



An appropriate regulatory estimate of gamma: Response to the DBP Draft Decision

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Executive Summary

1.1 Context

- 1 Frontier Economics (**Frontier**) has been retained by DBNGP (WA) Nominees Pty Ltd (**DBP**) to provide our opinions in relation to the DBP Draft Decision of the Economic Regulation Authority of Western Australia (**ERA**) insofar as it relates to the gamma parameter.
- 2 This report has been authored by Professor Stephen Gray, Professor of Finance at the UQ Business School, University of Queensland and Director of Frontier Economics, a specialist economics and 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. I have published several papers on the estimation of gamma, including in the *Journal of Financial Economics*, one of the leading international finance journals. A copy of my curriculum vitae is attached as Appendix 2 to this report.
- 3 My opinions set out in this report are based on the specialist knowledge acquired from my training and experience set out above. I have been provided with 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). I have read, understood and complied with the Expert Witness Guidelines.
- 4 I have previously provided a report on this issue to the ERA:
 - a. SFG Consulting, 2014 DBP, *Estimating gamma: Response to ATCO Gas Draft Decision*.
- 5 Since preparing that reports, I have joined Frontier Economics and provide this report on that basis.

1.2 Summary of conclusions

- 6 Our primary conclusions are as follows:
 - a. Gamma should be estimated as the product of:
 - i. The distribution rate, F ; and
 - ii. The value of distributed credits, θ .
 - b. As set out in Section 3 of this report, we adopt a distribution rate of 70% because:
 - i. That estimate is consistent with data for all companies;
 - ii. That estimate is consistent with data for all listed companies excluding the top 20; and

- iii. The distribution rate is a firm-specific parameter and the top 20 firms are very large multinationals that are able to distribute imputation credits via profits earned offshore and the benchmark entity operates only within Australia.
- c. Theta should be interpreted as the value of distributed credits – as in the price that an investor would be prepared to pay for a credit in the market for equity funds, or (equivalently) the extent to which credits are capitalised into stock prices.¹ We explain our reasons for this conclusion in Section 2 of this report.
- d. By contrast, the ERA's approach is to seek to estimate what gamma *would be* under a particular theoretical framework that is inconsistent with the very basis of the CAPM and which has been roundly criticised. In our view, there is no need to impose *any* assumption – rather than estimate what value imputation credits *would have* under any particular set of assumptions, the better approach is to empirically estimate what value credits *do* have by analysing market prices – the same as we do for all other WACC parameters.
- e. In our view, the best available point estimate of theta is 0.35. The source of this estimate is dividend drop-off analysis applied to data from 2000-2013. Other market value estimates of theta tend to be lower, in which case the 0.35 estimate would be conservative. We explain this in Section 5 of this report.
- f. The redemption rate (whether estimated using tax statistics or equity ownership proportions) does not provide an estimate of the relevant value of distributed credits, theta. It can only be used as an upper bound for theta. The ERA's redemption rate estimates are 0.43, 0.48 and 0.59. Our preferred estimate of theta of 0.35 lies below these upper bound estimates, satisfying that test. We explain this in Section 4 of this report.
- g. The distribution rate is a firm specific parameter because it depends upon dividend payout policies that vary across firms. Theta is a market wide parameter because the value of a credit in the hands of an investor is independent of its source. Consequently, there is no reason to impose a constraint that the same data source must be used to estimate both parameters. Rather, any data that is relevant to the estimation of the distribution rate should be used to estimate that parameter, and any data that is relevant to the estimation of theta should be used for that purpose. The best estimates of each parameter should then be multiplied to produce the best estimate of gamma. In our view, the ERA's approach of using different subsets of the

¹ That is, the extent to which stock prices have been bid up to reflect the market's assessment of the value of imputation credits.

available evidence to establish a range of ranges for each parameter and consequently for gamma is neither transparent nor necessary nor correct. We explain this point in Section 6 of this report.

- 7 In our view, the market evidence supports a gamma estimate of up to 0.25 within a range of 0 to 0.25. Our preferred regulatory point estimate of gamma is 0.25, which is the product of the distribution rate (0.7) and theta (0.35).

2 Value or redemption?

2.1 The key point to be determined

8 In relation to estimation of the gamma parameter, the key point of difference to be resolved is the question of whether theta (one of the components of gamma) should be interpreted as:

- a. The value of distributed credits (as in the worth of those credits to investors or the price that they would be prepared to pay for those credits in the market for equity funds or the extent to which credits are capitalised into stock prices); or
- b. The redemption proportion – the proportion of distributed credits that are likely to be redeemed.

