In its Guideline, the ERA proposed to estimate theta entirely on the basis of dividend drop-off analyses. In its ATCO Gas Draft Decision, the ERA states that it will now have no regard at all to dividend drop-off analyses:

Given that this market value is irrelevant to the required utilisation rate, the Authority has **disregarded them** for informing the required utilisation rate. The Authority notes this is a significant departure from the view held in the Rate of Return Guidelines, with dividend drop off studies being the sole evidence to inform the required utilisation rate.⁶⁸

91. The reason the ERA now disregards dividend drop-off analyses on the basis that it has formed the view that:
- a) Dividend drop-off analyses estimate the value of distributed imputation credits; and
 - b) The ERA no longer considers that theta represents the value of imputation credits, but rather that theta represents the proportion of distributed credits that are redeemed.
92. In our view, if theta is characterised as the proportion of distributed credits that are redeemed, dividend drop-off analyses are irrelevant. We agree with the ERA on this point. Dividend drop-off analyses estimate the value of distributed credits, which is a materially different concept to the proportion of them that are redeemed.
93. Having concluded that dividend drop-off analyses are now irrelevant on conceptual grounds, the ERA goes on to raise a series of econometric issues that it says affect the reliability of dividend drop-off estimates. This is curious for two reasons:
- a) The ERA has already concluded that dividend drop-off analyses are now irrelevant as they estimate the wrong thing (value instead of redemption), in which case there is no reason at all for the ERA to have any regard for how reliably drop-off analyses estimate the value of distributed credits; and
 - b) Every one of the econometric issues now raised by the ERA was also raised in the AER's Draft Guideline in August 2013 – three and a half months before the ERA decided to place 100% reliance on dividend drop-off analyses when estimating theta.
94. We note that it would be a clear error to conclude that theta should be interpreted as a redemption rate because of econometric issues involved in estimating the value of distributed credits.

The balance of this report

95. In our view:
- a) Theta is properly interpreted as the value of distributed imputation credits, in which case dividend drop-off analysis is an entirely appropriate method to use to inform the estimate of theta; and
 - b) The econometric “problems” that the ERA has recently become concerned about are overstated and (collectively) do not support the rejection of dividend drop-off evidence.

⁶⁸ ERA ATCO Gas Draft Decision, p. 447, Paragraph 105, emphasis added.

96. We deal with the conceptual issues relating to the definition and interpretation of theta in Sections 5 and 6 below. Our conclusion is that theta is properly interpreted as the value of distributed imputation credits and that theta should not be interpreted as the redemption rate. It then follows that theta should be estimated using approaches that seek to estimate the value of distributed credits, such as dividend drop-off analysis.
97. In Section 8, we then address the various empirical issues in relation to dividend drop-off analysis that the ERA has now raised.
98. The balance of the report then considers the remaining aspects of the ATCO Gas Draft Decision insofar as it relates to gamma, including the “conceptual goalposts test” and the advice from Lally (2013 AER) to the AER – on which the ERA now relies.

5. The conceptual definition of theta

The ERA approach to theta

99. As set out above, in its ATCO Gas Draft Decision the ERA proposes to replace its long-standing *value* interpretation of theta with a utilisation/redemption rate interpretation. In particular, the ERA now defines theta to be:

█ the proportion of imputation credits distributed that are redeemed – the utilisation rate.⁶⁹

100. That is, the ERA has decided that the appropriate task is not to estimate the *value* of distributed credits at all, but that the appropriate task is to estimate the proportion of distributed credits that investors are able to redeem – the redemption rate.

101. The ERA considers two methods for estimating the redemption rate: the equity ownership approach and tax statistics studies. The equity ownership approach estimates the proportion of Australian shares that are owned by resident investors, and then assumes that all imputation credits distributed to those resident investors will be redeemed. The tax statistic studies use ATO data to estimate the ratio of (a) the quantity of imputation credits redeemed in a given year, to (b) the quantity of imputation credits distributed in that year. Both of these methods are designed to estimate the redemption rate. The ERA concludes that the evidence from these two approaches supports a redemption rate of 70% – that 70% of the credits that are distributed end up being redeemed by resident investors.⁷⁰

There is a material difference between the *redemption rate* and the *value* of distributed imputation credits

102. As set out in Section 2 above, there is a material difference between the redemption rate (the proportion of credits that are redeemed) and the value of credits to shareholders. Redemption rate studies and market value studies consistently produce materially different estimates – because they seek to estimate materially different things. For example:

- a) The ERA adopts a theta estimate of 0.5 when estimating the value of distributed credits;⁷¹ but
- b) The ERA adopts a theta estimate of 0.7 when estimating the proportion of distributed credits that are redeemed.

103. That is, the ERA recognises (correctly in our view) that the value of distributed credits to investors (as in the usual meaning of *worth* or *price*) is materially lower than the redemption rate.

Value or redemption rates?

The regulatory framework requires a value interpretation

104. In the regulatory setting the return that is paid to shareholders is reduced according to the regulatory estimate of gamma. Consequently, if investors *value* a credit at 50 cents in the dollar,⁷² but the

⁶⁹ ERA ATCO Gas Draft Decision, p. 426, Paragraph 11.

⁷⁰ ERA ATCO Gas Draft Decision, p. 210, Paragraph 944.

⁷¹ This is the mid-point of the range set out by the ERA in its ATCO Gas Draft Decision, p. 215, Paragraph 968. In our view, a more reliable and appropriate estimate is 0.35. However, the point here is that the *value* estimate (however computed) is materially lower than the *redemption* estimate.

⁷² According to the ERA's own estimate, which we consider to be materially too high, as set out below.

regulator sets gamma on the basis of a redemption rate of 70 cents in the dollar,⁷³ the shareholders will be short-changed. That is, shareholders will have their allowed return reduced by 70 cents in respect of credits that are worth only 50 cents to them. In this case, shareholders will not receive a fair return commensurate with their risks.

105. Appendix 1 to this report explains in detail how the estimate of gamma affects the allowed return to shareholders through the regulatory process and post-tax revenue model.

The National Gas Rules require a value interpretation

106. Prior to the latest rule change, the Rules stated that:

■ γ is the assumed utilisation of imputation credits.⁷⁴

107. At the time of the latest Rule change, all regulators (including the ERA) had always interpreted this provision to require an estimate of the *value* of imputation credits, where “value” was interpreted as “worth” or “price” or “value to the market”. In this context, the AEMC amended the Rules to now state that:

■ γ is the value of imputation credits.⁷⁵

108. In our view, the clear intention of the AEMC was to clarify that the prevailing regulatory practice should be continued. That practice is to estimate the *value* (as in “worth”) of imputation credits. It seems highly unlikely that the AEMC could have had any other intention given that the wording in the new Rule accords precisely with the standard practice of all regulators at the time the Rule change was made.

109. Moreover, there are two reasons why it would seem to be quite fanciful to suggest that the intention of the AEMC was to *change* the interpretation of gamma *away* from the standard long-standing practice of all regulators at the time:

- a) The AEMC inserted the word “value,” the ordinary meaning of which corresponds precisely to the practice of all regulators at the time of the change; and
- b) The AEMC did not provide a detailed explanation about why such a change was necessary in its Final Determination. This is consistent with a mere tidying up of a Rule to properly reflect the existing practice, but inconsistent with an intention to fundamentally change the Rules away from the adopted practice.

110. In its ATCO Gas Draft Decision, the ERA seems to imply that the Rule which states that “ γ is the value of imputation credits” should not be interpreted as affirming the existing regulatory practice and that the term “value” in the Rules should not be interpreted as taking its common meaning of “worth” or “price,” but rather:

■ this ‘value’ is not a market value, but instead a ‘numerical value.’⁷⁶

⁷³ According to the ERA’s ATCO Gas estimate.

⁷⁴ NER cls. 6.5.3, 6A.6.4 (as at version 52).

⁷⁵ NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14).

⁷⁶ ERA ATCO Gas Draft Decision, p. 210, Paragraph 942.

111. That is, the Draft Decision implies that “value” should be interpreted as “the number used for” where “the number used for” is determined on the basis of utilisation/redemption rates, rather than approaches that seek to estimate value in the standard sense of the worth or price of imputation credits. In our view, this is clearly inconsistent with the apparent intention of the AEMC given the context of the Rule change set out above. Moreover, it is also inconsistent with economic and regulatory principles, as set out below.
112. In our view, the Rule which states that “ γ is the value of imputation credits”⁷⁷ should be interpreted as requiring an estimate of the value of imputation credits in the ordinary sense of the word “value” meaning “worth” or “price.” Our view is that it would be an error to interpret “value” otherwise.

The ERA’s own equation requires a value interpretation

113. In its ATCO Gas Draft Decision, the ERA sets out the following equation:⁷⁸

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + E[\hat{R}]}$$

114. The ERA states that this equation shows that the firm’s stock price will be equal to the present value of the after-tax distribution received during the year, the present value of the imputation credit received during the year, and the present value of the stock price at the end of the year:

...the sum of the expected [pre-tax] cash flows to equity holders (Y_1), less the expected company taxation over the year (Tax_1), plus **any value derived** from the distribution of franking credits. The latter term is defined as $U \times IC_1$, where IC_1 is the distributed imputation credits.⁷⁹

115. We agree entirely with this characterisation – the stock price will reflect the *value* that investors attribute to imputation credits. The relevant task is to determine the extent to which the distributed credits are reflected in the stock price. For example, suppose there is a dollar of imputation credits to be distributed so that $IC_1=1$. Also suppose that 70% of distributed credits are redeemed and that the distributed credits are *valued* at 50 cents per dollar, consistent with the ERA’s estimates. Clearly, the stock price will reflect the *value* of the credits, not the proportion of them that might be redeemed. That is, investors will not increase the stock price by 70 cents in relation to a credit that is worth only 50 cents to them.
116. The ERA’s own equation above clearly demonstrates the fallacy of the redemption rate approach. That approach implies (using the ERA’s own figures) that investors would be prepared to pay (via the stock price) 70 cents for a credit they value at 50 cents. In our view, it would be an error to rely on an approach that has such an implausible implication.

Reasons for the difference between the redemption rate and the value of distributed credits

117. The ERA’s Guideline explains why there is a material difference between the face value of a credit that is redeemed and the *value* that the shareholder receives from redeeming that credit. This is because it is costly to obtain and redeem a credit. The ERA notes that redemption rates provide an indication of the number of credits that are redeemed, but no indication of the *value* of those credits

⁷⁷ NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14).

⁷⁸ ERA ATCO Gas Draft Decision, Equation (6), p. 431, Paragraph 34.

⁷⁹ ERA ATCO Gas Draft Decision, pp. 430-431, Paragraph 33, emphasis added.

to the investors who redeem them. This is because the redemption rate ignores the costs that investors must bear to obtain and redeem their credits:

The Authority considers that tax statistics, while not suffering methodology issues, are irrelevant for the direct estimation of theta because they fail to take into account the costs investors incur in obtaining franking credits. **These costs result in franking credits being valued at less than their face value.** In order to qualify for franking credits, investors must take on risk by purchasing and/or holding stocks. In addition, domestic investors forgo the benefits of international diversification and incur transaction costs by qualifying for franking credits.⁸⁰

118. We note that there are a number of reasons why the value of distributed imputation credits that is reflected in share prices may be less than the face value of those credits, including:

- a) Some of the credits that are distributed to shareholders are never redeemed. There are, in turn, a number of reasons why a distributed credit might not be redeemed, including:
 - i) Credits distributed to non-resident investors cannot be redeemed under the dividend imputation legislation;
 - ii) Credits distributed to resident investors who sell the shares within 45 days of their purchase cannot be redeemed;⁸¹ and
 - iii) Some credits distributed to resident investors are not redeemed because some investors fail to keep the required records and simply do not claim them. For example, Handley and Maheswaran (2008) report that, on average 8% of the credits distributed to resident individuals are never redeemed.⁸²
- b) There is a time delay in obtaining any benefit from imputation credits. Whereas dividends are available to the investor as soon as they are paid, the imputation credits that are attached to that dividend only have value after the investor's end-of-year tax return is filed and processed. This time delay can be up to two years for a credit that is distributed directly from a company to an individual shareholder. The time delay can be even greater when credits are distributed through other companies or trusts;
- c) There are administrative costs involved in the redemption of imputation credits. The investor must maintain records of all credits that are received and redeem them by preparing the necessary schedules for the investor's tax return. This involves time and expenses such as accountant fees. By contrast, when an investor buys shares, they provide bank account details and all dividends are automatically transferred into that account without any action required of the investor. That is, it is more costly to convert imputation credits into value;
- d) Imputation credits are taxed as income in the same way that dividends are taxed. When an investor receives a franked dividend, their taxable income is increased by the amount of the dividend plus the face value of the credit. Both components are then taxed at the investor's marginal tax rate; and

⁸⁰ ERA Rate of Return Guideline Explanatory Statement, p. 213, Paragraph 932, emphasis added.

⁸¹ The so-called "45 day Rule" took effect in July 1997. It prevents resident investors from redeeming imputation credits unless they own the shares for 45 days around the payment of the relevant dividend.

⁸² This figure includes credits that are not redeemed due to the 45-day Rule and, for the pre-2000 period, credits that are not redeemed because the shareholder has taxable income below the tax-free threshold. The latter is likely to be immaterial as it is unlikely that a material proportion of shares are owned by residents whose income is below the tax-free threshold.

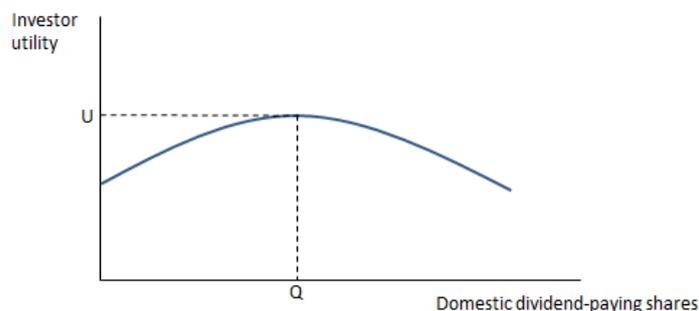
- e) If dividend imputation leads resident investors to hold more domestic dividend-paying shares than they otherwise would (because they are attracted by the possibility of receiving imputation credits) their portfolios will become more concentrated and the resulting loss of diversification comes at a cost. A rational investor would continue to increase the concentration of their portfolio until the marginal benefit of the last imputation credit equalled the marginal cost of losing diversification. That is, the last imputation credit would be of no net benefit.⁸³

119. This last point about portfolio diversification is particularly important and has been recognised by Lally (2013 AER) and the ERA itself:

The ERA (2013, page 5) goes even further and asserts that even domestic investors would value franking credits less than their face value because they must incur risk, pay transaction costs, and sacrifice international diversification opportunities by purchasing Australian stocks with imputation credits.⁸⁴

120. To explore the portfolio diversification point in more detail, first consider Figure 1 below in a market with no dividend imputation. That figure shows the utility⁸⁵ of a particular investor as a function of the proportion of their wealth that is invested in domestic dividend-paying shares (as opposed to domestic shares that do not pay dividends, international shares, or other assets such as real property, term deposits, bank balances and so on). Figure 1 shows that the optimal investment in domestic dividend-paying shares is at Q, because this maximises the investor's utility at U.

Figure 1
Optimal portfolio holding of domestic dividend-paying shares



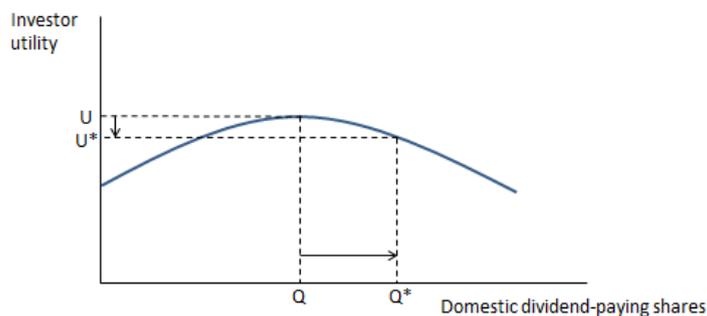
121. If the investor moved away from their optimal investment in domestic dividend-paying shares (Point Q), the result would be a loss of utility, in which case the investor would be worse off. This is illustrated in Figure 2 below, which shows that an over-investment in domestic dividend-paying shares (at Q*) leads to a reduction in utility (U*).

⁸³ This effect is explained in more detail in Paul Lajbcygier and Simon Wheatley (2012), “Imputation credits and equity returns,” *The Economic Record*, 88, 283, 476-494.

⁸⁴ Lally (2013 AER), p. 16. The reference to ERA (2013) appears to be a reference to Vo, Gellard and Mero (2013).

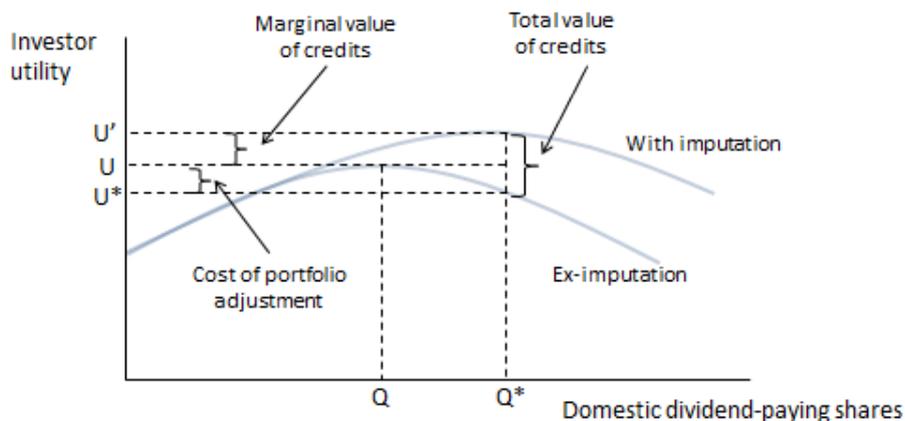
⁸⁵ Utility is the economic concept of well-being or satisfaction. The basis of most economic models is the notion that individuals will act to maximise their utility.