9 This dichotomy is relevant throughout the discussion below and for convenience we refer to the two possibilities as the *value* and *redemption* interpretations, respectively.

10 If the *value* interpretation is adopted, we should use estimation methods that measure the value of credits (such as dividend drop-off analysis), and if the *redemption* interpretation is adopted we should use estimation methods that measure the proportion of credits that are redeemed (such as the equity ownership and tax statistics approaches).

2.2 The role of gamma in the regulatory setting

11 In the regulatory setting, the regulator first estimates the return that shareholders require and then reduces that according to the estimate of gamma. For example, suppose the regulator determines that shareholders require a return of \$100 and that those shareholders will receive imputation credits that are worth \$20 to them. The regulator would then allow the firm to charge prices so that it can pay a return of \$80 to the shareholders.² That is, the regulator's estimate of gamma determines the quantum of the reduction in the return that the firm is able to provide its shareholders by other means (dividends and capital gains).

12 If, for example, the regulator's assessment of the value of imputation credits is greater than the true value of imputation credits to shareholders, the shareholders will be under-compensated. In this case, the reduction in other forms of return (dividends and capital gains) will exceed the true value of the imputation credits.

13 Thus, when estimating gamma, the appropriate question to consider is this: What is the quantum of dividends and capital gains that shareholders would be prepared to give up in order to receive imputation credits? It is precisely this question that is addressed by market value studies that seek to quantify the relative value (to investors in the market for equity funds) of dividends, capital gains, and imputation credits.

² This is apparent in Row 35 of the AER's Post-Tax Revenue Model.

14 The alternative is to reduce the regulatory allowance for returns from dividends and capital gains according to the proportion of investors who may be eligible to redeem credits, rather than according to the value of those credits. This approach will inevitably result in investors being mis-compensated because there is no attempt to consider whether the *value* of what investors are required to give up (dividends and capital gains) is equivalent to the *value* of what they receive in its place (imputation credits).³

15 On this issue, the ERA's DBP Draft Decision accepts that the value of imputation credits forms part of the return on equity:

As a general rule, investors who are able to utilise franking credits will accept a lower required rate of return, before personal tax, on an investment that has franking credits, compared with an investment that has similar risk and no franking credits, all other things being equal.⁴

16 In the regulatory setting, the regulator first determines the total allowed return on equity. Then the regulator determines how much of that return it considers will be generated in the form of imputation credits. The regulator then reduces the return that would otherwise be available to equity holders (via the other components of return, which are dividends and capital gains) accordingly. This can be seen in the **Analysis** sheet in the Post Tax Revenue Model (**PTRM**) where the **Annual Building Block Revenue Requirement** is reduced by the assumed **Value of Imputation Credits** – what would otherwise be available to the equity holders is reduced by the assumed value of imputation credits.

17 In our view it is clear that there are three components to the return on equity – dividends, capital gains, and imputation credits – and that a greater assumed value of imputation credits will result in a reduction in the regulatory allowance that generates dividends and capital gains. This is precisely what occurs in the PTRM – the return that could otherwise be provided to equity holders is reduced by the regulator's assessment of the value of imputation credits.

2.3 Rule requirements

2.3.1 The requirements of the NGR

18 Prior to the AEMC's 2012 rule change, the National Gas Rules (Rules) stated that:

γ is the assumed utilisation of imputation credits.⁵

19 At the time of the 2012 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 "in the market for equity funds" or "market value." Differences of opinion existed about how to best estimate the

³ The evidence suggests that such an approach will systematically under-compensate investors since the investors who are eligible to redeem credits do not value them at the face amount.

⁴ DBP Draft Decision, Appendix 5, p. 1.

⁵ NGR r. 87A.

market value of credits, but there was no dispute about what gamma meant or how it should be defined.⁶

20 In this context, the AEMC amended the Rules to state that:

γ is the value of imputation credits.⁷

21 This expression is economically equivalent to the longstanding prevailing regulatory practice at the time of the rule change.

22 In any event, the Rules now require regulators to produce an estimate of the *value* of imputation credits.

2.3.2 The ERA's new interpretation of the Rules

23 In its DBP Draft Decision, the ERA states that it will not adopt the practice of estimating theta as the market value of distributed credits. The ERA states that it will instead define theta to be the redemption rate – the proportion of credits that are likely to be redeemed.⁸

24 In the *Gamma Case*,⁹ the Tribunal agreed with our view that the redemption rate cannot be used to estimate theta, but can only be used as an upper bound for theta.

The AER accepted that utilisation rates derived from tax statistics [i.e., the redemption rate] 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.¹⁰

25 However, the ERA notes in its DBP Draft Decision that:

...the Australian Competition Tribunal views the estimate of gamma as an 'ongoing intellectual and empirical endeavour'.

26 The ERA now proposes to define theta to be the redemption rate. That is, the AER proposes to use the redemption rate as a point estimate of theta, rather than as an upper bound. Whereas the ERA had previously always defined theta to be the market value of distributed imputation credits, it has now redefined theta to be the "utilisation rate" which is subsequently defined to be:

⁶ See, for example, Australian Competition Tribunal, 2010, Application by Energex Limited (No 2) [2010] ACompT 7, 13 October; Australian Competition Tribunal, 2011, Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9, 12 May.

⁷ NGR r. 87A(1).

⁸ DBP Draft Decision, Appendix 5, p. 9.

⁹ Application by Energex Limited (No 2) [2010] ACompT 7; Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9.

¹⁰ Application by Energex Limited (No 2) [2010] ACompT 7 (13 October 2010), Paragraph 91.

...the proportion of franking credits received that are utilised by the representative investor.¹¹

27 That is, the ERA simply defines theta in terms of how many credits are redeemed without any consideration of what *value* investors obtain from those credits.

28 Under this new definition, it is tautologically true that the redemption rate could be used to estimate theta. However, that approach would, on its face, appear to be inconsistent with the Rules (which require an estimate of the *value* of imputation credits) and with the Tribunal's decision (which states that redemption rates can only serve as an upper bound for theta).

2.4 The Handley definitions of value

29 In its DBP Draft Decision, the ERA introduces the term “utilisation value.”¹² The source of that term was advice from Handley, who defines that term as follows:

We define this utilisation value as the incremental reduction in personal tax, if any, which arises from the receipt of a franked dividend compared to the receipt of an otherwise equivalent unfranked dividend.¹³

30 That is, the term “utilisation value” is precisely equivalent to the term “redemption rate” or the “proportion of credits that is redeemed.” In its DBP Draft Decision, the ERA makes the same point – “utilisation value” and the utilisation rate (or redemption rate or proportion of credits redeemed) are considered to be equivalent concepts.¹⁴

31 The ERA also cites Handley (2015), who develops the notion of “pre-personal-tax and pre-personal-cost value” for the AER. This is a measure of what the value of a credit would be to an investor if we set aside all of the reasons why investors would actually value the credit at less than the face amount. In relation to gamma, the ERA now follows the AER in adopting the Handley interpretation.¹⁵

32 Consider a new car that has a list price (face value) of \$40,000. Suppose that car has been used as a demonstration vehicle, so has 5,000 km on the odometer, a scratch along one side, and a tear in the upholstery of one seat.¹⁶ The value of the car, before considering mileage, scratches and tears (i.e., the pre-mileage, pre-scratch, pre-tear value) would be the list price of \$40,000. However, the actual value of the car in the market for cars (where value is defined in the ordinary sense of that word) would clearly be less than \$40,000.

¹¹ DBP Draft Decision, Appendix 5, Paragraph 25.

¹² DBP Draft Decision, Appendix 5, Paragraph 49.

¹³ Handley and Maheswaran (2008), p. 84.

¹⁴ DBP Draft Decision, Appendix 5, Paragraph 50.

¹⁵ DBP Draft Decision, Appendix 5, Paragraph 47.

¹⁶ That is, there are reasons why the market would not value the car at face value – analogous to the reasons why investors would not value imputation credits at the face amount set out in SFG (2014) and SFG (2015).

- 33 That is, “value” can be interpreted in the ordinary real world sense of that word – the actual worth to investors or the price that investors would be prepared to pay in the market for equity funds – or it can be interpreted in a theoretical way as the value that a credit would have to an investor if we assume away:
- a. all of the reasons why the market value might be less than the face amount; and
 - b. all of the empirical evidence that the market value *is* less than the face amount.
- 34 If we adopt the standard interpretation of “value,” we would use estimation approaches that seek to determine how much investors would be prepared to pay for credits in the market for equity funds – what is the amount of dividends or capital gains that investors would give up in order to obtain a credit.
- 35 If we adopt the theoretical interpretation, we would simply assume away any factor that would cause an investor to value credits at less than the face amount. Thus, the “pre-personal-tax and pre-personal-cost value” is also just another name for the redemption rate.
- 36 There is a strong analogy here to one of the arguments put in the *Gamma Case* before the Tribunal. In that case, there was debate about how the distribution rate should be estimated. The applicants submitted that there was direct real world empirical evidence that established that the actual distribution rate was 70%. By contrast, Dr Handley advised that the real world empirical evidence should be supplanted by theoretical considerations. He proposed that, in theory, the 30% of credits that had not been distributed in *any* year since the start of imputation might all be distributed in *every* year of the forthcoming regulatory period, so that the empirically observed distribution rate of 70% should be supplanted by a theoretically assumed distribution rate of 100%.
- 37 Handley (2014, pp. 11-14) continues to advise that is reasonable to assume that 100% of imputation credits will eventually be distributed, even though the consistent empirical evidence is that year after year after year the distribution rate averages 70%. The AER abandoned the use of a theoretically conceptualised distribution rate immediately prior to the *Gamma Case* and has rejected it ever since.
- 38 In the case at hand, the redemption rate definition of theta (whatever name it is given) is also a theoretically conceptualised one, as Handley (2015) explains:
- ...the use of redemption rates as a means of estimating the value of credits is driven by conceptual considerations and theory...This also forms the basis for using the equity ownership approach.¹⁷