Figure 2
Sub-optimal portfolio holding of domestic dividend-paying shares



122. Now suppose that imputation is introduced into this market, as illustrated in Figure 3 below. The domestic investor is likely to alter their portfolio by increasing their investment in domestic dividend-paying shares. This causes the investor to move away from their optimal portfolio, which comes at a cost – reducing utility from U to U^* . However, that cost is more than compensated by the value that the investor receives from imputation credits. When the value of imputation credits is included, the curve shifts and the optimal investment in domestic dividend-paying shares is at Q^* , producing utility of U' . This optimum occurs at the point where the marginal benefit of the next imputation credit is exactly offset by the marginal cost of further concentration of the investor’s portfolio. That is, the last dollar of imputation credits that the investor receives has a negligible marginal benefit.

Figure 3
Australian government bond yields and the proportion of domestic ownership



123. Figure 3 also shows clearly that the net benefit that this investor receives from imputation credits is to increase utility from U to U' . This net benefit is obtained by subtracting the cost of portfolio adjustment from the total value of the credits. In summary, the value that the investor obtains from imputation credits comes at a cost – the cost of concentrating the investor’s portfolio into domestic dividend-paying shares.

Conclusions on the conceptual definition of theta

124. For the reasons set out above, our view is that the regulatory framework requires theta to be estimated in terms of the long-standing *value* interpretation rather than as a redemption rate.

125. The Australian Competition Tribunal has held that redemption rates cannot be used to estimate the value of credits. In particular, the Tribunal held that redemption rates provide no more than an

upper bound check on estimates of the value of imputation credits obtained from the analysis of market prices, and that the AER was wrong to have interpreted such an estimate as a point estimate rather than as an upper bound:

The AER accepted that utilisation rates derived from tax statistics provide an upper bound on possible values of theta. Setting aside the manner in which the AER derived a value from the tax statistics study, it correctly considered that information from a tax statistics study was relevant. However, 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.⁸⁶

126. That is, if it is correct to interpret gamma in terms of the value of imputation credits (which it is, for the reasons set out above) the ERA's approach of relying on redemption rates would be in error – because redemption rates do not measure value.
127. The ATCO Gas Draft Decision also refers to certain other references to utilisation rates and redemption rates in various academic papers and regulatory submissions. These are not as directly relevant as the issues set out above, but are addressed in Appendix 2 to this report.

⁸⁶ Application by Energex Limited (No 2) [2010] ACompT 7 (13 October 2010), Paragraph 91.

6. Theoretical justification for the redemption rate interpretation

Overview

128. The ERA relies heavily on theoretical support for its new interpretation of gamma, stating that:

Lally considers that the correct interpretation of U can be found in Lally and van Zijl, in which it is shown that ' U is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion'⁸⁷

129. However, the ERA's definition of theta in terms of the proportion of credits that are redeemed is not consistent with *any* theoretical model. The theoretical models that involve "a complex weighted average over all investors" only apply to two special cases:

- a) The case where Australia is perfectly segmented from world capital markets; and
- b) The case where Australia is perfectly integrated into world capital markets.

130. Lally (2013 AER) advocates the application of the model to the former setting, recommending an approach that involves:

ignoring foreigners,⁸⁸

consistent with his long-standing view that:

Since national capital markets are assumed to be segregated, it would be inconsistent to recognise foreigners. Accordingly they are omitted from consideration.⁸⁹

131. By contrast, the ERA seeks to use the Lally model to justify its use of a redemption rate that reflects the extent to which Australian equities are owned by foreign investors. Lally has advised the AER and the QCA that his model does not apply in such a setting – there is no market clearing condition and one cannot solve for any equilibrium pricing results. As explained in detail below, there is no theoretical framework that supports the ERA's proposed approach.

The ERA's definition of the domestic capital market is not supported by any theoretical model

132. The ERA begins with its "definition of the domestic capital market"⁹⁰ which considers foreign investors to the extent that they invest in Australian equities:

the Authority's position is that the boundary should account for the full domestic data set, including any direct influences on the cost of capital for Australian domiciled firms. This may include the influence of international investors in Australian markets for equity.⁹¹

⁸⁷ ERA ATCO Gas Draft Decision, pp. 431-432, Paragraph 37.

⁸⁸ Lally (2013 AER), p. 3.

⁸⁹ Lally (2004, pp. 44-5).

⁹⁰ ERA ATCO Gas Draft Decision, p. 210.

⁹¹ ERA ATCO Gas Draft Decision, p. 210, Paragraph 940.

133. Lally (2013 AER) specifically disagrees with that approach, stating that it:

believes that all CAPMs start by defining the “market”, from which the “relevant” set of investors follows. Thus, if the market is Australian equities, then the relevant set of investors includes foreigners to the extent they invest in Australian equities. I do not agree.⁹²

134. Lally (2013 AER) goes on to confirm that the “complex weighted average of all investors” framework only applies in the special cases of perfect segmentation and perfect integration:

CAPMs do not start with a definition of the “market” but a set of assumptions about investor behaviour and institutional features, and the particular assumptions imply which market portfolio and set of investors are relevant. Some versions of the CAPM (such as Officer, 1994) **assume complete segmentation** of equity markets, in which case the relevant investors are Australian residents and the relevant market portfolio is all Australian risky assets (assets that can be purchased by Australian residents in a world in which there is complete segmentation of risky asset markets). Other versions of the CAPM **assume complete integration** (such as Solnik, 1974), in which case the relevant investors are those throughout the world and the relevant market portfolio would be all risky assets throughout the world.⁹³

135. That is, some theoretical models apply to the case of complete integration and some apply to the case of complete segmentation – but *none* apply to the ERA’s “definition of the domestic capital market.”

136. Lally (2013 AER) concludes that:

The AER (2013, page 237) also defines the utilisation rate as the proportion of distributed credits that investors redeem. This is not correct.⁹⁴

137. In summary, the ERA has materially changed its framework for gamma, primarily on the basis of Lally (2013 AER). However, that report actually recommends against the framework and approach that the ERA has adopted.

138. The remainder of this section of the report explains in more detail why the ERA’s framework and approach is actually inconsistent with the theoretical models on which the ERA says it is based.

A closed system is required

139. Lally (2013 AER) notes that there is a special case in which the proportion of imputation credits that are redeemed would be an appropriate estimate of the value of imputation credits that is reflected in the share price. He considers a class of models that includes Monkhouse (1993) and Lally and van Zijl (2003). These models all consider a setting in which there is a single market in which the m investors jointly own all of the n assets. In these models there is a closed system – there are no assets outside the market that are available to the m investors inside the market and there are no investors outside the market who can buy any of the n assets inside the market. That is, these models only apply in a closed system where the m investors collectively own all of the n assets and nothing else.

⁹² Lally (2013 AER), p. 14.

⁹³ Lally (2013 AER), pp. 14-15.

⁹⁴ Lally (2013 AER), p. 13.

140. The models then derive an equilibrium by solving a market clearing condition. This involves noting that:
- a) All of the m investors must invest all of their wealth across the n assets and nothing else; and
 - b) All of the n assets must be owned entirely by the m investors and no one else.
141. Each of the m investors will hold a different amount of each of the n assets according to their wealth, their risk aversion and their tax status. Other things equal, wealthy investors will hold more of each asset than poor investors, highly risk averse investors will tend to hold safer portfolios, and investors who are eligible to redeem imputation credits will hold relatively more of the stocks that distribute larger amounts of those credits.
142. Because there is a closed system in which the m investors collectively own all of the n assets and nothing else, it is possible to derive the relative amount of each asset that each investor will want to hold. This will be a function of the investor's relative wealth, risk aversion and tax status. The relative demand for each asset will determine its equilibrium price and the equilibrium return that investors will require for holding it. Again, it is very important to emphasise that none of these equilibrium calculations can be performed unless the system is closed such that the m investors collectively own all of the n assets and nothing else.
143. These models also make the assumption that a dollar of redeemed credits has the same value as a dollar of cash dividends. We discuss the reasonableness of this assumption in the next sub-section of this report.
144. A by-product of these equilibrium calculations is an estimate of the equilibrium value of the imputation credits that are distributed by each firm. This is a derived figure for the extent to which imputation credits will be capitalised into the equilibrium stock price. In these models, the equilibrium value of imputation credits (capitalised into the stock price) turns out to be a weighted-average of the extent to which each investor is able to redeem imputation credits, weighted by wealth and risk aversion. That is, under the assumptions of these models (including the assumption that a dollar of redeemed credit is equal in value to a dollar of cash dividends) the market value of imputation credits (i.e., the extent to which the credits are capitalised into stock prices) will be equal to the weighted-average redemption rate. Under the assumptions of these models, the market value of imputation credits can be estimated as the weighted-average of the utilisation rates of the m investors.
145. That is, in an economy where the prerequisite conditions hold (i.e., there is a closed system in which the m investors collectively own all of the n assets and nothing else) and where all of the assumptions of the model hold (including the assumption that redeemed credits and cash dividends are equally valued), it must be the case that the market value of imputation credits is equal to the weighted-average utilisation rate. In this case, there is equality between:
- a) The extent to which imputation credits are capitalised into stock prices; and
 - b) The weighted-average redemption rate.

That is, there are two equivalent ways of determining the value of imputation credits, but only if the pre-requisite conditions and assumptions of the model hold. Importantly, under these special assumptions value and redemption will be equal. That is, redemption rates can be used to estimate value under these special assumptions. That is, these models do not say that redemption is the right interpretation and value is the wrong interpretation – the value interpretation is always the correct one. The only contribution of these models is to identify the special cases in which the redemption rate *would* provide an estimate of value.

Specific cases of a closed system

146. Lally (2013 AER) considers an extreme case where:

- a) There are m investors who collectively own all of the n assets and nothing else;
- b) All of the m investors value a dollar of redeemed credits equal to a dollar of cash dividends, and
- c) All of the m investors can redeem 100% of the imputation credits that are distributed to them (i.e., there are no foreign investors).

147. He notes that (a) and (b) above establish the pre-conditions that are required for the weighted-average utilisation rate to provide an appropriate estimate of the value of distributed credits, theta. He also notes that from (c) above the weighted-average utilisation rate will be 100%. In this special case, 100% of the face value of the distributed credits will be capitalised into the stock price and theta will be equal to 1. Lally (2013 AER) recommends that the regulator should adopt the assumptions set out above and set theta to 1.

148. Of course, if theta is to be estimated not as it actually *is* in the market for equity funds, but as it *would be* in a world with no foreign investors, consistency requires that *all* WACC parameters must be estimated on the same basis. Lally (2013 AER) presents some calculations to show how one might go about estimating beta and MRP as they *would be* in such a world.

149. Lally (2013 AER) also considers the case of perfectly integrated capital markets where:

- a) The m investors consist of all global investors; and
- b) The n assets consist of all global equities.

150. This is also a closed system in which the m investors collectively own all of the n assets and nothing else. Consequently, an equilibrium exists in which the value of imputation credits capitalised into the stock price is equal to the weighted-average of the utilisation rates over the m investors. In this case, only a small proportion of the m investors are eligible to redeem imputation credits (commensurate with the small proportion of Australian investors in the global market), in which case theta will be negligibly small.

151. By contrast, the ERA considers a setting in which:

- a) The m investors consist of all Australian investors and those foreign investors who own some Australian shares; and
- b) The n assets consist of all Australian equities.

152. This is not a closed system because it is not the case that the m investors collectively own all of the n assets and nothing else. Consequently, no market clearing equilibrium can be derived and it will not be the case that an equilibrium exists in which the value of imputation credits capitalised into the stock price is equal to the weighted-average of the utilisation rates over the m investors.

153. In the context of these equilibrium models, if foreign investors are included, foreign assets must also be included. Alternatively, if foreign assets are not included, then foreign investors must be assumed away. If neither of these assumptions is made, no equilibrium model will apply and the weighted-average utilisation rate cannot be used as an estimate of theta.

Lally's specific rejection of the ERA approach

154. In his advice to the QCA, Lally (2013 QCA) notes that one:

...possible approach to estimating U arises from the definition of U as a value weighted average over the utilisation rates of individual investors, but without imposing the restriction that investors must be Australian residents. Consequently U would be a value weighted average over the utilisation rates of locals and foreigners. Since foreigners cannot benefit from the credits (except through tax arbitrage), then U would be the proportion of Australian shares held by Australians.⁹⁵

155. It is this very approach of using an average utilisation rate that the ERA has adopted. In fact, the ERA places 100% weight on this single approach and zero weight on all other approaches. Lally (2013 QCA) goes on to advise that:

The drawback with this approach is that the estimate is inconsistent with the use of a CAPM that assumes complete segmentation of risky asset markets. Handley (2008, section 2.2) appears to believe that there is no inconsistency and believes that all CAPMs start by defining the "market", from which the "relevant" set of investors follows. Thus, if the market is Australian equities, then the relevant set of investors includes foreigners to the extent they invest in Australian equities. I do not agree. Every CAPM starts instead with a set of assumptions about investor behaviour and institutional features rather than a "market", and the particular assumptions imply which market portfolio and set of investors are relevant.⁹⁶

156. We agree entirely with Lally on this point. There is no version of the CAPM, and indeed no version of any equilibrium asset pricing model, that supports the taking of an average utilisation rate across Australian investors and "foreigners to the extent that they invest in Australian entities." As set out above, such an approach violates the most basic market clearing condition of equilibrium asset pricing models.

157. Lally goes on to advise that a weighted average utilisation rate is only relevant where:

- a) All of the m investors must invest all of their wealth across the n assets and nothing else; and
- b) All of the n assets must be owned entirely by the m investors and no one else.

158. He notes that there are only two settings in which this condition holds. This first is the complete segmentation case in which:

the relevant investors are Australian residents and the relevant market portfolio is all Australian risky assets⁹⁷

and the second is the complete integration case in which:

the relevant investors are those throughout the world and the relevant market portfolio would be all risky assets throughout the world.⁹⁸

⁹⁵ Lally (2013 QCA), p. 13.

⁹⁶ Lally (2013 QCA), p. 13. See also Lally (2013 AER), p. 14.

⁹⁷ Lally (2013 QCA), p. 14.

⁹⁸ Lally (2013 QCA), p. 14.

159. By contrast, under the ERA's setting in which:

- a) The m investors consist of all Australian investors and those foreign investors who own some Australian shares; and
- b) The n assets consist of all Australian equities

the proportion of credits that are redeemed has nothing to do with the value of those credits to shareholders. That is, there is no theoretical framework that supports the ERA's proposed approach.

160. Lally (2013 QCA) also notes that the use of redemption rates based on the proportion of foreign investors

has the perverse consequence that as national equity markets become increasingly integrated, foreign ownership of Australian equities will rise, the resulting estimate of U will fall, and therefore the cost of equity capital estimated using the Officer model will rise. However, as markets become more integrated, investors will be holding more well diversified portfolios and therefore the cost of equity capital should fall.⁹⁹

⁹⁹ Lally (2013 QCA), p. 14.

7. Errors in the ERA's re-definition of theta

Summary of errors in relation to the conceptual definition of theta

161. In our view, the ERA has erred in defining theta to be the proportion of distributed credits that are redeemed rather than the value of distributed credits. That is, our view is that the ERA has embarked on the task of estimating the wrong thing. The reasons for our conclusion that this new definition of theta is in error are as follows:

- a) The Australian regulatory framework reduces the allowed return to shareholders by $\$ \gamma$ for every \$1 of imputation credits created.¹⁰⁰ If shareholders do not *value* the \$1 imputation credit at $\$ \gamma$, they will not receive an appropriate return;
- b) The National Gas Rules and National Electricity Rules specifically define that “ γ is the *value* of imputation credits”;¹⁰¹
- c) The Australian Competition Tribunal has held that “The utilisation rate (or theta) represents the per-dollar value to a shareholder of a distributed imputation credit,”¹⁰² and that “investors may not value cash dividends and franking credits to their full dollar values, or to the same dollar value for each. This is where θ (theta) comes in.”¹⁰³
- d) Any reasonable analysis of the relevant literature leads to the conclusion that gamma is intended to be a measure of the value of imputation credits. Even McKenzie and Partington (2013), state that:

Theta (θ) [one of the components of gamma] is the value to the investor of the imputation credits distributed, expressed as a fraction of face value,¹⁰⁴

and:

The standard practice has been to measure the market value of theta.¹⁰⁵

and:

The question then is how to measure the market value of the imputation credits.¹⁰⁶

- e) Lally (2013 AER) makes it clear that what he calls the *utilisation rate* (U) is the extent to which distributed imputation credits (IC) are capitalised into the stock price – the extent to which the stock price reflects the *value* of distributed imputation credits;¹⁰⁷

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + R_f + \phi \beta_e}$$

¹⁰⁰ The regulatory framework actually reduces the allowed return by $\$ \gamma$ for every \$1 of corporate tax paid, but corporate tax paid equals imputation credits created for a domestic firm, such as regulated businesses.

¹⁰¹ NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14), emphasis added.

¹⁰² Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 68.

¹⁰³ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 104.

¹⁰⁴ McKenzie and Partington (2013), p. 31.

¹⁰⁵ McKenzie and Partington (2013), p. 32.

¹⁰⁶ McKenzie and Partington (2013), p. 33.

¹⁰⁷ Lally (2013 AER), p. 10, Equation (3).

- f) The ERA justifies their use of the redemption rate on theoretical models developed by Lally and others. However, the Lally model only applies to the special case where Australia is assumed to be completely segmented from world capital markets, in which case there is zero foreign investment.¹⁰⁸ By contrast, the ERA seeks to use the Lally model to justify its use of a redemption rate that reflects the extent to which Australian equities are owned by foreign investors. Lally (2013 AER) has advised that his model does not apply in such a setting – there is no market clearing condition and one cannot solve for any equilibrium pricing results. The ERA has either misunderstood or ignored this advice. There is no theoretical framework that supports the ERA’s proposed approach.

Estimates of theta based on tax statistics and equity ownership

162. Having concluded that theta should no longer be interpreted as the value of distributed credits, but rather as the proportion of distributed credits that might be distributed, the ERA turns to methods that are designed to estimate the redemption rate. In particular, two approaches are available:

- a) The tax statistic approach; and
- b) The equity ownership approach.