2.5 A theoretically conceptualised theta

- 39 Two ways have been proposed for estimating theta. One method involves the empirical estimation of theta from market prices, providing a direct estimate of

¹⁷ Handley (2015), p. 28.

the value of imputation credits in the market for equity funds. The alternative is to theoretically conceptualise what theta would be under a certain set of theoretical assumptions.

2.5.1 Lally's theoretical conceptualisation

40 One example of the theoretical conceptualisation approach is Lally (2014), whose key assumption is that there is no foreign ownership of Australian equity. This assumption leads Lally to conclude that theta should theoretically be set to 1, and that is his recommendation.

41 The key assumption on which Lally's conceptualised theta is based is clearly unrealistic and it is inconsistent with the way every other WACC parameter is estimated. For example, the standard practice is to estimate the risk-free rate with reference to traded government bond prices which reflect the participation of foreign investors in that market – we don't theoretically conceptualise how much higher government bond yields might be in the absence of foreign investors.

2.5.2 Handley's theoretical conceptualisation

42 Another example of the theoretical conceptualisation approach is Handley (2014, 2015). He recognises that (a) foreign investors can own Australian equity and (b) Australian investors can own foreign equity. His key assumption is that investors construct their investment portfolio in a way that violates the principles of Markowitz efficiency that underpin the CAPM.¹⁸ Under the CAPM, all investors seek to maximise the utility (i.e., the risk/return trade-off) of their investment portfolio. The very first equation in Sharpe (1964) sets out this basic premise.

43 Indeed, the very basis of the CAPM is that we cannot consider an asset (or a subset of assets) in isolation, we must consider every asset in the context of the entire portfolio held by the investor. Investor's will optimise their portfolio by balancing the risk and return of the whole portfolio. Without this Markowitz portfolio optimisation, investors would not hold the risk-free asset and the market portfolio and, consequently, the CAPM would not exist.

44 The Handley approach is inconsistent with Markowitz portfolio optimisation – it requires that investors will consider their Australian equity investments independently of any other assets they hold. That is, they will compile a portfolio of Australian stocks without any regard to any other assets they may hold. Thus, no investor optimises their investment portfolio or their utility and no investor behaves in a manner that is consistent with the CAPM.

45 The ERA is quite open about this in the DBP Draft Decision, noting that their framework for estimating gamma relies on an assumption that investors "price Australian assets in isolation of other assets."¹⁹ This assumption is directly inconsistent with the fundamental basis of the CAPM. Moreover, there is no

¹⁸ Harry Markowitz was awarded the Nobel Prize jointly with William Sharpe, the developer of the CAPM, in 1991.

¹⁹ DBP Draft Decision, Appendix 5, Paragraph 43.

need to impose *any* assumption – rather than estimate what value imputation credits *would have* under any particular set of assumptions, the better approach is to empirically estimate what value credits *do* have by analysing market prices – the same as we do for all other WACC parameters.

2.5.3 Selecting a theoretical conceptualisation of theta

46 The ERA has considered advice on the theoretical conceptualisation of theta from both Lally and Handley. Each has advised that the other’s theoretical conceptualisation is flawed and has no proper basis.

47 For example, Lally advises, in a report considered by the ERA, that there is an inconsistency between the use of the CAPM and the use of an assumption that violates the principles of Markowitz efficiency that underpin the CAPM, and that he disagrees with Handley’s approach:

...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. 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.²⁰

48 Symmetrically, Handley (2015) advises, in a report considered by the ERA, that the Lally approach is wrong on the basis that it is wrong to assume away all foreign investment and that there is:

...an assumption by Lally which contradicts a key joint assumption in the CAPM.²¹

49 Our view is that:

- a. It would be inappropriate to adopt a conceptual theta on the basis of an assumption that there is no foreign investment in Australian shares (Lally); and
- b. It would be equally inappropriate to adopt a conceptual theta on the basis of an assumption that investors do not seek to maximise their utility over their investment portfolio (Handley). This would be a particularly egregious error if the CAPM was being used to estimate the required return on equity.