163. The equity ownership approach estimates the proportion of Australian shares that are owned by resident investors, and then assumes that all imputation credits distributed to those resident investors will be redeemed. The tax statistic studies use ATO data to estimate the ratio of (a) the quantity of imputation credits redeemed in a given year, to (b) the quantity of imputation credits distributed in that year. Both of these methods are designed to estimate the redemption rate. The ERA concludes that the evidence from these two approaches supports a redemption rate of 70% – that 70% of the credits that are distributed end up being redeemed by resident investors.¹⁰⁹

164. In our view, neither of these methods provides an estimate of theta and it would be an error to interpret them as doing so. Our view is that theta represents the value of distributed imputation credits. Neither the equity ownership approach nor the tax statistics approach even attempt to estimate the value of distributed credits – those approaches seek to estimate the proportion of distributed credits that might be redeemed. Consequently, our view is that the equity ownership and tax statistics approaches do not provide relevant evidence – they provide estimates of the wrong thing. In our view, the redemption rate (estimated using the tax statistics approach or the equity ownership approach) should not be used to estimate theta. In our view, the best that can be done with any estimate of the redemption rate is to use it as an upper bound cross check on the estimate of the *value* of distributed credits, estimated with reference to actual market prices.

Conclusions in relation to the conceptual definition of theta and relevant estimation methods

165. Our view is that theta represents the value of distributed credits. The tax statistic and equity ownership approaches do not estimate the value of distributed credits, so they do not estimate theta. Theta can only be estimated using empirical approaches that seek to estimate the value of distributed credits. Dividend drop-off analysis is such an approach and we consider that approach in detail in the next section of this report.

¹⁰⁸ Lally recommends that regulators should assume complete segmentation. The model also applies in the case of perfect integration (which would lead to gamma being set close to zero), but this case is not recommended.

¹⁰⁹ ERA ATCO Gas Draft Decision, p. 210, Paragraph 944.

8. Dividend drop-off analysis

The basis for dividend drop-off analysis

166. In its ATCO Gas Draft Decision, the ERA sets out the following equation, based on Lally (2013 AER):¹¹⁰

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + E[\hat{R}]}$$

167. The ERA states that this equation shows that the firm's stock price will be equal to the present value of the after-tax distribution received during the year, the present value of the imputation credit received during the year, and the present value of the stock price at the end of the year:

...the sum of the expected [pre-tax] cash flows to equity holders (Y_1), less the expected company taxation over the year (Tax_1), plus **any value derived** from the distribution of franking credits. The latter term is defined as $U \times IC_1$, where IC_1 is the distributed imputation credits.¹¹¹

168. In this equation, shareholders receive a distribution equal to the “cash flows to equity” less corporate tax. Defining this to be Div_1 , we have:

$$S_0 = \frac{Div_1 + IC_1 U + S_1}{1 + E[\hat{R}]}$$

169. This equation can be rearranged with some basic algebra to yield:

$$S_0(1 + E[\hat{R}]) - S_1 = Div_1 + U \times IC_1$$

170. This is the very equation that is implemented in a dividend drop-off analysis. The left hand side of the equation is the regressor – the change in the stock price over the ex-dividend day (with the standard market adjustment). The right hand side sets out the two regressands – the cash dividend and the imputation credit. That is, the equation that is estimated via drop-off analysis is derived precisely from the equation the ERA purports to adopt.

ATCO Gas Draft Decision

171. In its ATCO Gas Draft Decision, the ERA states that it will apply *limited* weight to approaches that estimate the *value* of distributed credits, preferring approaches that estimate the proportion of credits that are redeemed:

the Authority has determined to place **limited weight** on the dividend drop off estimates, and on the range of applied market value estimates more generally. The Authority has instead considered other approaches to estimating θ .¹¹²

¹¹⁰ ERA ATCO Gas Draft Decision, Equation (6), p. 431, Paragraph 34.

¹¹¹ ERA ATCO Gas Draft Decision, pp. 430-431, Paragraph 33, emphasis added.

¹¹² ERA ATCO Gas Draft Decision, p. 213, Paragraphs 959-960, emphasis added.

172. In its ATCO Gas Draft Decision, the ERA also states that it will apply *no* weight to approaches that estimate the *value* of distributed credits, and that it will have no regard to such approaches:

Given that this market value is irrelevant to the required utilisation rate, the Authority has **disregarded them** for informing the required utilisation rate. The Authority notes this is a significant departure from the view held in the Rate of Return Guidelines, with dividend drop off studies being the sole evidence to inform the required utilisation rate.¹¹³

173. We are unable to reconcile these two positions – it is not clear to us how “limited weight” can be applied to evidence that has been “disregarded.”

174. In our view, theta should be interpreted as the value of distributed imputation credits and should be estimated accordingly. For the reasons set out throughout this report, our view is that it is only *value* estimates of theta that are consistent with the regulatory framework, the PTRM, and the NGR requirement that “ γ is the value of imputation credits.”

Econometric issues

175. The ATCO Gas Draft Decision raises a number of general econometric issues in relation to dividend drop-off analysis. Most of these issues have previously been considered by the ERA, with the ERA determining that they are not so severe as to impact on its total reliance on drop-off analysis for estimating theta. However, three specific issues are raised that the ERA says it has “not previously considered.”¹¹⁴

The interpretation of theta

Background and context

176. In its ATCO Gas Draft Decision, the ERA endorses the recommendation by Lally (2013 AER) that the dividend drop-off estimate of theta should be divided by the dividend drop-off estimate of the value of cash dividends to provide a final estimate of the utilisation rate, U .¹¹⁵

177. The ERA indicates that it has not previously considered the adjustment to dividend drop-off estimates of theta that Lally (2013 AER) recommends.¹¹⁶ This is surprising, given that Lally has been consistently recommending that same adjustment to regulators for over ten years.¹¹⁷

178. For the reasons set out below, our view is that the adjustment is inappropriate, which is consistent with the fact that no regulator has ever adopted it.

Quantification of the effect

179. The effect of applying the proposed scaling adjustment is summarised as follows:

- a) The ERA notes that the approach would result in the SFG theta estimate being scaled up from 0.35 to 0.4;¹¹⁸

¹¹³ ERA ATCO Gas Draft Decision, p. 447, Paragraph 105, emphasis added.

¹¹⁴ ATCO Gas Draft Decision, p. 442, Paragraph 88.

¹¹⁵ ATCO Gas Draft Decision, pp. 443-445, Paragraphs 94-98.

¹¹⁶ ERA ATCO Gas Draft Decision, p. 445, Paragraph 98.

¹¹⁷ See, for example, Lally (2004), pp. 33-34.

¹¹⁸ ATCO Gas Draft Decision, p. 445, Paragraph 98. We note that the ERA proposes a revised range of 0.40-0.63 on p. 445 and a range of 0.38-0.69 for exactly the same thing on p. 212.

- b) The ERA notes that the approach would result in the mid-point of its own theta range being scaled up from 0.45 to 0.51;¹¹⁹ and
- c) Where the ERA has used standard market-adjusted returns, its overall estimate of theta scales from 0.34 to 0.39, and its range scales from 0.21-0.44 to 0.22-0.53.

180. In summary, even if this adjustment is applied, the effect is to increase the best available estimate of theta from 0.35 to 0.40.

The proposed adjustment is not required

181. In our view, this adjustment is not appropriate when estimating theta as the *value* of distributed imputation credits. When theta takes a *value* interpretation within the regulatory framework, what is required is an estimate of the price that investors would be prepared to pay for an imputation credit. This is because the allowed return for an investor will be reduced by theta for every dollar of imputation credits that is distributed to them. To preserve the appropriate return to investors, the regulatory framework must reduce the return to investors by an amount that is equivalent to the price investors would be prepared to pay for the credit. Dividend drop-off analysis is specifically designed to estimate the price that investors would be prepared to pay for imputation credits. It directly estimates the extent to which imputation credits are capitalised into the stock price. This is an estimate of how much the stock price has been bid up in relation to the imputation credit that is to be received. The standard dividend drop-off estimate of theta provides a direct estimate of the *value* of distributed credits.

The proposed adjustment produces perverse outcomes

182. Moreover, the proposed scaling has perverse outcomes. To see this, first recall that the proposed adjustment is to divide theta by the estimated value of cash dividends, which the ERA defines to be δ . Suppose the regulator applies the scaling approach, but that the dividend drop-off analysis suggests that $\delta = 1$, so that the scaling has no effect. The regulator then determines the allowed revenue for the firm of say \$X.

183. Now consider a case that is identical in all respects to the one above, except that the drop-off analysis produces an estimate of $\delta < 1$. In this case, everything is identical to the previous case, except that shareholders do not value dividends as highly. If anything, this should require an increase in the allowed revenues – because shareholders do not value dividends as highly, they would need to receive more of them in order to be left equally well off.¹²⁰ However, under the proposed approach the drop-off estimate of theta would be increased (by dividing by $\delta < 1$) which would in turn result in *lower* allowed revenues.

184. Under the proposed approach, as the dividends paid by the firm become less valuable to investors, the allowed revenues are further reduced – which is the exact opposite of what should occur.

The proposed adjustment would need to apply throughout the regulatory process

185. In using the Sharpe-Lintner CAPM to estimate the required return on equity, the ERA imposes an estimate of $\delta = 1$ – it estimates the required return on the basis that shareholders value dividends at their full face value. There are more complex versions of the CAPM that allow for $\delta < 1$, but the ERA does not use them. For example, Lally and van Zijl (2003) develop a version of the CAPM that

¹¹⁹ ATCO Gas Draft Decision, p. 445, Paragraph 98. We note that the ERA proposes a revised range of 0.40-0.63 on p. 445 and a range of 0.38-0.69 for exactly the same thing on p. 212.

¹²⁰ See for example, Lally and van Zijl (2003).

allows for the case where $\delta < 1$. These more complex models simplify to the Sharpe-Lintner CAPM for the case where $\delta = 1$.

186. It would be inconsistent and wrong for a regulator to adjust the estimate of theta on the basis that $\delta < 1$, but then to estimate the required return on equity in the same WACC estimation process on the basis that $\delta = 1$. That is, if $\delta < 1$ when estimating theta, $\delta < 1$ throughout the WACC estimation process.

Summary and recommendations

187. In our view, the proposed scaling adjustment should not be applied. The drop-off estimate of theta already provides a direct estimate of the value of distributed credits, and the adjustment would have the perverse effect of *reducing* the allowed revenues as dividends become less valuable.

188. If, however, a particular value of $\delta < 1$ is to be used to adjust the estimate of theta, consistency requires that the same value of $\delta < 1$ would have to be used throughout the WACC estimation process. It would be inconsistent and wrong to estimate theta on the basis that $\delta < 1$ and r_e on the basis that $\delta = 1$ in the same WACC estimation process.

Composition and incentives of investors around the ex-dividend date

189. The ERA questions whether the trading activity around the ex-dividend date is representative of long-term providers of equity capital.¹²¹ In this regard, the ERA notes that for each ex-dividend event in the sample, data is collected from the day before and the day after the dividend and imputation credit separate from the share. The ERA raises the prospect that the ex-dividend event itself may attract short-term investors who are not representative of the long-term providers of equity capital. The idea is that the ex-dividend event may create incentives for certain types of investors to engage in certain types of trading around the ex-dividend event, and that dividend drop-off analysis may estimate the value of imputation credits to the investors who are incentivised to trade around the ex-date, rather than the value of imputation credits to the providers of long-term equity capital.

190. This issue was raised in the AER's Draft Guideline in August 2013 and responded to in detail by the ENA submission in October 2013, so it is surprising that the ERA has not previously had regard to it, given that the ERA placed 100% reliance on dividend drop-off analysis in its December 2013 Guideline.

191. This point appears to be based on the issue raised in the AER's Guideline materials which note that trading volumes tend to increase around ex-dividend dates and that dividend drop-off studies will estimate the value of imputation credits to those investors who are incentivised to be active in the market around the ex-date, in which case:

By largely reflecting the abnormal trading conditions on the two relevant trading days, dividend drop off studies may not identify the market value for the representative investor.¹²²

192. The ENA submission on the AER's Draft Guideline contained a detailed discussion on this point.¹²³ In that discussion, the ENA demonstrated that the empirical evidence shows that the increase in trading volume around ex-dividend dates is driven by a subset of investors who value imputation

¹²¹ ATCO Gas Draft Decision, pp. 442-443, Paragraphs 89 and 91 and p. 213, Paragraph 958.

¹²² AER Rate of Return Guideline, Explanatory Statement, Appendix H, p. 170.

¹²³ ENA Submission, 11 October 2013, Section 7.9, pp. 119-123.

credits highly. These investors purchase shares to capture the dividend and imputation credit, causing a run-up in the cum-dividend price.¹²⁴

193. To the extent that this effect is material, it results in the dividend drop-off being *higher* than it would otherwise be, which in turn results in the estimate of theta being *higher* than it would otherwise be. That is, to the extent that the increase in trading volume around the ex-dividend date has an effect, it is likely to result in an *over*-estimate of theta.

194. A detailed response on this issue is set out in Appendix 3 to this report.

The impact of foreign investors

195. In its ATCO Gas Draft Decision, the ERA states that the regulatory framework that it intends to adopt:

■ assumes a segmented domestic capital market¹²⁵

whereas dividend drop-off analyses:

■ reflect the empirical reality of foreign investors.¹²⁶

in which case:

■ any estimate of the utilisation rate using the dividend drop off method is incompatible with the Officer CAPM framework and by extension the NGR,¹²⁷

notwithstanding the fact that Officer himself has been a pioneer of the dividend drop-off method.

196. That is, dividend drop-off analysis relies on market prices that have been contaminated by foreign investors, and therefore cannot be used.

197. But of course *all* WACC parameters are estimated with reference to market data that has been contaminated by foreign investors. If market data cannot be used to estimate theta, consistency requires that it cannot be used to estimate other WACC parameters. Consequently, no WACC parameter could be estimated on the basis of a market value interpretation – *all* would have to be estimated on the basis of some conceptual re-definition that does not require the use of any financial market data.

198. By contrast, our view is that all WACC parameters should be estimated with reference to financial market data, consistent with standard commercial practice. The observed prices of financial securities provide direct evidence about the prevailing conditions in the market. What the prevailing conditions might be in a different market where there was no foreign investment is simply irrelevant.

¹²⁴ The same point is made by McKenzie and Partington (2011), pp. 9-10.

¹²⁵ ATCO Gas Draft Decision, p. 442, Paragraph 90.

¹²⁶ ATCO Gas Draft Decision, p. 442, Paragraph 90.

¹²⁷ ATCO Gas Draft Decision, pp. 442-443, Paragraph 90.

The relative merits of the SFG and ERA studies

External verification

199. In its Rate of Return Guideline, the ERA considered two dividend drop-off studies when estimating theta as the value of distributed credits – the SFG study and the study by Vo, Gellard, and Mero (2013) (the ERA study). In our March 2013 submission to the ERA, we compared the relative merits of these two studies. We noted that the Australian Competition Tribunal praised the SFG study stating that:

The Tribunal is satisfied that the procedures used to select and filter the data were appropriate and do not give rise to any significant bias in the results obtained from the analysis. Nor was that suggested by the AER.¹²⁸

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.¹²⁹

200. The Tribunal went on to conclude that:

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.¹³⁰

and

No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the SFG report value.¹³¹

201. By contrast, we are unaware of any external verification of the ERA study. We understand that the ERA has submitted its study for academic publication, but the Draft Decision does not comment on the progress of that endeavour.

The differences between the SFG and ERA results

202. In our March 2013 submission to the ERA we noted that the SFG study performs a standard market adjustment of all returns. The standard approach in dividend drop-off studies is to assume that, but for the dividend, the stock price would have followed the movement in the broad market over the ex-dividend day. That is, if the broad market index increases by 2% over the ex-dividend day, it is assumed that, but for the dividend, the particular stock would also have increased by 2%. We are unaware of any recent paper in a peer-reviewed journal that does not make such an adjustment.

203. The ERA study also reports results where this standard approach has been applied, confirming the results from the SFG studies. In particular, the SFG studies conclude that an appropriate value for theta is 0.35. The ERA study reports that, when the standard market correction is applied, the average estimate of theta is 0.34. The estimate using robust regression and Model Specification 4 (which the ERA considers to be the most reliable estimate) is 0.33.¹³²

¹²⁸ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraphs 18-19.

¹²⁹ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 22.

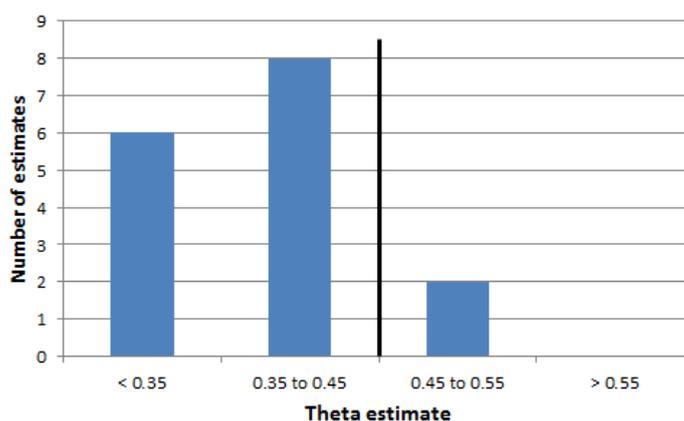
¹³⁰ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 29.

¹³¹ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

¹³² Vo, Gellard and Mero (2013), Table 5.

204. The ERA study goes on to estimate theta *without* the standard market adjustment. These calculations are based on the implausible notion that on days when the return on all other stocks averages 2%, the expected return on the stock in question is 0%. If someone asks you to think of a particular stock, then they tell you that on a particular day the average return on stocks was +2%, what is your best estimate of the return on your stock – the +2% that applied to the average stock, or 0%?
205. The ERA provides two reasons for persisting with its unique approach of assuming that a given stock would have an expected return of 0% on days when all other stocks averaged a return of +2%. The first is that it is easier. However, applying the standard market adjustment is not difficult and the ERA itself was able to include results estimated on that basis. The second reason is that it is acceptable to mis-measure variables, because regression analysis includes an error term.¹³³ If this claim were true, it would be unnecessary to take any care when estimating variables because any mis-measurement would be “already in the error term.”¹³⁴ This would seem to be at odds with the great care that is taken in statistics and econometrics to measure variables as accurately as possible, and with the uniformly accepted view that proper estimation of variables improves the reliability of the resulting estimates.
206. Even when no market correction is applied, the ERA reports an average theta estimate of 0.40 and a robust regression estimate from its preferred Model Specification 4 of 0.32.
207. In fact, there is very little evidence to support the ERA’s mid-point estimate of 0.45 at all. The ERA’s estimates of theta are summarised in Figure 4 below. This figure summarises the ERA’s point estimates for all different model specifications and estimation methodologies (with and without the standard ex-day market correction) except for the OLS estimates, which the ERA deems to be inappropriate.¹³⁵ The figure shows that the vast majority of estimates fall below the ERA’s mid-point estimate (marked as a line). Moreover, whereas a material number of estimates fall below the bottom of the range (less than 0.35) there are no estimates above the top end of the range (0.55).

Figure 4. Distribution of ERA theta estimates



Source: Vo et al (2013), Table 5.

208. Another issue raised in the ATCO Gas Draft Decision is what the ERA refers to as a “large divergence in empirical estimates of the utilisation rate using dividend drop off studies.”¹³⁶ However, this is an inaccurate characterisation of the evidence. The SFG study uses all available data and a range of accepted methods, all of which support the proposed estimate of 0.35 with reasonable

¹³³ ERA ATCO Gas Draft Decision, p. 211, Paragraph 951.

¹³⁴ ERA ATCO Gas Draft Decision, p. 211, Paragraph 951.

¹³⁵ Vo, Gellard and Mero (2013), p. 9.

¹³⁶ ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

precision. We have also submitted an expanded set of stability analyses to the ERA which demonstrate that our results are strongly robust to the inclusion or removal of influential observations. However, the ERA persists with its claims that dividend drop-off estimates are sensitive to “the most influential observations.”¹³⁷ The data and estimation methods used by SFG produce results that are *not* sensitive to influential observations. The only evidence of such sensitivity comes from the ERA study when raw returns are used, contrary to the accepted practice in the literature. Logically, if the ERA’s analysis is unable to produce reliable results it should be given little weight – it should not be used to cast dispersions on *all* drop-off analyses

Conclusions in relation to dividend drop-off evidence

209. In our view:

- a) Theta is properly interpreted as the value of distributed imputation credits, in which case dividend drop-off analysis is an entirely appropriate method to use to inform the estimate of theta; and
- b) The econometric “problems” that the ERA has recently become concerned about are overstated and (collectively) do not support the rejection of dividend drop-off evidence.

210. As set out above, our view is that the ERA has erred in interpreting theta to be the redemption rate. This error has led to it disregarding dividend drop-off analysis when estimating theta. Correction of this error, leading to the ERA seeking to estimate the value of imputation credits rather than the proportion of them that are redeemed, would lead to a materially preferable outcome.

211. In our view, there are a number of reasons to prefer the SFG studies to the ERA study:

- a) The SFG approach has been subjected to intense scrutiny. All data and computer code was supplied to the AER. All issues that the AER has identified have been considered by the Tribunal. The Tribunal has endorsed and adopted the results. By contrast, the ERA study has not been subjected to such scrutiny;
- b) The SFG studies employ the standard, Tribunal-approved and AER-approved approach of correcting prices for market movements over the ex-dividend day; and
- c) The SFG theta estimates have been shown to be stable and reliable in the face of a battery of stability and robustness checks, whereas the ERA expresses concerns about the stability and reliability of its own results.

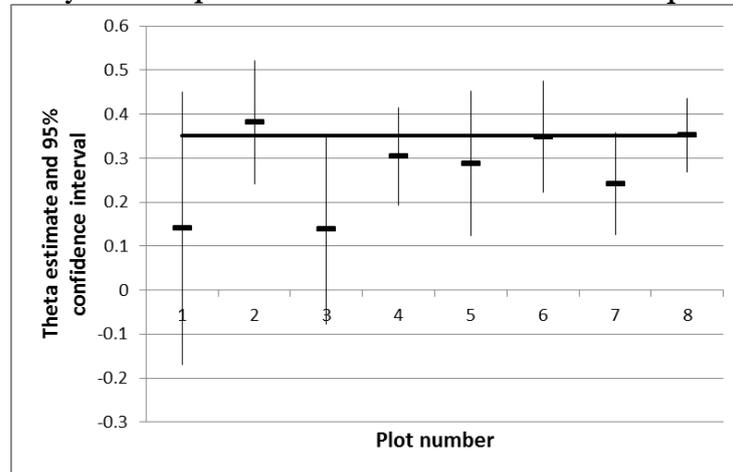
212. In any event, there is little evidence to support the ERA’s mid-point estimate of 0.45 from within its range of 0.35 to 0.55:

- a) The ERA’s own estimates are overwhelmingly below 0.45 (see Figure 4 above), and a significant proportion of those estimates are below 0.35;
- b) The ERA study reports a theta estimate of 0.34 when the standard ex-day market correction is applied;
- c) The ERA estimate increases only to 0.4 when the standard ex-day market correction is removed; and

¹³⁷ ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

- d) The SFG (2013) estimates indicate that, if anything, the 0.35 estimate is towards the upper end of the reasonable range. See for example Figure 5 below, which is reproduced from SFG (2013), Figure 5.

Figure 5
Summary of point estimates and confidence intervals for theta
by model specification and estimation technique



For each estimate, the narrow line represents the 95% confidence interval for theta and the solid black marker represents the point estimate. The solid black horizontal line represents the recommended point estimate of 0.35.
 Plot 1: Model specification 1, OLS estimation; Plot 2: Model specification 2, OLS estimation;
 Plot 3: Model specification 3, OLS estimation; Plot 4: Model specification 4, OLS estimation;
 Plot 5: Model specification 1, RR estimation; Plot 6: Model specification 2, RR estimation;
 Plot 7: Model specification 3, RR estimation; Plot 8: Model specification 4, RR estimation.

213. In our view, there is no reasonable basis for adopting a dividend drop-off estimate of theta above 0.35.

9. The Lally conceptual test

The role of the conceptual goal posts test

214. In its ATCO Gas Draft Decision, the ERA states that it:

gives weight to the so-called ‘conceptual goal posts’ approach.¹³⁸

215. In fact, this “test” has an important impact on the ERA’s final estimate of theta:

The Authority considered switching its estimation approach to be based on listed equity ownership only, as this underpins other parameter estimates for the rate of return. However, the resulting estimate of the utilisation rate, of 0.56, would fall outside the bounds for the utilisation rate, of 0.6 to 1 inferred from the conceptual goal posts approach (see below), and is therefore rejected.¹³⁹

216. That is, the application of this test appears to have had a material impact on the ERA’s estimate of theta – but for the test, the ERA may have set theta to 0.56 rather than its final estimate of 0.7.

217. For the reasons set out below, our view is that the test is based on such an implausible and inherently contradictory foundation that it would be an error to place any weight on it. In any event, the test clearly does not support the 0.6 to 1 range as claimed by the ERA.

What does the test conclude?

218. Lally (2013 AER) develops a “conceptual test” that is designed to provide some bounds around a reasonable estimate of the utilisation rate. Before addressing the merits of the test itself, we consider the ERA’s unique interpretation of the outcomes of the test.

219. Lally (2013 AER) himself concludes that the test is only satisfied by setting the utilisation rate close to one:

...estimates of U that are significantly less than 1 fail this test in virtually every case examined, and are therefore deficient...By contrast, if the Officer model were combined with a utilisation rate on imputation credits of 1, or close to it, the test described here would be satisfied in most cases. All of this suggests that, if the Officer model is used, the only sensible estimate of the utilisation rate is at or close to 1.¹⁴⁰

220. The QCA also concludes that the test is only satisfied by setting the utilisation rate to one, or close to one:

a utilisation rate of one (or close to one) in conjunction with the common approach of Australian regulators is reasonable (i.e. it produces a result that satisfies the test).¹⁴¹

¹³⁸ ERA ATCO Gas Draft Decision, p. 213, Paragraph 961.

¹³⁹ ERA ATCO Gas Draft Decision, p. 214, Paragraph 964.

¹⁴⁰ Lally (2013 AER), pp. 46-47. Note that Lally uses U rather than theta to represent the second component of gamma. The ERA uses the two terms interchangeably – ATCO Gas Draft Decision, p. 429, Paragraph 27.

¹⁴¹ QCA Market Parameters Decision, p. 99.

221. The AER also concludes that the test is only satisfied by setting the utilisation rate to one or close to one:

■ The conceptual goalposts approach, which suggest (sic) a utilisation rate of 0.8 to 1.0.¹⁴²

222. By contrast, the ERA concludes that the test supports any theta estimate above 0.6:

■ the Authority considers that it is reasonable to infer a range for θ of 0.6 to 1, as conceptual goal posts.¹⁴³

223. This conclusion is apparently based on Lally (2013 AER Table 3, p. 45). That table applies the “test” to 27 various different combinations of parameters and shows that the test is failed by 23 of the 27 parameter combinations. Lally himself concludes that:

■ These four exceptions occur for extreme parameter combinations in the table.¹⁴⁴

224. The “extreme parameter combinations” that Lally refers to involve:

- a) A dividend yield for the average Australian firm of 2.5% (whereas Lally concludes that the data supports an estimate of 5%); or
- b) A market-wide estimate of the proportion of dividends that are franked of 37.5% (whereas Lally concludes that the data supports and estimate of 75%).¹⁴⁵

such that:

■ ...estimates of U that are significantly less than 1 fail this test in virtually every case examined, and are therefore deficient.¹⁴⁶

225. For the reasons set out below, our view is that the Lally “conceptual goal posts test” is so flawed that it should be given no regard whatsoever. However, if the Lally “test” calculations are to be relied upon, those calculations support an estimate of “one or close to one.” Interpreting the Lally “test” calculations as though they support estimates as low as 0.6 would be an error. Such an interpretation is inconsistent with the test calculations set out by Lally (2013 AER) and with the interpretations of Lally himself, the AER, and the QCA.

What role does the “test” play?

226. The ERA adopts a theta estimate of 0.7, which is *not* “one or close to one.” That is, the ERA estimate is outside the bounds of the range established by the “conceptual goal posts test.” At this point, the ERA must decide whether the Lally test does bound the reasonable values for theta or whether it does not. That is the ERA must decide whether:

¹⁴² AER Rate of Return Guideline Explanatory Statement, p. 159.

¹⁴³ ERA ATCO Gas Draft Decision, p. 450, Paragraph 121.

¹⁴⁴ Lally (2013 AER), p. 45.

¹⁴⁵ Lally (2013 AER) p. 40.

¹⁴⁶ Lally (2013 AER), pp. 46-47. Note that Lally uses U rather than theta to represent the second component of gamma. The ERA uses the two terms interchangeably – ATCO Gas Draft Decision, p. 429, Paragraph 27.

- a) The test provides reliable bounds such that all reasonable values of theta rate must fall within those bounds; or
- b) The test does not provide reliable bounds such that reasonable values for theta may be taken from outside the bounds established by the test.

227. It is important to note that the “test” is not designed to inform a point estimate for theta. Rather, it examines Lally’s modelling of two extreme end-points of a theoretical spectrum.

228. Logically:

- a) If the ERA considers that the test does provide reliable bounds, they must reject (as unreasonable) any estimate from outside of those bounds; and
- b) If the ERA considers that the test does not provide reliable bounds, it should not be given any weight in its decision-making process.

229. In our view, in its Final Decision the ERA should either:

- a) Adopt an estimate of theta that is “one or close to one” consistent with the conceptual goal posts “test”; or
- b) Reject the “test” as being unreliable and place no weight on it.

The merits of the conceptual test

[Overview](#)

230. In our view, the Lally conceptual goal posts test does not establish a reasonable range for the utilisation rate and it should be afforded no weight at all. The reasons for this conclusion are:

- a) To our knowledge, no person or entity anywhere in the world at any time has ever adopted an estimate of the utilisation rate from within the range established by the Lally test;
- b) The test relies upon estimates of CAPM parameters as they would be in perfectly segmented and perfectly integrated worlds. The estimation of CAPM parameters in the real world (where substantial data is available to assist) is already difficult and contentious. It is simply impossible to estimate what these parameters *might be* in the theoretical worlds considered in the Lally test;
- c) The Lally test is based upon the assumption that the market risk premium in every country is equal to the same multiple of historical stock market variance. By contrast the ERA places zero weight on this method for estimating the MRP in the real world. That is, a method that warrants no weight at all in the real world is, by itself, able to provide estimate of the MRP in two theoretical extreme worlds – to three decimal places. Moreover, the QCA has recently noted that Lally himself has previously concluded that “the statistical precision of the method is very low”;¹⁴⁷
- d) The first version of the test (Lally 2013 AER) relied upon government bonds having the same yield whether or not foreign investors are allowed to buy them, which is clearly unsupportable; and

¹⁴⁷ QCA Market Parameters Decision, p. 74.

- e) The second version of the test (Lally 2014 QCA) is based on a scenario in which the market for government bonds is completely integrated while at the same time the market for all other assets is completely segmented. That is, all investors throughout the world own government bonds in all other countries in the world, whereas they are only allowed to own risky assets in their own country. This assumption is even more implausible than the one it is supposed to replace.

Parameter estimation

- 231. In our view it is simply impossible to estimate CAPM parameters as they *would be* in the theoretical worlds that form the basis of the Lally test. It is already difficult to estimate the expected return on the market in the real world. Estimating (with any degree of precision) what it might be in two different theoretical worlds is impossible. By way analogy, it is difficult to predict the winner of Melbourne Cup, but we can make reasonable forecasts based on the form of horses over previous races – for which some data is available. But it is impossible to make an estimate with any precision about which horse might win if the race were held on ice, or if the horses had to run backwards – because there is no data about these theoretical worlds to inform any estimate.
- 232. Lally (2013 AER) undertakes the estimation task by starting with estimates of WACC parameters from the real world and making adjustments to determine what those parameter estimates would be if markets were perfectly segmented and what they would be if markets were perfectly integrated. In our view, this is an impossible task. Estimating beta and MRP in the real world (reflecting the actual impact that foreign investors have on asset prices) is extremely difficult and a matter of great controversy, thousands of pages of expert submissions, and almost continual litigation. The task of estimating what beta and MRP *would be* if there no foreign investment was allowed, and what they would be if markets were perfectly integrated is impossible.
- 233. Even if was possible to derive point estimates of beta and MRP as they would be in these theoretical scenarios, the reasonable ranges (or confidence intervals) around the point estimates would be very wide indeed – reflecting not just statistical estimation error, but also the extent to which the theoretical adjustments to convert estimates from their real world values to their theoretical world values were not perfectly accurate. Indeed properly constituted ranges would likely be so wide as to be of no use whatsoever. For example, the ERA’s own estimate of the reasonable range for MRP is currently 250 basis points wide and for beta the width is 200 basis points.
- 234. However, Lally (2013 AER) produces point estimates of the required return on equity to three decimal places and uses these point estimates to rule out all estimates of theta other than his own theoretically reasoned value of 1. He does not consider the possibility of *any* estimation error or of *any* model error in converting real-world estimates to their theoretical world values.¹⁴⁸

Estimates are based on an estimation approach that has been rejected by the ERA

- 235. The technique that Lally (2013 AER) uses to estimate the MRP in his theoretical worlds is materially different to the techniques that the ERA uses to estimate MRP in the real world. Lally proposes to estimate MRP as a fixed multiple of the historical variance of the market return in each of his theoretical worlds. However, the ERA has rejected that approach for estimating MRP in the real world – the ERA places zero weight on this method for estimating the MRP.

¹⁴⁸ Lally (2012, 2013) does consider different values for certain parameters that are used to convert from the real world to the theoretical worlds, but he assumes that his approach for converting between worlds is perfectly accurate.

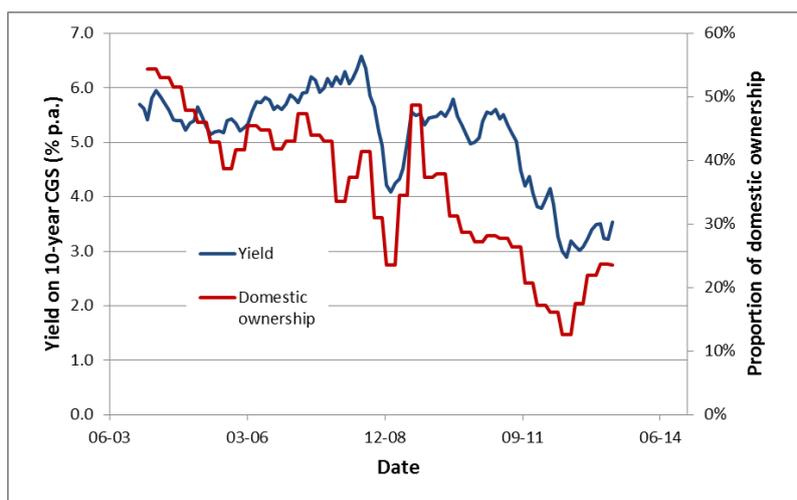
236. If the ERA intends to persist with its reliance on the Lally conceptual goal posts test, it should explain why it considers that the multiple-of-variance approach is a suitable method for estimating the MRP in Lally’s theoretical worlds when that same method is unsuitable for use in the real world.

Treatment of risk-free rates

237. The most important aspect of the test set out in Lally (2013 AER) is the assumption that the risk-free rate would not change in a segmented market. In our view, this assumption is untenable. The Reserve Bank reports that more than 80% of all Australian government bonds are owned by foreign investors. If that demand were removed from the market, the price would surely be lower and the yield would surely be higher. Yet the Lally (2013 AER) test is based on the risk-free rate being the same in a perfect segmentation world as in a perfect integration world.

238. Given that at any point in time there is a fixed supply of Commonwealth government bonds, basic supply/demand dynamics indicates that the material reduction in demand caused by the withdrawal of all foreign ownership would result in a reduction in the price of government bonds and a consequential increase in yields. The relationship between foreign ownership and government bond yields is illustrated in Figure 6 and Figure 7 below.