50 Theta is the outcome of the complex interaction of trading between different types of foreign and domestic investors. Consequently, the conceptualisation of theta requires the adoption of some strong simplifying assumptions. For example, the complex interaction of trading is simplified by assuming away the existence of foreign investors, or by assuming that investors trade in such a simplistic manner that it pre-dates Markowitz (1959). As set out below, the alternative is to use market data to empirically estimate theta rather than trying to

²⁰ Lally (2013 AER), pp. 14-15.

²¹ Handley (2015), p. 10.

conceptualise what θ might be under different sets of simplifying assumptions.

2.6 Theoretical basis for the redemption rate approach

2.6.1 Overview

51 Our view is that the ERA's justification of its new approach for θ has become increasingly muddled and contradictory as it has changed from the standard market value approach to a redemption rate approach. The result is a confused justification in terms of "utilisation rates" and pre-personal tax and pre-personal cost "values."

52 By contrast, Our approach is to simply estimate θ from observed market prices – the same way it has always been done, and the same way that every other WACC parameter is estimated.

2.6.2 The ERA's theoretical basis

53 The ERA justifies its position on the basis that representative agent equilibrium models provide a conceptual theoretical basis for its approach of defining θ to be the redemption rate. In an earlier report, SFG (2015), we explain in some detail that these models *do not* imply that there is an equivalence between θ and the proportion of credits that investors redeem.²² SFG (2014) makes the same point in some detail.²³

54 In advice commissioned by the AER, Lally (2013 AER) also makes the same point:

The AER (2013, page 237) also defines the utilisation rate [θ] as the proportion of distributed credits that investors redeem. **This is not correct;** the redemption rate is merely an estimation method.²⁴

55 Lally goes on to note that Handley (2008) had previously made the same error:

...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.** 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.²⁵

56 In its recent draft decision, the ERA does not address the fact that Lally has advised that the ERA's approach to this point is in error. Rather, the ERA's

²² SFG (2015), p. 10.

²³ SFG (2014), p. 76.

²⁴ Lally (2013 AER), p. 13, emphasis added.

²⁵ Lally (2013 AER), pp. 14-15, emphasis added.

response has been to lock-step follow the AER in endorsing the erroneous Handley view.

- 57 In summary, Associate Professor Lally and we have both submitted that the theoretical basis on which the Handley approach (that the AER relies on) is flawed. NERA (2015) also make the same point in a different way.

2.7 A better approach: Empirical estimation

- 58 The alternative approach is to simply recognise that the outcome of the complex interaction of trading between investors can be observed in the stock price. We can use observed prices from financial markets to estimate parameters as they *are*, rather than conceptualising what they *would be* under a particular set of assumptions. This is the approach that is adopted for all other WACC parameters. For example, government bond prices reflect the complex interaction of trading by investors and we use those prices directly to estimate risk-free rates. We do not conceptualise what the risk-free rate would be if there was no foreign investment, or if investors traded in a particular simplistic manner that is inconsistent with the CAPM. Rather, we accept that there is foreign investment and that investors will adopt whatever strategy they like, and that the observed price will reflect all of those things. Similarly, when estimating beta and MRP we use observed stock prices and conduct empirical analysis – we do not conceptualise what those parameters would be under a particular set of assumptions.

2.8 Imputation credits, stock prices and the Officer framework: The basis for a market value interpretation

- 59 The mathematical formulas set out in Lally (2013) also support a value interpretation. In its recent draft decision, the ERA considers the key formula from Lally (2013), as set out in Figure 1 below.

Figure 1: ERA's documentation of the key result from Lally (2013)

$$S_0 = \frac{Y_1 - Tax_1 + IC_1 U + S_1}{(1 + E[\hat{R}])} \quad (3)$$

Where

U is the utilisation rate or value that investors attribute to imputation credits;

Y_1 is the expected cash flows over the first year to equity holders (net of all deductions except company taxes);

Tax_1 is the expected company taxes over the first year;

S_0 is the current value of equity;

S_1 is the expected value in one year; and

$E[\hat{R}]$ is the equilibrium expected rate of return on equity;

IC_1 is the distributed imputation credits over the first year.

Source: DBP Draft Decision, Appendix 5, Equation 3, p. 7.