Figure 6
Australian government bond yields and the proportion of domestic ownership



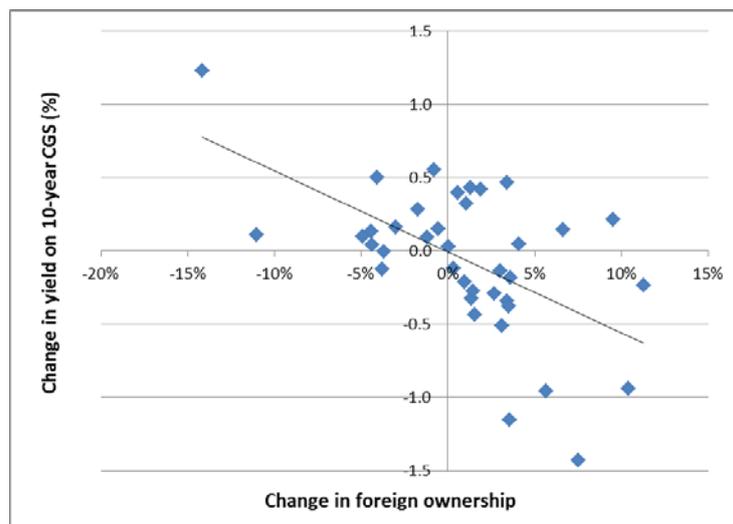
Source: RBA Statistical Tables E3 and F2.

239. Figure 6 shows that, over the last ten years, movements in government bond yields have closely mirrored movements in the proportion of domestic ownership. When the proportion of foreign investment increases (causing a reduction in domestic ownership) yields tend to fall. Conversely, when foreign investment falls, yields tend to rise. This is consistent with increases in foreign investment bidding up the price of government bonds and lowering yields.

240. Figure 7 shows the relationship between changes in government bond yields and changes in the proportion of foreign ownership over the last ten years. Increases in foreign investment are associated with decreases in government bond yields and the relationship is statistically and economically significant.¹⁴⁹

¹⁴⁹ T-statistic is -3.97, p-value is less than 1%, R-squared value is 33%.

Figure 7
RBA estimates of the ownership of Australian equity



Source: RBA Statistical Tables E3 and F2

241. Of course CGS yields vary for many reasons in addition to changes in the demand from foreign investors and correlation does not imply causation. However, the data from the last ten years is consistent with the basic economic principle that (other things being equal) a reduction in demand leads to a reduction in price. By contrast, the notion that the government bond yield would be unchanged if all foreign investment were withdrawn is inconsistent with basic economic principles and with the empirical data.

242. Lally (2013 AER) explains that his “test” is based on the assumption that government bond yields would remain the same even if all foreign investment were withdrawn on the basis that:

CAPMs treat the risk free rate as exogenously determined, and therefore the same empirically observed rate applies to both the Officer and Solnik models.¹⁵⁰

243. The risk-free rate is determined by the demand/supply dynamics of government bonds. The CAPM then takes the resulting risk-free rate as an exogenously determined input. However, this does not imply that the *same* risk-free rate should be used independent of the demand for government bonds. In a setting where there is high demand, the exogenously determined risk-free rate would be low and a low figure would be employed in the CAPM. In a setting where there is low demand, the exogenously determined risk-free rate would be high and a high figure would be employed in the CAPM. Logically, it does not follow that because the risk-free rate is exogenously determined the same value should be used in materially different settings.

244. By analogy, suppose we have a model for estimating the winning time in a marathon race. The weather conditions would be an obvious exogenous input variable – analogous to the risk-free rate in the CAPM.¹⁵¹ But this does not imply that we should assume the same weather conditions for the Boston and Brisbane marathons. That is, “exogenous” means “determined by factors outside the model” – it does not mean “equal in all circumstances.”

¹⁵⁰ Lally (2012) Footnote 18 and Lally (2013) Footnote 23.

¹⁵¹ Like the risk-free rate, weather conditions are relevant and they are exogenous in the sense that they are independently determined. For example, the number or quality of runners in the race does not affect what sort of weather might eventuate.

245. Moreover, if the perfect segmentation risk-free rate is increased by just 1% above the perfect integration risk-free rate, our proposed theta estimate of 0.35 would *pass* the Lally test. That is, even setting aside all of the problems with such a test, our proposed estimate of 0.35 cannot be ruled out unless one assumes that government bond yields would be identical whether or not foreign investors are admitted.
246. In our view it would be an error to rely on a “test” that is based on such an implausible assumption.

Revised treatment of risk-free rates

247. In his recent report for the QCA, Lally (2014 QCA) simply defines the obvious difference in government bond yields in the two cases as being an irrelevant consideration that has no impact at all on the conclusions. The basis for this treatment is that the:

CAPM only assumes that the market for *risky* assets is completely segmented. No assumption is made in this model about the market for the risk-free asset.¹⁵²

248. That is, the new version of the Lally test is based on a scenario in which the market for government bonds is completely integrated while at the same time the market for all other assets is completely segmented. That is, all investors throughout the world own government bonds in all other countries in the world, whereas they are only allowed to own risky assets in their own country. This assumption is even more implausible than the one it is supposed to replace.
249. Such an inherently contradictory framework should not be used to determine the bounds for reasonable estimates of the utilisation rate. Indeed such a framework is not fit for any purpose at all. In our view, it would be an error to place any weight whatsoever on any analysis that is based on such a nonsensical foundation.

¹⁵² Lally (2014), p. 29.

10. Summary of advice from Lally

Preferred estimate of one

250. The primary recommendation from Lally (2013 AER) is that theta (or what he calls “the utilisation rate”) should be set to one on the basis of the assumption that all Australian shares are owned by resident investors who can costlessly redeem all credits that are distributed to them. Lally states that his “preferred estimate”¹⁵³:

...arises from the definition of the parameter as a weighted average across all investors; coupled with ignoring foreigners (consistent with the Officer CAPM), this yields an estimate of 1 (the utilisation rate of local investors).¹⁵⁴

251. In its ATCO Gas Draft Decision, the ERA does not adopt this primary recommendation from Lally, apparently because it is based on an implausible assumption that is clearly contradicted by the observable data – it “ignores foreigners” when in fact there is significant foreign investment in Australian equity.

Ranking of other estimates

252. Lally (2013 AER) sets out three criteria for ranking the possible estimates of theta (what he calls “U”):

that the estimate be consistent with the definition of U , as a value-weighted average over the utilisation rates of all investors who are relevant to the Officer CAPM, that the parameter estimate is likely to give rise to an estimated cost of equity from the Officer model that lies within the bounds arising from either complete segmentation or complete integration of equity markets, and that the estimate is reasonably precise.¹⁵⁵

253. The first of Lally’s criteria is that theta (or U) must be a value-weighted average over the utilisation rates of domestic investors, because we should “ignore foreigners.” That is, the first criteria is that theta (or U) must be 1. Indeed, Lally (2013 AER) notes that the only estimation approach that satisfies this criteria is his theoretically assumed estimate of 1.

254. The second criterion is that the estimate must pass the conceptual goal posts test, which requires an estimate of one or close to one. Again, Lally (2013 AER) notes that the only estimation approach that satisfies this criterion is his theoretically assumed estimate of 1.

255. The third criterion is precision – the extent to which whatever is being estimated can at least be estimated precisely.

256. The ERA proposes to estimate theta by placing primary reliance on the equity ownership and tax statistic redemption rate approaches. Lally (2013 AER) states that both of these approaches violate his first two criteria, and should be rejected in favour of his theoretical value of 1.

¹⁵³ Lally (2013 AER), p. 5.

¹⁵⁴ Lally (2013 AER), p. 3.

¹⁵⁵ Lally (2013 AER), p. 3.

257. He goes on to state that the only redeeming feature of the equity ownership approach is that, even though it is an estimate of the wrong thing, it is at least a statistically precise one.¹⁵⁶ However even that is disputed in Section 0 below.
258. Lally (2013 AER) concludes that the redemption rate approach produces an imprecise estimate, and therefore violates every one of his criteria.
259. That is, the equity ownership and tax statistic redemption rate approaches on which the ERA now seeks to rely are not endorsed by Lally (2013 AER). Lally does not recommend either of these approaches. Indeed these approaches violate every one of Lally's evaluation criteria, save for the fact that the equity ownership approach provides a reasonably precise estimate – albeit of the wrong thing. In our view it would be an error to conclude that Lally (2013 AER) provides support for the approach adopted by the AER.

¹⁵⁶ Lally (2013 AER), pp. 3-4.

11. Current equity ownership estimate

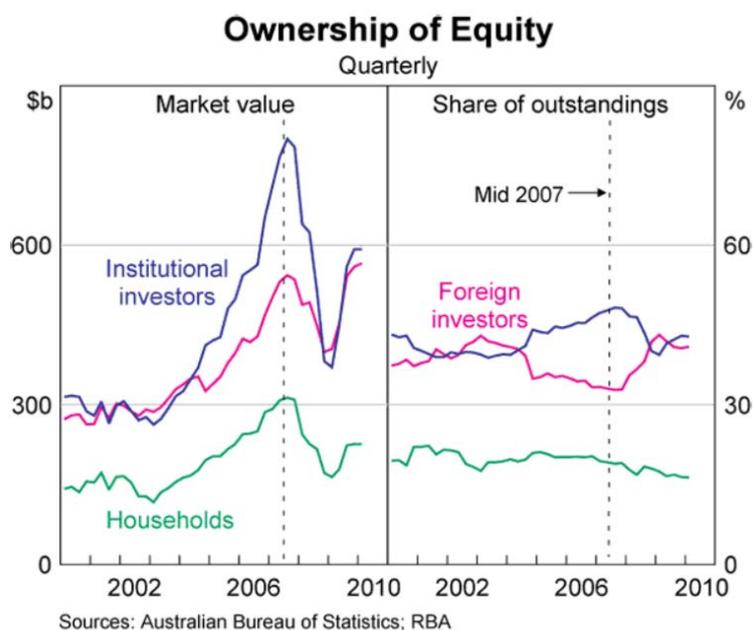
Source of the ERA estimate

260. In its ATCO Gas Draft Decision, the ERA adopts an equity ownership estimate of 0.7.¹⁵⁷ This figure was first reported in the AER's Draft Guideline in August 2013, which in turn refers to a 2007 estimate from the Australian Bureau of Statistics (ABS).¹⁵⁸

Updated estimates

261. A more recent RBA paper shows that the 2007 ABS estimate of the proportion of foreign equity ownership is materially lower than previous and subsequent estimates. That is, the 2007 estimate happens to produce the lowest estimate of foreign equity ownership (and consequently the highest estimate of theta) of any point in the last 10 years – as illustrated in Figure 8 below.

Figure 8
RBA estimates of the ownership of Australian equity



Source: Black and Kirkwood (2010), RBA.

262. If the ABS aggregate equity ownership estimate is to be used, the 2007 estimate should not be preferred to the updated estimates – which indicate a materially higher proportion of foreign ownership.

The reliability of the 0.7 estimate

263. Moreover, there are a number of reasons why the aggregate ABS equity ownership estimate is inappropriate and should not be used at all. First, in addition to privately-owned equity the ABS aggregate estimate includes equity in government-owned trading enterprises, general government and

¹⁵⁷ ERA ATCO Gas Draft Decision, p. 214, Paragraph 963.

¹⁵⁸ AER Explanatory Statement, Footnote 367, p. 130 cites the source of the 70% figure as being Australian Bureau of Statistics, *Feature article: Foreign ownership of equity*, Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5302.0Feature%20Article10Sep%202007?opendocument&tabname=Summary&prodno=5302.0&issue=Sep%202007&num=&view>.

the Reserve Bank. If the purpose is to determine what proportion of imputation credits (which are distributed with the dividends paid by non-government corporations) are likely to be redeemed by the recipients, the data should be restricted to privately-owned equity. The inclusion of equity in GOCs will cause a systematic downward bias in the estimate of foreign ownership. The ASX has recognised that issue and has presented foreign ownership estimates for privately-owned listed equity. Lally (2012) refers to the ASX (2011) estimate of 46% foreign ownership and concludes that “the proportion of Australian equities held by Australians” is 54%.¹⁵⁹ ASX (2013) provide the most recent estimate of the proportion of privately-owned equity that is owned by foreign investors, concluding that the best estimate remains at 46%.¹⁶⁰

264. The ASX estimate is based on data for privately-owned equity. However, this estimate apparently includes listed and unlisted equity.¹⁶¹ The ABS warns that its estimates in relation to unlisted equity are unreliable. In particular, the ABS warns that:

The estimated market value of equity issued by some sectors is considered to be of poor quality. In particular, estimates of the market value of the amount issued by private corporate trading enterprises are considered poor because they are largely built up from counterpart and other information obtained from ABS Surveys of Foreign Investment and Balance Sheet Information. This sector covers equity issued by both listed and unlisted private corporate trading enterprises, of which there are over half a million.

In terms of the analysis undertaken here, errors in the estimated market value of equity on issue will impact on the accuracy of estimates of the proportion of that equity owned by non-residents.

A further concern relates to valuation. While both financial accounts and international investment statistics (from which the rest of the world data are sourced) are on a market value basis in principle, collection and estimation methods differ between the two sets of statistics...Because of the differences in the methodologies used, it is possible that there could be more variability in the market value estimates of equity held by the rest of the world than in the estimated market value of the equity on issue, thus causing some variation in the foreign ownership series derived from these data.¹⁶²

Conclusions and recommendations in relation to equity ownership estimates

265. We first note that our view is that theta should be estimated as the value of distributed credits, not as the proportion of them that might be redeemed. The equity ownership approach does not seek to estimate the value of distributed credits; it seeks to estimate the proportion of distributed credits that might be redeemed. Consequently, our view is that the equity ownership approach does not provide relevant evidence – it is an estimate of the wrong thing. In our view, the redemption rate (estimated using the tax statistics approach or the equity ownership approach) should not be used to estimate theta. In our view, the best that can be done with any estimate of the redemption rate is to use it as an upper bound cross check on the estimate of the *value* of distributed credits, estimated with reference to actual market prices.

¹⁵⁹ Lally (2012 QCA), p. 6.

¹⁶⁰ ASX (2013), p. 2. The ASX figures are based on ABS series 5232.0, Table 32 for the September quarter 2012.

¹⁶¹ See the data description for ABS series 5232.0 at [http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5232.0 Explanatory%20Notes1Jun%202013?OpenDocument](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5232.0%20Notes1Jun%202013?OpenDocument).

¹⁶² See the ABS feature article that first explains the foreign ownership calculations at <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5306.0Feature%20Article150Jun%201992?opendocument&tabname=Summary&prodno=5306.0&issue=Jun%201992&num=&view=>.

266. If the equity ownership estimate is to be used for any purpose, it is our view that the 30% estimate of foreign ownership that is adopted in the ATCO Gas Draft Decision is unreliable and it would be an error to rely on it because it is:

- i) Based on data from 2007 that is data and has been superseded;
- ii) Includes equity in GOCs, general government and the Reserve Bank; and
- iii) Is subject to a warning from the ABS about data problems and inaccuracies.

12. Errors in the ERA's approach

Summary of conclusions

267. In our view, the ERA has erred in defining theta to be the proportion of distributed credits that are redeemed rather than the value of distributed credits. That is, our view is that the ERA has embarked on the task of estimating the wrong thing. The reasons for our conclusion that this new definition of theta is in error are as follows:

- a) The Australian regulatory framework reduces the allowed return to shareholders by $\$ \gamma$ for every \$1 of imputation credits created.¹⁶³ If shareholders do not *value* the \$1 imputation credit at $\$ \gamma$, they will not receive an appropriate return;
- b) The National Gas Rules and National Electricity Rules specifically define that “ γ is the *value* of imputation credits”;¹⁶⁴
- c) The Australian Competition Tribunal has held that “The utilisation rate (or theta) represents the per-dollar value to a shareholder of a distributed imputation credit,”¹⁶⁵ and that “investors may not value cash dividends and franking credits to their full dollar values, or to the same dollar value for each. This is where θ (theta) comes in.”¹⁶⁶
- d) Any reasonable analysis of the relevant literature leads to the conclusion that gamma is intended to be a measure of the value of imputation credits. Even McKenzie and Partington (2013), state that:

Theta (θ) [one of the components of gamma] is the value to the investor of the imputation credits distributed, expressed as a fraction of face value,¹⁶⁷

and:

The standard practice has been to measure the market value of theta.¹⁶⁸

and:

The question then is how to measure the market value of the imputation credits.¹⁶⁹

- e) Lally (2013 AER) makes it clear that what he calls the *utilisation rate* (U) is the extent to which distributed imputation credits (IC) are capitalised into the stock price – the extent to which the stock price reflects the *value* of distributed imputation credits;¹⁷⁰

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + R_f + \phi \beta_e}$$

¹⁶³ The regulatory framework actually reduces the allowed return by $\$ \gamma$ for every \$1 of corporate tax paid, but corporate tax paid equals imputation credits created for a domestic firm, such as regulated businesses.

¹⁶⁴ NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14), emphasis added.

¹⁶⁵ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 68.

¹⁶⁶ Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 104.

¹⁶⁷ McKenzie and Partington (2013), p. 31.

¹⁶⁸ McKenzie and Partington (2013), p. 32.

¹⁶⁹ McKenzie and Partington (2013), p. 33.

¹⁷⁰ Lally (2013 AER), p. 10, Equation (3).

- f) The ERA justifies their use of the redemption rate on theoretical models developed by Lally and others. However, the Lally model only applies to the special case where Australia is assumed to be completely segmented from world capital markets, in which case there is zero foreign investment.¹⁷¹ By contrast, the ERA seeks to use the Lally model to justify its use of a redemption rate that reflects the extent to which Australian equities are owned by foreign investors. Lally (2013 AER) has advised that his model does not apply in such a setting – there is no market clearing condition and one cannot solve for any equilibrium pricing results. The ERA has either misunderstood or ignored this advice. There is no theoretical framework that supports the ERA’s proposed approach.

268. In our view, the ERA has erred in re-defining theta to be the redemption rate rather than the value of distributed credits. This has led the ERA to rely on estimates of the redemption rate, which are not estimates of theta. At most, they are upper bound cross checks for theta, as explained by the Tribunal.¹⁷²

269. In our view, theta represents the value of distributed credits and it should be estimated as such. Dividend drop-off analysis is specifically designed to estimate the value of distributed credits. As set out in Section 8 of this report, our view is that:

- a) The econometric issues that have recently become a concern for the ERA do not render dividend drop-off analyses unreliable. In fact, to the extent that these issues have an effect, it would be to increase the estimate of theta; and
- b) The SFG (2011, 2013) dividend drop-off studies should be strongly preferred to the ERA study.

270. Our conclusion is that the best available estimate of theta is the SFG dividend drop-off estimate of 0.35. This is the highest quality estimate of the relevant (value) concept.

271. We also conclude that the ERA has erred in placing weight on what it calls the “conceptual goal posts” test. In Section 9 of this report we explain that this “test” is based on such an inherently contradictory framework that it should not be used to determine the bounds for reasonable estimates of the utilisation rate. Indeed such a framework is not fit for any purpose at all. In our view, it would be an error to place any weight whatsoever on any analysis that is based on such a nonsensical foundation.

272. Finally, we demonstrate in Section 10 of this report that the equity ownership and tax statistic redemption rate approaches on which the ERA now seeks to rely are not endorsed by Lally (2013 AER). Lally does not recommend either of these approaches. Indeed these approaches violate every one of Lally’s evaluation criteria, save for the fact that the equity ownership approach provides a reasonably precise estimate – albeit of the wrong thing. In our view it would be an error to conclude that Lally (2013 AER) provides support for the approach adopted by the AER.

Regulatory implications

273. We note that the AEMC has explicitly stated that achieving the National Gas Objective (NGO) and Revenue and Pricing Principles (RPP) requires the best estimate possible in the circumstances of the benchmark efficient financing costs, an important component of which is that required return on equity:

¹⁷¹ Lally recommends that regulators should assume complete segmentation. The model also applies in the case of perfect integration (which would lead to gamma being set close to zero), but this case is not recommended.

¹⁷² Application by Energex Limited (No 2) [2010] ACompT 7 (13 October 2010), Paragraph 91.

Achieving the NEO, the NGO, and the RPP requires the best possible estimate of the benchmark efficient financing costs. The Commission stated that this can only be achieved when the estimation process is of the highest possible quality. The draft rule determination stated that this meant that a range of estimation methods, financial models, market data and other evidence must be considered.¹⁷³

274. For the reasons set out above, our view is that the ERA's current estimate of theta is not the best estimate possible in the circumstances. Indeed it is not even an estimate of theta – it is an estimate of the redemption rate, which is a different concept entirely. It then follows that the ERA has not produced “the best possible estimate of the benchmark efficient financing costs” as required by the AEMC above and in the Allowed Rate of Return Objective. It also follows, as set out by the AEMC above, that the ERA's allowed return will not achieve the NGO or RPP. Specifically, a key part of the NGO is to:

promote efficient investment in...natural gas services...for the long term interests of consumers.¹⁷⁴

275. An allowed return on equity that is materially below the efficient financing costs of the benchmark efficient entity will create incentives for under investment, which is not in the long-term interests of consumers.¹⁷⁵

276. Similarly, the RPP require that:

regard should be had to the economic costs and risks of the potential for under and over investment,¹⁷⁶

and that:

a reference tariff should allow for a return commensurate with the regulatory and commercial risks involved.¹⁷⁷

277. These principles cannot be complied with if the allowed return does not reflect the best estimate possible in the circumstances of the efficient financing costs of the benchmark efficient entity.

278. The RPP also require that:

a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs,¹⁷⁸

which would seem to require that the allowed return must be at least commensurate with the efficient financing costs of the benchmark efficient entity.

¹⁷³ AEMC Rule Change Final Determination, p. 43.

¹⁷⁴ National Gas Law, s. 23.

¹⁷⁵ We note that (other things being equal) a higher estimate of theta produces a higher estimate of gamma, which reduces the returns that the firm is able to provide to equity investors.

¹⁷⁶ National Gas Law, s. 24(6).

¹⁷⁷ National Gas Law, s. 24(5).

¹⁷⁸ National Gas Law, s. 24(2).

279. For all of the reasons set out above, our view is that:

- a) The Draft Decision should be varied so that the Final Decision corrects each of the errors we have identified in this report; and
- b) Doing so will, or will be likely to, result in a decision which is materially preferable to the Draft Decision in making a contribution to the NGO as regards the estimation and quantum of the cost of equity.

280. In forming these views we have taken into account the constituent components of the gamma parameter and how they interrelate with each other, the RPPs, and the Draft Decision as a whole as it relates to the allowed return to equity, together with each of the other relevant considerations raised through-out this report.

13. Declaration

281. I confirm that 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 from the Court.



Professor Stephen Gray

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Appendix 1: The role of gamma in the Australian regulatory setting

The regulatory tax calculation in a non-imputation setting

282. Consider a firm with \$700 of equity in its RAB and an allowed return on equity of 10%. In the absence of dividend imputation, such a firm would require an after-tax profit of \$70 to distribute to its shareholders. This would require a pre-tax profit of \$100, as set out in the table below.

Profit before tax	100
Less corporate tax	30
After-tax profit available for distribution to shareholders	70

283. In general, in the absence of dividend imputation, a pre-tax profit of \$X will generate an after-tax profit (available for distribution to shareholders) of $\$X(1-T)$ where T is the corporate tax rate. In this case, the required pre-tax profit can be determined by solving:

$$X(1 - 0.3) = 70,$$

where X is \$100 in this case.

284. That is, the regulator would allow the firm to charge prices so that the expected pre-tax profit is \$100, in order that there would be \$70 of after-tax profits available to shareholders, as required.

285. Note that the \$70 benefit that the shareholders receive from the after-tax profit is independent of the firm's payout policy. For example, suppose the firm distributes a dividend of \$50 and retains \$20 to fund future investment. If the invested funds earn a normal return, the value of those investments will be \$20. That is, whatever is not distributed as a dividend increases the value of the firm by an equivalent amount.

The regulatory tax calculation in an imputation setting

286. Now consider the case *with* imputation. We consider the same firm as above with \$700 of equity capital and an allowed return of 10%. In the regulatory setting, the allowed return on equity includes the value of imputation credits – it represents the total return required by shareholders, a portion of which is assumed to come in the form of imputation credits.

287. By way of example, suppose gamma is set to 0.25. In that case, a \$100 pre-tax profit produces the same \$70 after-tax profit for distribution to shareholders. It also produces imputation credits with a face value of \$30 (equal to the amount of corporate tax paid). For gamma set to 0.25, the value of those imputation credits is $0.25 \times 30 = 7.5$. Thus, the total return to shareholders is the sum of the \$70 after-tax profit and the \$7.5 of value from imputation credits, as set out in the table below.

Profit before tax	100
Less corporate tax	30
After-tax profit available for distribution to shareholders	70
Value of imputation credits	7.5
Total return to shareholders	77.5

288. In general, a pre-tax profit of \$X will generate an after-tax profit for shareholders of $\$X(1-T)$ plus imputation credits valued at γTX . In this case, a pre-tax profit of \$100 produces an after-tax profit for distribution to shareholders of:

$$100(1 - 0.3) = 70.$$

and imputation credits with a value of:

$$\gamma TX = 0.25 \times 0.3 \times 100 = 7.5.$$

289. In summary, a pre-tax profit of \$X produces a return to shareholders of:

$$X(1 - T) + \gamma TX$$

which can also be written as:

$$X(1 - T(1 - \gamma)).$$

290. In the example above, a pre-tax profit of \$100 produces a total return to shareholders of:

$$100(1 - 0.3(1 - 0.25)) = 77.5.$$

291. This is more than the \$70 return that is required by shareholders of a firm with \$700 of equity capital and an allowed return on equity (including imputation credits) of 10%. In this case, the correct pre-tax profit is determined by solving:

$$X(1 - 0.3(1 - 0.25)) = 70 \tag{1}$$

292. In this case, the required pre-tax profit is \$90.32. This produces an after-tax profit for shareholders of \$63.23 and imputation credits with a value of \$6.77 – a total of \$70, as set out in the table below.

Profit before tax	90.32
Less corporate tax (30%)	27.10
After-tax profit available for distribution to shareholders	63.23
Value of imputation credits (0.25 times corporate tax paid)	6.77
Total return to shareholders	70.00

Estimated tax cost

293. The Rules define the Estimated Tax Cost (ETC)¹⁷⁹ as:

$$ETC = (ETI \times r_t)(1 - \gamma).$$

where *ETI* is the estimated taxable income (90.32 in the above example) and *r_t* is used to represent the corporate tax rate (30% in the above example). That is, the expected tax cost in the above example is:

$$ETC = (90.32 \times 0.3)(1 - 0.25) = 20.32 \tag{2}$$

¹⁷⁹ NER Clause 6.5.3.

294. This calculation recognises that the firm pays corporate tax of 27.10, which is offset by the value that shareholders receive from imputation credits, 6.77 (i.e., $27.10 - 6.77 = 20.32$, with rounding).

295. In its PTRM, the AER combines Equations (1) and (2) above. This enables the calculation of the expected tax cost as:

$$ETC = \frac{\text{Required return on equity}}{\text{ex - imputation credits}} \times \frac{T}{1 - T(1 - \gamma)} \quad (3)$$

296. In the above example, we have:

$$ETC = 70 \times \frac{0.3}{1 - 0.3(1 - 0.25)} = 27.10$$

as set out in Row 44 of the Analysis sheet of the PTRM.

297. The PTRM then computes the value of imputation credits by multiplying the corporate tax payment gamma at Row 43 of the Analysis sheet of the PTRM. In the example above, this is:

$$27.10 \times 0.25 = 6.77.$$

298. The required pre-tax profit is then determined as:

$$\begin{aligned} \text{Pre - tax profit} &= \text{After - tax profit} + ETC - \gamma \times ETC \\ &= 70 + 27.10 - 6.77 = 90.32, \end{aligned} \quad (4)$$

exactly as set out above. This calculation is performed at Row 27 of the Analysis sheet of the PTRM.

Returns with and without imputation credits

299. In the above example, shareholders require a total return (including imputation credits) of 10%, which amounts to \$70 for equity capital of \$700. The \$70 return is paid in two components:

- a) Imputation credits comprise \$6.77 of the \$70 total. This amounts to 9.68% of the total; and
- b) The firm is allowed to charge prices that enable it to achieve an after-tax profit for the shareholders of \$63.23, which amounts to 90.32% of the total.

300. Officer (1994) has previously shown that the proportion of the total return that comes from after tax profits (i.e., not including the value of imputation credits) is:

$$\frac{1 - T}{1 - T(1 - \gamma)},$$

which, in the above example is:

$$\frac{1 - 0.3}{1 - 0.3(1 - 0.25)} = 90.32\%.$$

301. Similarly, Officer (1994) has also previously shown that the relationship between the with-imputation return and the ex-imputation return is given by:

$$r_{ex} = r_{with} \frac{1-T}{1-T(1-\gamma)}$$

302. In the above example, we have:

$$r_{ex} = 10\% \frac{1-0.3}{1-0.3(1-0.25)} = 9.032\%$$

303. Note that the return from after-tax profits is \$63.23, which amounts to a return of 9.032% on the \$700 of equity capital.

Calculations in the Australian regulatory framework

304. The Australian regulatory framework, and the AER's PTRM in particular, begin with an estimate of the total (with-imputation) required return on equity (10% in the above example). From this, the PTRM computes the total required return to equity (\$70 in the above example).

305. The PTRM then computes the pre-tax profit that would be required to produce the required return to equity by solving:

$$X(1-T(1-\gamma)) = \frac{\text{Total required return to equity}}$$

306. In the example above, a pre-tax profit of \$90.32 produced an after-tax profit for shareholders of \$63.23 and imputation credits with a value of \$6.77 – making up the \$70 total required return.

307. The regulator then sets prices to produce the required pre-tax profit (\$90.32 in the above example).

308. The starting point for these calculations is an estimate of the with-imputation required return on equity. Consequently, any approach that produces an estimate of the ex-imputation required return on equity must first be converted to a with-imputation required return on equity for use in the Australian regulatory framework (and the AER's PTRM in particular). As set out above, converting between ex-imputation and with-imputation required returns is straightforward, as shown by Officer (1994):

$$r_{ex} = r_{with} \frac{1-T}{1-T(1-\gamma)} \tag{5}$$

309. For example, IPART uses a number of versions of the dividend discount model to inform its estimate of the required return on equity. The dividend discount approach takes no account of imputation credits at all, and consequently produces an estimate of the ex-imputation required return on equity. IPART use the Officer formula set out above to convert the ex-imputation estimate into a with-imputation estimate, for use in the regulatory model.

310. In summary, IPART and the PTRM both convert between the with-imputation and ex-imputation required return on equity using the Officer (1994) formula in Equation (5) above.

Appendix 2: Other papers and submissions on value vs. redemption rates

Overview

311. The ERA's ATCO Gas Draft Decision refers to a number of papers and reports that consider the relative merits of the *value* and *redemption rate* interpretations of theta. This issue was addressed in some length in the AER's Guideline. This appendix reviews the work on this issue that was considered in the AER Guideline.

McKenzie and Partington (2011)

312. The AER's Guideline materials refer to advice from McKenzie and Partington (2011) as supporting the redemption rate interpretation of theta. In its Guideline materials, the AER states that the McKenzie and Partington report that it commissioned during the *Gamma* case "raised fundamental questions over the framework."¹⁸⁰

313. In that report, McKenzie and Partington (2011) state that there are two possible interpretations of theta:

■ the market value of franking credits distributed¹⁸¹

and:

■ the franking credits redeemed as a percentage of franking credits distributed...known as the utilisation ratio.¹⁸²

314. That is, McKenzie and Partington (2011) are clear about the fact that one must choose between a *value* interpretation and a *utilisation* interpretation. In our view, it is this exact distinction that the AEMC sought to clarify in its recent Rule change which specifies that gamma "is the value of imputation credits." The standard regulatory practice has always been to estimate the *value* of imputation credits and this remains the practice of all regulators other than the AER. The Rule change clarifies that the *value* interpretation that has always been used is the correct one.

315. McKenzie and Partington (2011) are also clear about the fact that:

- a) Empirical studies such as dividend drop-off analysis provide an estimate of the *value* of imputation credits; whereas
- b) Redemption rates provide an estimate of the *utilisation* of credits.¹⁸³

316. Nowhere in their report do McKenzie and Partington (2011) state their view about which of the value or utilisation interpretations is the appropriate one in the regulatory/valuation setting, although they do note that the general consensus is that the value interpretation should be used:

■ The literature subsequent to Officer has tended to view both gamma and theta as market values.¹⁸⁴

¹⁸⁰ AER Rate of Return Guideline, Explanatory Statement, Appendix H, p. 149.

¹⁸¹ McKenzie and Partington (2011), p. 2.

¹⁸² McKenzie and Partington (2011), p. 2.

¹⁸³ McKenzie and Partington (2011), p. 2.

¹⁸⁴ McKenzie and Partington (2011), p. 3.

317. In their more recent submission to the QCA, McKenzie and Partington (2013) clarify their view as follows:

Theta (θ) is the value to the investor of the imputation credits distributed, expressed as a fraction of face value,¹⁸⁵

and:

The standard practice has been to measure the market value of theta.¹⁸⁶

318. McKenzie and Partington (2013) then state that:

The question then is how to measure the market value of the imputation credits¹⁸⁷

and the balance of their report considers various empirical estimates of the value of imputation credits, without any further discussion of utilisation/redemption rates.

319. In summary, the advice from McKenzie and Partington does not recommend that the redemption rate interpretation of theta should be adopted. Rather, McKenzie and Partington simply state that if a regulator decides to define gamma in terms of redemption rates, then gamma should be estimated in terms of redemption rates. Certainly McKenzie and Partington never suggest that redemption rates should be used to the exclusion of market value estimates, or even in preference to market value estimates.

320. In our view, the advice from McKenzie and Partington (2011, 2013) does not support the sole reliance on redemption rates when estimating gamma. By contrast, McKenzie and Partington (2011, 2013) consider empirical estimates of the *value* of imputation credits at some length.

Handley (2008)

321. During its 2009 WACC Review, Handley (2008) provided the same advice in a report commissioned by the AER. One issue that was addressed in the Handley report was the appropriate interpretation of the redemption rate estimates reported by Handley and Maheswaran (2006). Handley (2008) advised the AER that the Handley and Maheswaran study estimated redemption rates, rather than the value of distributed credits. Handley further advised that it would be inappropriate to use a redemption rate interpretation of theta for the purposes of estimating gamma. He advised the AER that a redemption rate estimate of theta will not produce an appropriate estimate of gamma – at best, it will produce an upper bound for gamma.

322. In particular, Handley (2008) advised the AER that an estimate of gamma based on the redemption rate interpretation:

may be interpreted as a reasonable upper bound on the value of gamma.¹⁸⁸

¹⁸⁵ McKenzie and Partington (2013), p. 31.

¹⁸⁶ McKenzie and Partington (2013), p. 32.

¹⁸⁷ McKenzie and Partington (2013), p. 33.

¹⁸⁸ Handley (2008), p.8.

323. At the Roundtable convened by the AER in October 2008, Handley further addressed the concept of an estimate of gamma that was based on a redemption rate (rather than on a market value estimate of theta). He again stated clearly that the redemption rate interpretation does not provide an appropriate estimate of gamma:

Well, that's not our estimate of gamma therefore we haven't said that's our estimate of gamma. In some ways, what you could do is you could certainly say that is perhaps an upper bound for what gamma is.¹⁸⁹

324. In summary, the author of the main redemption rate study that the AER relied upon at its last WACC Review has advised the AER that the study estimates the redemption rate and not theta, and that redemption rates cannot be used to provide an appropriate estimate of gamma. Handley's point is that his redemption rate study provides a reasonable estimate of the utilisation of imputation credits, but that the utilisation of credits cannot be used to produce an appropriate estimate of gamma.