60 To be clear, in this formula S_0 represents the *market value* of equity, as in the worth to investors. The formula shows that the current market value of equity is equal to:

- a. The present value of cash flows (net of all deductions); minus
- b. The present value of tax paid to the government; plus
- c. The present value of imputation credits; plus
- d. The expected value of the equity in one year.

61 In this formula, U represents the extent to which imputation credits are capitalised into the market value of equity. We note that this is precisely what is estimated by dividend drop-off analysis and other market value studies. The formula shows that one takes the present face value of imputation credits, $IC/(1+E[R])$, and then multiplies by U and the result makes up part of the market value of equity.

62 Another way to see this is to rearrange the formula to isolate gamma as follows:

$$S_{with-IC} = S_{ex-IC} + U \frac{IC}{1 + E[R]}$$

where $S_{with-IC}$ represents the market value of equity including imputation credits, S_{ex-IC} represents the market value of equity excluding imputation credits and $\frac{IC}{1 + E[R]}$ represents the present face value of imputation credits. It is clear in

this formula that U does not represent the proportion of imputation credits that might be redeemed, but rather the extent to which imputation credits increase the market value of equity – their “value” in the ordinary sense of that word.

63 Handley (2015) responds to the analysis set out above as follows:

There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) above. However, SFG fails to see that

within Officer's framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

64 This seems to suggest that:

- a. In the real world it is the market value of imputation credits that investors capitalise into the stock price; whereas
- b. In the theoretical setting that forms the basis of Handley's advice, it is the "redemption value" of imputation credits that is capitalised into the price. (The "redemption value" is yet another new term that is presumably equivalent to the redemption rate, "utilisation value," and "pre-personal-tax and pre-personal-cost value".)

65 That is, there is an observed stock price in the real world that has the market value of imputation credits capitalised into it. There may then be an alternative theoretical stock price that has the redemption rate capitalised into it. If one is analysing this theoretical world, the real world stock price would be of little use because it reflects the real world market value of imputation credits rather than the redemption rate. In this regard, the ERA cites the AER's view that market value estimates are not "conceptually appropriate."²⁶ On this point, the ERA is following the AER, which states that the market value that is reflected in observed stock prices:

...is not consistent with our interpretation of the conceptual framework²⁷

and:

...does not align with the conceptual definition of utilisation rate.²⁸

66 Our point here is a simple one. There appears to be general agreement that real world stock prices will reflect the market value of imputation credits. Thus, stock prices can be used to estimate the market value of imputation credits. It is this market value (based on observations from the market for equity funds) that the regulator should consider when deciding on the extent to which there should be a reduction in the firm's ability to generate dividends and capital gains for its shareholders.

2.9 Is the redemption rate an upper bound or a point estimate?

67 There appears to be agreement between us and Handley that if theta is to be defined as the market value of imputation credits (as in worth to investors in the market), the redemption rate estimates cannot be used to estimate theta. They can, at best, be used to provide an upper bound for theta. By contrast, if theta is

²⁶ DBP Draft Decision, Appendix 5, Paragraph 95.

²⁷ AER Rate of Return Guideline, Explanatory Statement, p. 159.

²⁸ AER Rate of Return Guideline, Explanatory Statement, p. 168.

to be redefined as the redemption rate, then studies that estimate the redemption rate would (tautologically) provide an appropriate estimate of theta.

68 On several occasions, Handley has referred to the redemption rate as providing an upper bound rather than a point estimate. This is consistent with the view that theta represents the market value of imputation credits and that the redemption rate represents an upper bound that the market cannot exceed. In this regard, Handley (2015) notes that he has previously stated that:

The extent to which observed stock prices reflect the value of franking credits can only be determined empirically.²⁹

69 I agree entirely with that statement. In his previous report, Handley (2008) goes on to describe the tax statistic approach to estimating the redemption rate and he concludes that:

...this estimate [i.e., the redemption rate] may be interpreted as a reasonable upper bound on the value of gamma.³⁰

70 That is, Handley suggests that there are two alternative ways of determining theta (and consequently gamma). One approach is to empirically estimate the value of imputation credits from observed stock prices. The other approach is to consider the proportion of credits that are redeemed. He says that the latter approach would not produce a point estimate, but only an upper bound.

71 Handley (2015) now says that the redemption rate provides a point estimate of theta. He explains that:

An unfortunate side issue relates to my previous use of the term “upper bound”. The point of using the term was this: we cannot be sure what is the value of imputation credits reflected in market prices, but we know that it should not exceed its redemption value, since this, by definition, represents the ultimate source of value of a credit. With hindsight, using “upper bound” in this context was unnecessary and confusing.