325. In our view, the advice from Handley (2008) does not support the sole reliance on redemption rates when estimating gamma. A more appropriate interpretation of Handley (2008) suggests that redemption rates can only be used as an upper bound cross check.

Officer (1994)

326. In its Guideline materials, the AER points out that Officer (1994) defines gamma to be both:

- a) The value of a dollar of tax credit to the shareholder; and
- b) The proportion of company tax that is rebated against personal tax.¹⁹⁰

327. In their report for the AER, McKenzie and Partington (2011) also note this apparent inconsistency, describing it as “a potential source of confusion”¹⁹¹ and “ambiguity.”¹⁹²

328. Logically, there are two paths through the confusion and ambiguity caused by the drafting of the text in Officer (1994):

- a) Conclude that Officer means gamma to have a *value* interpretation and that words suggesting a *utilisation* interpretation were poorly drafted (i.e., the reference to utilisation should be read as simply identifying the source of value); or
- b) Conclude that Officer means gamma to have a *utilisation* interpretation and that words suggesting a *value* interpretation were poorly drafted.

329. In our view, the first interpretation is plausible and the second is not. To see this, first consider the following passage from Officer (1994):

Where there is a market for tax credits one could use the market price to estimate the value of γ for the marginal shareholder, i.e. the shareholder who implicitly sets the price of the shares and the price of γ and the company's cost of capital at the margin, but

¹⁸⁹ AER Roundtable transcript, 10 October 2008, p. 18.

¹⁹⁰ AER Rate of Return Guideline, Explanatory Statement, Appendix H, p. 138. The QCA also notes this apparent inconsistency at p. 93.

¹⁹¹ McKenzie and Partington (2011), p.2.

¹⁹² McKenzie and Partington (2011), p.3.

where there is only a covert market, estimates can only be made through dividend drop-off rates.¹⁹³

330. In our view, it is inconceivable that anyone who so clearly refers to the “market price” and “value” and who specifically references dividend drop-off analysis could possibly be of the view that the value interpretation was the one that was incorrect. Such explicit statements are unlikely to have been made by accident. It is far more likely that the references to “the proportion of tax collected from the company which gives rise to the tax credit associated”¹⁹⁴ have simply been poorly drafted.

331. Second, one can bypass the ambiguous language in Officer (1994) altogether and go directly to the mathematical equations and numerical examples to see precisely how gamma is interpreted in his paper. For example, consider the calculations in Officer’s worked example. In particular, consider the calculations relating to the vanilla definition of WACC labelled “III” on p. 17 of Officer (1994). That example adopts the parameters set out in Table 1 below.

Table 1
Parameters for Officer (1994) worked example

Parameter	Symbol	Estimate
Corporate tax rate	T	39%
Gamma	γ	0.5
Cost of equity	r _e	17.70%
Cost of debt	r _d	14.32%

Source: Officer (1994)

332. The cash flows and imputation credits from that example are summarised in Table 2 below.

Table 2
Cash flows and imputation credits for Officer (1994) worked example

	Symbol	\$ (millions)
Pre-tax profit	X _O	39.96
Interest	X _D	5.14
Taxable income	X _O -X _D	34.82
Corporate tax	TAX	13.58
Face value of imputation credits	IC	13.58

Source: Officer (1994)

333. In general, the annual cash flow to equity is:

$$\text{Cash Flow to Equity} = \text{Pre-tax Profit} - \text{Interest} - \text{Corporate Tax} + \text{Value of Imputation Credits}$$

which can be expressed as:

$$CF(\text{Equity}) = X_o - X_D - TAX + \gamma \times IC.$$

¹⁹³ Officer (1994), p. 5.

¹⁹⁴ Officer (1994), p. 5.

334. Consequently, the annual cash flow to equity in this case is:¹⁹⁵

$$\begin{aligned} CF(Equity) &= X_o - X_D - TAX + \gamma \times IC \\ &= 39.96 - 5.14 - 13.58 + 0.5 \times 13.58 \\ &= 28.03. \end{aligned}$$

335. Since, in this example, all cash flows are perpetuities the value of equity is given by:¹⁹⁶

$$E = \frac{X_o - X_D - TAX + \gamma \times IC}{r_e} = \frac{39.96 - 5.14 - 13.58 + 0.5 \times 13.58}{0.177} = 158.362.$$

336. This expression unambiguously shows that gamma represents the extent to which imputation credits are capitalised into the stock price. Gamma shows the effect that imputation credits have on the *value* of the shares. In the absence of imputation credits, the value of the firm's equity would be:

$$E_{ex-IC} = \frac{X_o - X_D - TAX}{r_e}.$$

337. Gamma then represents the increase in the *value* of equity due to imputation credits, expressed as a proportion of the face value of imputation credits:

$$\gamma = \frac{E_{with-IC} - E_{ex-IC}}{IC}.$$

338. This shows, unambiguously, that gamma has a *value* interpretation.

339. Finally, we note that McKenzie and Partington (2011) have advised the AER that:

The literature subsequent to Officer has tended to view both gamma and theta as market values.¹⁹⁷

340. We suggest that the foregoing discussion explains why it is that the standard practice is to view gamma and theta as market values. We also suggest that the literature subsequent to Officer has *uniformly* viewed gamma and theta as market values. Even the authors of redemption rate studies view gamma and theta as market values, such that redemption rates can only provide an upper bound.

341. In our view, Officer (1994), properly and holistically interpreted, does not support the sole reliance on redemption rates when estimating gamma. That is, the QCA's proposed approach is inconsistent with Officer (1994).

¹⁹⁵ Since, in this example, all of the profits after interest and tax are paid as a dividend to the shareholders, we can also write $CF(Equity) = Dividend + \gamma \times IC = 21.24 + 0.5 \times 13.58 = 28.03$.

¹⁹⁶ Similarly the value of debt is given by $D = \frac{5.14}{0.14316} = 35.903$ in which case the value of the firm is $V = E + D = 194.265$ as set out in Officer (1994, p. 17).

¹⁹⁷ McKenzie and Partington (2011), p. 3.

Hathaway and Officer (2004)

342. The AER's Guideline materials present a quote from Hathaway and Officer (2004) that is claimed to be "supporting the cash flow interpretation of the value of imputation credits."¹⁹⁸ However, the Guideline materials have misconstrued the point that Hathaway and Officer are making. The point being made is simply that estimates of the value of distributed credits are not estimates of gamma, but of theta. They need to be multiplied by the distribution rate (F) to obtain an estimate of gamma.

343. Indeed the Guideline materials quote only the first half of the relevant paragraph. In the second half of that same paragraph, Hathaway and Officer (2004) state that:

Gamma is not the *value* of distributed credits alone. It is the compounding of two factors – the fraction of tax distributed as credits multiplied by the *value* of distributed credits. In this sense it is the *value* of all possible credits, that is, the *value* of all tax payments giving rise to the creation of credits.¹⁹⁹

344. Moreover, the primary purpose of the Hathaway and Officer (2004) study was to present the results of a dividend drop-off analysis, which is clearly relevant only to the standard *value* interpretation of theta. Hathaway and Officer also present some statistics relating to redemption rates, but that analysis has been retracted by Hathaway who has since stated that it should not be relied upon.²⁰⁰

345. In our view, Hathaway and Officer (2004) does not support the sole reliance on redemption rates when estimating gamma. In particular, the fact that Hathaway and Officer (2004) is primarily a dividend drop-off analysis would suggest that they would not support exclusive reliance on redemption rates when estimating gamma and that they do not consider a market value interpretation to be irrelevant.

¹⁹⁸ AER, Rate of Return Guideline, Explanatory Statement, Appendix H, p. 143, emphasis added.

¹⁹⁹ Hathaway and Officer (2004), p. 7.

²⁰⁰ Hathaway (2013), Paragraph 12.

Appendix 3: The effect of additional trading around the ex-dividend event

Overview

346. The ERA's ATCO Gas Draft Decision refers to a number of potential issues that arise from the trading that occurs around ex-dividend dates. These issues have all been previously considered as part of the AER's Guideline process. This appendix reviews the relevant material from the AER Guideline process.

347. In its Explanatory Statement, the AER sets out its concerns regarding the abnormally high trading volumes that tend to be observed around ex-dividend events.²⁰¹ The AER notes that drop-off studies are based on stock price changes between the cum-dividend and ex-dividend prices, and that there is evidence that trading volumes are higher than normal over those two days. The AER further notes that a particular mix of investors might be motivated to trade around the ex-dividend day, and that this mix might differ from the mix of investors who trade at different times of the year. The AER refers to this as a potential "clientele effect," concluding that:

By largely reflecting the abnormal trading conditions on the two relevant trading days, dividend drop off studies may not identify the market value for the representative investor in other circumstances.²⁰²

348. In summary, the AER's concern is that the theta estimated using dividend drop-off analysis will reflect the equilibrium value of the mix of investors who trade around the ex-dividend date, which may differ from the mix of investors who provide long-term equity capital to the firm.

The impact of additional trading

349. The first step in addressing the potential clientele effect is to consider whether there is any evidence that the mix of investors who trade around ex-dividend events is unusual, and if so, whether their trading is likely to lead to an under- or over-estimate of theta. This is done by considering whether there is any evidence about the effect that the additional trading around ex-dividend events might have on the cum-dividend price and on the ex-dividend price.

350. In this regard, the AER cites evidence of abnormal trading being associated with an increase (or "run-up") in the cum-dividend price.²⁰³ The Explanatory Statement cites the report prepared for the AER by McKenzie and Partington (2011), who survey the relevant research and report that there is:

Direct evidence of the presence of short term trading about the ex-dividend date in Australia²⁰⁴

and that

Short term traders appear to be arbitraging higher yield franked dividends and low spread stocks.²⁰⁵

351. They conclude that the result is

²⁰¹ Explanatory Statement, pp. 242-243.

²⁰² Explanatory Statement, p. 242.

²⁰³ Explanatory Statement, p. 242.

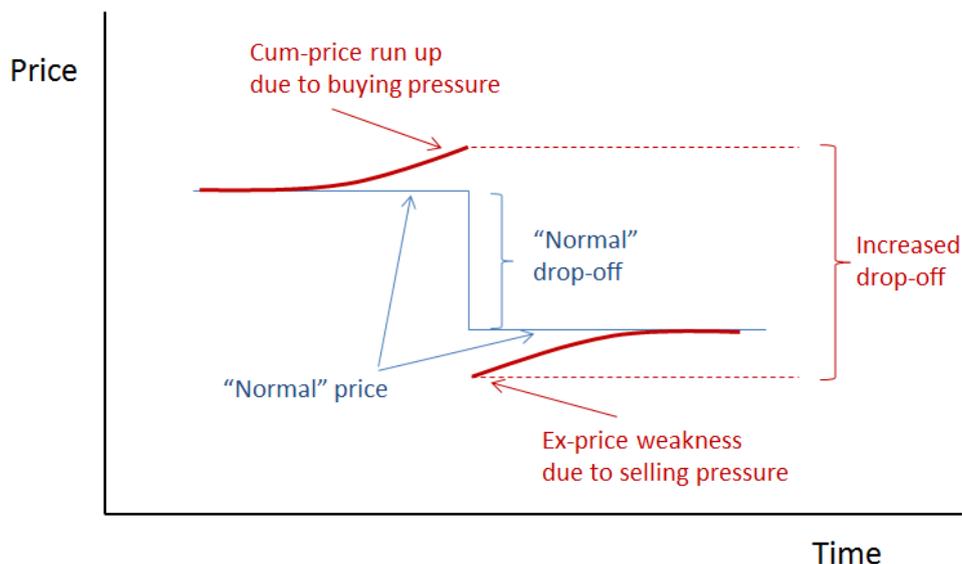
²⁰⁴ McKenzie and Partington (2011), p. 9.

²⁰⁵ McKenzie and Partington (2011), p. 10.

Buying pressure cum dividend, selling pressure ex dividend, and an abnormal volume of trades. Note however, that these price effects are not just from short-term trading.²⁰⁶

352. In summary, McKenzie and Partington advise that there is buying pressure from a range of investor types that causes the cum-dividend price to be higher than it would otherwise be (the price run-up) and selling pressure from a range of investor types that causes the ex-dividend price to be lower than it would otherwise be. The result is that the abnormal trading volume causes the dividend drop-off to be larger than it would have been if trading among market participants had been at more normal levels. This is illustrated in Figure 9 below.²⁰⁷

Figure 9
Effect of excess trading on dividend drop-off estimates



353. According to McKenzie and Partington, abnormal buying pressure causes an increase in the cum-dividend price and abnormal selling pressure causes a decrease in the ex-dividend price. To the extent that these effects are material, the result is a dividend drop-off that is larger than it would otherwise be. This results in the estimate of theta being larger than it would otherwise be. That is, to the extent that the increase in trading volume around the ex-dividend date has an effect, it will result in an over-estimate of theta.

Potential effect of short-term traders

354. The Explanatory Statement also considers advice from McKenzie and Partington (2011) about the potential impact of short-term investors around the ex-dividend event:

McKenzie and Partington identify that if short term traders are highly involved in trading around the cum-dividend/ex-dividend dates, dividend drop off studies would underestimate the value of dividends and franking credits to those traders.²⁰⁸

²⁰⁶ McKenzie and Partington, p. 10.

²⁰⁷ McKenzie and Partington (2011) suggest that the cum-price run-up due to buying pressure is a stronger and more consistent result than the ex-dividend price weakness dues to selling pressure. Even if there is no ex-price weakness, the strong cum-price run-up causes the measured drop-off to be larger than it would otherwise be.

²⁰⁸ Explanatory Statement, p. 242.

355. The substance of this advice is that there may be a subset of investors who value the dividend and imputation credit less than the equilibrium market value, and if that subset of investors dominate trading around the ex-dividend event, it is their (lower) valuation that will be reflected in the dividend drop-off estimates.
356. To understand this argument further, suppose that the representative investor values a \$1 dividend and the associated imputation credit at a combined value of \$1 (which is consistent with a broad range of empirical evidence as set out below). Also suppose that there is a subset of investors who value the same package at only 80 cents.²⁰⁹ The McKenzie and Partington argument is that *if* this subset of investors dominates trading around the ex-dividend event, it is their valuation that will be reflected in stock prices and the resulting drop-off will be 80 cents on average, which is less than the value to the representative investor.
357. However, there are two problems with this argument by McKenzie and Partington. First, it is illogical. It would be impossible for this subset of investors to dominate trading around ex-dividend events thereby imposing their lower-than-average valuation on market prices. If it were the case that the trading of such investors did result in a drop-off of only 80 cents, where the equilibrium value in the market was \$1, other investors would surely enter the market to take advantage of the abnormal returns that were on offer. For example, an investor who valued the dividend and imputation credit at the equilibrium value of \$1 would seek to buy shares in the cum-dividend period, obtain the dividend and imputation credit which they valued at \$1, and then see the stock price fall by only 80 cents, being 20 cents to the better overall. This activity would continue until the cum-dividend buying pressure offset the trading of the “low valuation” subset of investors. That is, the argument that the subset of “low valuation” investors could drive prices around the ex-dividend day is only plausible if it is accompanied by an argument about why all other investors have been excluded from trading around the ex-dividend day. But McKenzie and Partington provide no such evidence – they merely state that an effect *can* occur *if* a subset of investors that *may* exist dominates trading around the ex-date.
358. The second problem with the hypothesis that “low valuation” investors may cause a lower-than-equilibrium drop-off to occur is that all of the available evidence suggests the exact opposite. For the observed drop-off to be lower than the equilibrium valuation, it would have to be the case that the cum-dividend price was driven down by the additional trading, whereas McKenzie and Partington note that the evidence is consistent with the exact opposite – a cum-dividend price run-up.
359. Moreover, there is also direct evidence that “low valuation” investors do *not* dominate trading around ex-dividend events. Again, the evidence suggests the exact opposite – the investors who dominate trading in the cum-dividend period and cause a price run-up are those that have a *high* valuation of dividends and imputation credits. McKenzie and Partington (2011)²¹⁰ state that these “high valuation” investors include “long term investors [who] trade cum-dividend to capture dividends” and short-term arbitrageurs “(eg. Domestic investors with higher franking credit values)”.
360. In summary, the notion that a subset of “low valuation” investors dominate trading around the ex-dividend date causing the drop-off to be artificially low is directly contradicted by all of the available evidence and should be given no weight.

²⁰⁹ This scenario only requires that some group of investors have a valuation that is lower than the representative investor’s valuation. The difference may be due to tax positions, transaction costs, or other factors.

²¹⁰ See McKenzie and Partington (2011), p. 10.

Consistency with other evidence

361. The Explanatory Statement also cites evidence from offshore markets.²¹¹ For example, Frank and Jagannathan (1998) develop a simple model of investor trading around ex-dividend dates to explain why the observed drop-off in the Hong Kong market tends to be less than the amount of the dividend. They explain that investors in the Hong Kong market pay no tax on dividends or capital gains, in which case there is no tax-related reason for trading around ex-dividend events. Indeed, in the Frank and Jagannathan model there is no increase in trading volume around the ex-dividend event. Rather, there is simply a change in the type of investor who initiates a trade. Specifically, Frank and Jagannathan develop a type of “dividend annoyance” model whereby investors would generally prefer not to receive dividends because they involve the administrative costs of having to reinvest them appropriately.
362. The result of the Frank and Jagannathan model is that trades in the cum-dividend period are more likely to be seller-initiated (as there are relatively more investors seeking to avoid the dividend) and to occur at the bottom of the bid-ask spread. Conversely, trades that occur in the ex-dividend period are more likely to be buyer-initiated (as investors who delayed their purchase to avoid the dividend now seek to buy the stock) and to occur at the top of the bid-ask spread. This has the effect of reducing the measured drop-off.
363. The no-tax conditions in the Hong Kong market lead to a material number of investors seeking to avoid dividends. However, McKenzie and Partington (2011) report that the Australian market conditions lead to a material number of investors being attracted to dividends.²¹² The cum-dividend buying pressure not only results in trades being more likely to occur at the top of the bid-ask spread, but it causes both bid and ask prices to increase in the form of a “cum-dividend price run-up.”
364. In summary, the Frank and Jagannathan model helps to explain why the drop-off is likely to be over-estimated in a setting where there is cum-dividend buying pressure and ex-dividend selling pressure – as is the case in Australia according to McKenzie and Partington (2011).
365. The Explanatory Statement also refers to a study of the Finnish stock market by Rantapuska (2008). Rantapuska shows that the subset of investors who (because of their tax and other circumstances) value the dividend most trade more heavily in the cum-dividend period to capture the dividend. Cum-dividend buying pressure then results in the sort of cum-dividend price run-up that McKenzie and Partington (2011) document for the Australian market. That is, to the extent that trading patterns around the ex-dividend day are materially different from other days, it is the subset of investors who value the dividend most that cause the cum-dividend price run-up, which in turn results in a higher drop-off than would otherwise be observed.
366. To the extent that this Finnish study has any relevance to the Australian market, it is this: cum-dividend trading is likely to be influenced by that subset of investors who value the dividend and imputation credit the most. That subset of investors cause the cum-dividend price run-up and the drop-off being higher than it would otherwise be. This, in turn, results in the estimated value of the dividend and imputation credit (theta) being higher than it would otherwise be. Consequently, to the extent that these effects are material, they would result in an over-estimation of theta.

²¹¹ The ENA’s view is that the regulator should have regard to offshore evidence if that evidence is relevant and useful. If, however, the AER determines that offshore evidence cannot be used because the benchmark firm is defined to be one operating in Australia, this offshore evidence must be ignored. For example, if the AER determines that offshore comparables cannot be used to assist in the estimation of equity beta, internal consistency would require that offshore evidence cannot be used to assist in the estimation of gamma.

²¹² McKenzie and Partington (2011), pp. 9-10.

Appendix 4: Curriculum Vitae of Professor Stephen Gray

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Academic Qualifications

- 1995** Ph.D. (Finance), Graduate School of Business, Stanford University.
Dissertation Title: Essays in Empirical Finance
Committee Chairman: Ken Singleton
- 1989** LL.B. (Hons), Bachelor of Laws with Honours, University of Queensland.
- 1986** B.Com. (Hons), Bachelor of Commerce with Honours, University of Queensland.

Employment History

- 2000-Present** Professor of Finance, UQ Business School, University of Queensland.
- 1997-2000** Associate Professor of Finance, Department of Commerce, University of Queensland and Research Associate Professor of Finance, Fuqua School of Business, Duke University.
- 1994-1997** Assistant Professor of Finance, Fuqua School of Business, Duke University.
- 1990-1993** Research Assistant, Graduate School of Business, Stanford University.
- 1988-1990** Assistant Professor of Finance, Department of Commerce, University of Queensland.
- 1987** Specialist Tutor in Finance, Queensland University of Technology.
- 1986** Teaching Assistant in Finance, Department of Commerce, University of Queensland.

Academic Awards

- 2006 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
- 2002 Journal of Financial Economics, All-Star Paper Award, for Modeling the Conditional Distribution of Interest Rates as a Regime-Switching Process, JFE, 1996, 42, 27-62.
- 2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
- 2000 University of Queensland Award for Excellence in Teaching (a University-wide award).
- 1999 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
- 1999 KPMG Teaching Prize, Department of Commerce, University of Queensland.
- 1998 Faculty Teaching Prize (Business, Economics, and Law), University of Queensland.
- 1991 Jaedicke Fellow in Finance, Doctoral Program, Graduate School of Business, Stanford University.
- 1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.
- 1986 University Medal in Commerce, University of Queensland.

Large Grants (over \$100, 000)

- Australian Research Council Linkage Grant, 2008—2010, Managing Asymmetry Risk (\$320,000), with T. Brailsford, J.Alcock, and Tactical Global Management.
- Intelligent Grid Cluster, Distributed Energy – CSIRO Energy Transformed Flagship Collaboration Cluster Grant, 2008-2010 (\$552,000)
- Australian Research Council Research Infrastructure Block Grant, 2007—2008, Australian Financial Information Database (\$279,754).
- Australian Research Council Discovery Grant, 2006—2008, Capital Management in a Stochastic Earnings Environment (\$270,000).
- Australian Research Council Discovery Grant, 2005—2007, Australian Cost of Equity.
- Australian Research Council Discovery Grant, 2002—2004, Quantification Issues in Corporate Valuation, the Cost of Capital, and Optimal Capital Structure.

- Australian Research Council Strategic Partnership Grant, 1997—2000, Electricity Contracts and Securities in a Deregulated Market: Valuation and Risk Management for Market Participants.

Current Research Interests

Benchmark returns and the cost of capital. Corporate Finance. Capital structure. Real and strategic options and corporate valuation. Financial and credit risk management. Empirical finance and asset pricing.

Publications

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- T. Fitzgerald, S. Gray, J. Hall and R. Jeyaraj, (2013), "Unconstrained estimates of the equity risk premium" *Review of Accounting Studies*, 18, 560-639.
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- Gray, S. (1988), "The Straddle and the Efficiency of the Australian Exchange Traded Options Market," *Accounting Research Journal*, 1(2), 15-27.

Teaching

Fuqua School of Business, Duke University, Student Evaluations (0-7 scale):

- Financial Management (MBA Core): Average 6.5 over 7 years.
- Advanced Derivatives: Average 6.6 over 4 years.
- Empirical Issues in Asset Pricing: Ph.D. Class

1999, 2006 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.

UQ Business School, University of Queensland, Student Evaluations (0-7 scale):

- Finance (MBA Core): Average 6.6 over 10 years.
- Corporate Finance Honours: Average 6.9 over 10 years.

2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).

2000 University of Queensland Award for Excellence in Teaching.

1999 Department of Commerce KPMG Teaching Prize, University of Queensland.

1998 Faculty Teaching Prize, Faculty of Business Economics and Law, University of Queensland.

1998 Commendation for Excellence in Teaching, University-wide Teaching Awards, University of Queensland.

1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.

Board Positions

2002 - Present: Director, Financial Management Association of Australia Ltd.

2003 - Present: Director, Moreton Bay Boys College Ltd. (Chairman since 2007).

2002 - 2007: External Risk Advisor to Board of Enertrade (Queensland Power Trading Corporation Ltd.)

Consulting

Managing Director, Strategic Finance Group: www.sfgconsulting.com.au.

Consulting interests and specialties, with recent examples, include:

- **Corporate finance**
 - ⇒ **Listed multi-business corporation:** Detailed financial modeling of each business unit, analysis of corporate strategy, estimation of effects of alternate strategies, development of capital allocation framework.
- **Capital management and optimal capital structure**
 - ⇒ **State-owned electricity generator:** Built detailed financial model to analyze effects of increased leverage on cost of capital, entity value, credit rating, and stability of dividends. Debt of \$500 million issued.
- **Cost of capital**
 - ⇒ **Cost of Capital in the Public Sector:** Provided advice to a government enterprise on how to estimate an appropriate cost of capital and benchmark return for Government-owned enterprises. Appearance as **expert witness** in legal proceedings that followed a regulatory determination.
 - ⇒ **Expert Witness:** Produced a written report and provided court testimony on issues relating to the cost of capital of a cable TV business.
 - ⇒ **Regulatory Cost of Capital:** Extensive work for regulators and regulated entities on all matters relating to estimation of weighted-average cost of capital.
- **Valuation**

- ⇒ **Expert Witness:** Produced a written report and provided court testimony. The issue was whether, during a takeover offer, the shares of the bidding firm were affected by a liquidity premium due to its incorporation in the major stock market index.
- ⇒ **Expert Witness:** Produced a written report and provided court testimony in relation to valuation issues involving an integrated mine and refinery.
- **Capital Raising**
 - ⇒ Produced comprehensive valuation models in the context of capital raisings for a range of businesses in a range of industries including manufacturing, film production, and biotechnology.
- **Asset pricing and empirical finance**
 - ⇒ **Expert Witness:** Produced a written report on whether the client's arbitrage-driven trading strategy caused undue movements in the prices of certain shares.
- **Application of econometric techniques to applied problems in finance**
 - ⇒ **Debt Structure Review:** Provided advice to a large City Council on restructuring their debt portfolio. The issues involved optimisation of a range of performance measures for each business unit in the Council while simultaneously minimizing the volatility of the Council's equity in each business unit.
 - ⇒ **Superannuation Fund Performance Benchmarking:** Conducted an analysis of the techniques used by a large superannuation fund to benchmark its performance against competing funds.
- **Valuation of derivative securities**
 - ⇒ **Stochastic Volatility Models in Interest Rate Futures Markets:** Estimated and implemented a number of models designed to predict volatility in interest rate futures markets.
- **Application of option-pricing techniques to real project evaluation**
 - ⇒ **Real Option Valuation:** Developed a framework for valuing an option on a large office building. Acted as arbitrator between the various parties involved and reached a consensus valuation.
 - ⇒ **Real Option Valuation:** Used real options framework in the valuation of a bio-tech company in the context of an M&A transaction.

Appendix 5: Instructions

JOHNSON WINTER & SLATTERY
L A W Y E R S

Partner: Roxanne Smith +61 8239 7108
Email: roxanne.smith@jws.com.au
Our Ref: B1299
Your Ref:
Doc ID: 66276333.1

24 November 2014

Professor Stephen Gray
SFG Consulting
PO Box 29
SOUTH BANK QLD 4101

Dear Sir

ATCO GAS AUSTRALIA PTY LTD- ERA Price Determination

We act for ATCO Gas Australia Pty Ltd (ATCO Gas) in relation to the Economic Regulation Authority's (ERA) review of the Gas Access Arrangement for ATCO Gas under the National Gas Law and Rules for the period July 2014 to December 2020. As you are aware, ATCO Gas submitted with its Access Arrangement proposal a report from SFG titled: "*Estimating gamma*" dated 13 March 2014.

ATCO Gas wishes to engage you to prepare an expert report in connection with the ERA's Draft Decision review of the access arrangement for the period 2015-2020.

This letter sets out the matters which ATCO Gas wishes you to address in your report and the requirements with which the report must comply.

Terms of Reference

Legal Framework

The terms and conditions upon which ATCO Gas provides access to its gas network are subject to five yearly reviews by the ERA. The ERA undertakes that review by considering the terms and conditions proposed against criteria set out in the *National Gas Law* and *National Gas Rules*.

Rule 76 of the *National Gas Rules* provides that the total revenue for each regulatory year is determined using a building block approach, which building blocks include a return on the projected capital base (Rule 76(a)) and the estimated cost of corporate income tax (Rule 76(c)).

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Rule 87 provides for the determination of a rate of return on the projected capital base. The amended Rule 87 now in force requires a rate of return to be determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in Rule 87A.

Rule 87A sets out the formula for the calculation of the estimated cost of corporate tax, which formula includes an estimate of the value of imputation credits (γ).

Rule 74(2) requires a forecast or estimate to be arrived at on a reasonable basis and must represent the best forecast or estimate possible in the circumstances.

Also relevant is the overarching requirement that the ERA must, in performing or exercising its economic regulatory function or power perform or exercise that function or power in a manner that will or is likely to contribute to the achievement of the national gas objective (**NGO**).

The NGO is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

You should also have regard to the Revenue and Pricing Principles (**RPP**) in section 24 of the National Gas Law.

In preparing your report you should consider the relevant sections of the National Gas Rules and Law and the ERA's Rate of Return Guidelines and Explanatory Statement.

Gamma

In respect of the estimate of γ the ERA's approach in the Draft Decision departs from that set out in the Rate of Return Guidelines. In particular:

1. While there is some further consideration of the distribution rate, the ERA proposes to continue to adopt the distribution rate of 0.7.
2. In respect of the utilisation rate (θ), there is a significant change in approach from the Guidelines. The Authority has changed its interpretation of the "value" of imputation credits that it is estimating. The ERA says that it has considered a range of estimates for θ including:
 - (a) dividend drop off studies;
 - (b) equity ownership;
 - (c) taxation statistics;
 - (d) conceptual goalposts.
3. Having considered those approaches to the estimates of the θ and based on its interpretation of "value", the ERA derives an estimate for θ of 0.7, giving an estimate of γ of 0.49. This is then rounded to 0.50.

Opinion

In this context ATCO Gas wishes to engage you to prepare an expert report which provides:

- 1 A review of the ERA's consideration of the distribution rate.
- 2 A review of the ERA's interpretation of the value of imputation credits at paragraphs 942-943 and Appendix 8.
- 3 An analysis of the ERA's revised approach to theta and the basis for departure from the Guidelines, as well as the response to your March report.
- 4 Your opinion on whether the ERA's estimate provides the best estimate of the value of imputation credits possible in the circumstances, which is consistent with the requirements of the NGO and the RPP.
- 5 If you do not consider the ERA's approach to the estimate of the value of imputation credits meets the requirements of the Rules identified above, what method(s) should be used in order to produce the best estimate possible in the circumstances which is consistent with the NGO and RPP?

Contribution to the achievement of the NGO

One of the issues for the ERA is whether, where there are two or more overall decisions that could be made as to approval of ATCO Gas Australia Pty Ltd's (**ATCO Gas**) proposed revised access arrangement, to make the one that the regulator is satisfied will or is likely to contribute to the achievement of the national gas objective¹ to the greatest degree.

On any merits review of the Final Decision before the Australian Competition Tribunal, one of the issues for the Tribunal would be whether a fresh decision correcting errors that might have been made by the ERA would be materially preferable to the ERA's decision in making a contribution to the achievement of the NGO.²

In the light of the above, in addition to the topics you have been asked to deal with above please include in your Report the following matters:

- 1 On the assumption that the errors (if any) in the Draft Decision which you identify in your Report are repeated in the Final Decision, would you please in your Report make an assessment of whether, either separately or collectively,³ those errors if corrected would, or would be likely to, result in a materially preferable designated NGO decision as regards the relevant topic.
- 2 In doing this work, and if you make an affirmative assessment, please provide the basis upon which you make the assessment that the result will, or will likely, be materially preferable.
- 3 In doing so, in particular would you please include in your Report the following:⁴
 - (a) a consideration of how the constituent components of those parts of the decision which you have been asked to consider interrelate with each other and with the matters you have raised as errors (and which may therefore be grounds for review);
 - (b) how you have taken account of the revenue and pricing principles;⁵ and

¹ As set out in s 23 of the National Gas Law.

² As that term is defined in s 259(4a)(c) of the National Gas Law.

³ See s 246(1a) of the National Gas Law.

⁴ Which the Tribunal itself is required under s 259(4b) of the National Gas Law to have regard to when assessing whether a result will be, or will be likely to be, materially preferable.

⁵ As set out in s 24 of the National Gas Law.

- (c) in assessing the extent of the contribution of the correction(s) you identify in your Report to the achievement of the national gas objective, your consideration of the decision as a whole in respect of the topics you have reviewed. We note that section 23 of the National Gas Law provides:

“The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.”

In relation to question 3 above, we stress that this is not an exhaustive list and that any other matter that may be relevant under the Law should be taken into account (the opening words of s 259(4b) make this clear). If you are in doubt about whether a matter may or may not be relevant in this regard, please include your consideration of it in your Reports. In particular, you should take into account any other matter you reasonably consider material and relevant and should indicate the relevant matter or matters which informs your opinions on the “materially preferable” issue.

Further, in relation to questions 1-3 above, please note that⁶ the following matters do not, in themselves, determine the question about whether a materially preferable decision exists, namely:

- 1 the establishment of a ground for review under section 246(1), that is, whether there is error or are errors;
- 2 consequences for, or impacts on, the average annual regulated revenue of a covered pipeline service provider; or
- 3 that the amount that is specified in or derived from the decision exceeds the threshold amount required for the granting of leave (under section 249(2)).

Use of Report

It is intended that your report will be submitted by ATCO Gas to the ERA with its Access Arrangement Proposal. The report may be provided by the ERA to its own advisers. The report must be expressed so that it may be relied upon both by ATCO Gas and by the ERA.

The ERA may ask queries in respect of the report and you will be required to assist in answering these queries. The ERA may choose to interview you and if so, you will be required to participate in any such interviews.

The report will be reviewed by ATCO Gas’ legal advisers and will be used by them to provide legal advice as to its respective rights and obligations under the *National Gas Law* and *National Gas Rules*.

If ATCO Gas was to challenge any decision ultimately made by the ERA, that appeal will be made to the Australian Competition Tribunal and your report will be considered by the Tribunal. ATCO Gas may also seek review by a court and the report would be subject to consideration by such court. You should therefore be conscious that the report may be used in the resolution of a dispute between the ERA and ATCO Gas. Due to this, the report will need to comply with the Federal Court requirements for expert reports, which are outlined below.

⁶ Under s 259(4b) of the National Gas Law.

Timeframe

ATCO Gas's Access Arrangement proposal must be submitted by **25 November 2014**. Your report will need to be finalised by the end of 24 November 2014.

Compliance with the Code of Conduct for Expert Witnesses

Attached is a copy of the Federal Court's Practice Note CM 7, entitled "*Expert Witnesses in Proceedings in the Federal Court of Australia*", which comprises the guidelines for expert witnesses in the Federal Court of Australia (**Expert Witness Guidelines**).

Please read and familiarise yourself with the Expert Witness Guidelines and comply with them at all times in the course of your engagement by the Gas Businesses.

In particular, your report prepared for the Gas Businesses should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Expert Witness Guidelines.

Your report must also:

- 1 contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;
- 2 identify the questions that the expert has been asked to address;
- 3 set out separately each of the factual findings or assumptions on which the expert's opinion is based;
- 4 set out each of the expert's opinions separately from the factual findings or assumptions;
- 5 set out the reasons for each of the expert's opinions; and
- 6 otherwise comply with the Expert Witness Guidelines.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

It is also a requirement that the report be signed by the expert and include a declaration that "*[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report*".

Please also attach a copy of these terms of reference to the report.

Terms of Engagement

Your contract for the provision of the report will be directly with ATCO Gas. You should forward ATCO Gas any terms you propose govern that contract as well as your fee proposal.

Please sign a counterpart of this letter and return it to us to confirm your acceptance of the engagement.

Yours faithfully



Enc: Federal Court of Australia Practice Note CM 7, “Expert Witnesses in Proceedings in the Federal Court of Australia”

.....
Signed and acknowledged by Professor Stephen Gray

Date