72 I agree that it is the market value of credits that is reflected in market prices. We also agree that the market price cannot exceed the redemption rate. But we cannot see why this implies that the redemption rate can now be used as a point estimate of theta, or why it would have led anyone to have mistakenly referred to what they believed to be a point estimate as an upper bound instead.

73 Moreover, in his earlier report, Handley (2008) recommends a range for gamma where most of that range is based on dividend drop-off estimates and the upper bound of the range is determined by his redemption rate estimate.³¹ That is, the redemption rate estimate was used as an “upper bound” – a figure that a reasonable estimate for theta (from market value studies) could not exceed.

²⁹ Handley (2015), p. 14.

³⁰ Handley (2015), p. 14.

³¹ Handley (2008), p. 22.

2.10 Further guidance on market value vs. redemption rate

74 The standard treatment of imputation credits in Australian finance textbooks is to interpret gamma in terms of the market value of imputation credits. We are unaware of any published work that interprets gamma in terms of the redemption rate.

75 For example, in their corporate finance textbook, Associate Professor Partington and his co-authors state (correctly in our view) that:

γ =the market value of franking credits as a percentage of face value.³²

76 They also note (correctly in our view) that the evidence suggests that investors value imputation credits materially below the face amount:

The results have been mixed, but they suggest that the market value of franking credits is positive, but significantly less than the credit's face value.³³

and:

...the market value of the franking credit is likely to differ from its face value. We do not know exactly what the market value is, but the evidence suggests that franking credits are valued at a significant discount to their face value.³⁴

77 Partington et. al also provide an explanation (with which we agree) as to why imputation may have had an immaterial effect on the corporate cost of equity capital:

The impact of imputation may not have been that big. There are several reasons for this. As suggested by Bob Officer, in a small open economy like Australia, equilibrium rates of return are likely to be determined by capital flows from international investors. If so, domestic tax changes are likely to have a reduced effect, or no effect at all, on equilibrium rates of return.³⁵

78 The AER has responded to these points by claiming that there is no inconsistency between:

- a. Partington's statement that "gamma is the market value of imputation credits"; and
- b. The AER's approach of rejecting market value studies in favour of estimating theta as the redemption rate.³⁶

79 This claim appears to be based on the circular proposition that the market value would be the same as the redemption rate if we assume away (a) any reasons why the market value would be less than the redemption rate, and (b) the empirical evidence that the market value *is* less than the redemption rate.

³² Brealey, Myers, Partington and Robinson (2000), p. 168.

³³ Brealey, Myers, Partington and Robinson (2000), p. 169.

³⁴ Brealey, Myers, Partington and Robinson (2000), p. 168.

³⁵ Brealey, Myers, Partington and Robinson (2000), p. 168.

³⁶ JEN Preliminary Decision, Appendix 4, p. 4-60.

3 The distribution rate

3.1 A firm-specific parameter

80 It is generally accepted that the distribution rate is a firm specific parameter. For example, in its October and November 2015 preliminary and draft decisions, the AER notes that:

...the distribution rate is a firm specific parameter.³⁷

81 There is also agreement on this point from Lally (2013 AER):

...within the Officer (1994) model, the distribution rate is a firm specific parameter rather than a market average parameter.³⁸

82 We agree that the distribution rate should be interpreted as the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors. This implies that, when estimating the distribution rate, one should have regard to the relevant characteristics of the benchmark efficient entity. Specifically, it implies that one should be wary of estimates of the distribution rate that are materially affected by data from firms that are materially dissimilar to the benchmark efficient entity in terms of their ability to distribute imputation credits.

3.2 The relevant characteristics of the benchmark efficient entity

83 The ERA's 2013 Rate of Return Guideline defines the benchmark efficient entity without reference to size or listing status. The ERA defines the benchmark efficient entity to be:

An efficient 'pure-play' regulated gas network business operating within Australia without parental ownership.³⁹

84 Thus, the ERA's view is that the benchmark efficient entity should not be defined as a large listed company, but generically as a "network business."

85 In this regard, the AER (which has adopted essentially the same definition of the benchmark efficient entity) notes that:

...if we estimated a distribution rate strictly in accordance with our benchmark definition we would end up with only the firms that we regulate, or an observable set of similar firms.⁴⁰

86 On this basis, the AER has decided that it should not estimate the distribution rate with reference to a small set of comparator firms (as it does for other firm-specific parameters such as beta and gearing) because that may provide an

³⁷ JEN Preliminary Decision, p. 4-21.

³⁸ Lally (2013 AER), p. 41.

³⁹ ERA Rate of Return Guideline, Explanatory Statement, Paragraph 114.

⁴⁰ JEN Preliminary Decision, p. 4-90.

incentive for regulated firms to manipulate their dividend payout policies to obtain a higher regulatory estimate of gamma.⁴¹ Rather, the AER has determined that a broader data set should be used to estimate the distribution rate and the ERA has followed suit on this issue.

87 One would also be led to the use of a broader data set if the definition of the benchmark efficient entity were expanded beyond the firms that are regulated by the ERA to include “similar” firms. For the purposes of the distribution rate, an expanded set of firms would include those that are similar to electricity or gas distribution and transmission firms in terms of their ability to distribute imputation credits.

88 Consideration of a larger set of firms also assists in reducing the statistical estimation error that is associated with small sample sizes.

89 Thus, whether one is led to consider a broader data set due to a broader definition of the benchmark entity or due to concerns about regulatory gaming or estimation error, the question is *which* broader data set should be used to estimate the distribution rate.

90 In its DBP Draft Decision, the ERA considers two sets of estimates that are available for the purpose of producing an appropriate estimate of the distribution rate:

- a. An estimate pertaining to all listed companies; and
- b. An estimate pertaining to all companies (listed and unlisted).

91 It is possible that estimates for other samples of firms will be available in the future,⁴² but for present purposes the distribution rate must be derived from the estimates set out above. In the remainder of this section, we consider how to best use the available estimates to determine an appropriate distribution rate for regulatory purposes.

3.3 The role of the top 20 listed firms

92 The ERA relies equally on estimates of the distribution rate for all listed equity and for all equity. The specific values the ERA accept are:

- a. All equity in aggregate distribute 70% of the credits that they create; and
- b. All listed equity in aggregate distribute 80% of the credits that they create.⁴³

93 SFG (2015) demonstrate that these two data sets produce effectively identical estimates when the 20 largest listed companies, which have materially higher payout ratios, are removed. The set of the 20 largest firms is relevant because

⁴¹ AER Rate of Return Guideline, Explanatory Statement, p. 164.

⁴² For example, it would be possible (although time consuming) to estimate the distribution rate for different sets of comparator firms.

⁴³ DBP Draft Decision, Appendix 5, pp. 28-30.

Lally (2014 QCA) has produced an estimate of the distribution rate for that set of firms. The key point here is that the top 20 firms differ from the benchmark efficient entity in that they have access to a material amount of foreign-sourced income that can be used to help distribute imputation credits. The same general point would be made if the top 30 or 50 stocks were considered – the largest firms, on average, have the largest proportion of foreign-sourced income.

94 In its DBP Draft Decision, the ERA considers two estimates of the distribution rate for listed equity:

- a. An estimate of 0.8 from Handley that is based on ATO data for all listed companies;⁴⁴ and
- b. An estimate of 0.84 from Lally that is based on the top 20 companies only.⁴⁵

95 Since the top 20 companies represent approximately 62% of the total market equity, the ERA's figures imply that the public firms that are not among the top 20 have an average distribution rate of 73% since:

$$73\% \times 0.38 + 84\% \times 0.62 = 80\%.$$

96 NERA (2015) use Australian Tax Office data to estimate distribution rates for various types of companies from 2000-2012. Their results are summarised in Table 1 below.

Table 1: Distribution rate 2000-2012 by company type

Firm type	Distribution rate
Top 20 ASX listed	0.840
Public, but not top 20 ASX listed	0.693
All public	0.755
Private	0.505
All companies	0.676

Source: NERA (2015), Table 3.4, p. 23.

97 Thus, the distribution rate for listed firms is approximately 70%, for all but the 20 largest listed firms and it is lower for unlisted firms. Handley (2015 JGN, pp. 7, 11) confirms that the distribution rate is a firm specific parameter and confirms the NERA estimates set out above.

98 Consequently, given the estimates that are currently available, the question is whether “the proportion of imputation credits generated by the benchmark

⁴⁴ DBP Draft Decision, Appendix 5, Paragraph 123.

⁴⁵ DBP Draft Decision, Appendix 5, Paragraph 123.

efficient entity that is distributed to investors”⁴⁶ is best estimated with reference to the 20 largest listed firms, or with reference to other firms.

99 Frontier (2015 Gamma) explains that when estimating the distribution rate there are two reasons to be concerned about the weight that is afforded to the top 20 listed firms:

- a. The ERA has specifically stated that the benchmark efficient entity should not be assumed to be a large listed company, as set out above; and
- b. The top 20 listed firms differ from the benchmark entity in that their foreign sourced profits enable a higher distribution rate.

100 On the second point, Frontier (2015 Gamma) and SFG (2015) note that the 20 largest listed firms are very large multinationals. For example, BHP has equity that is valued at more than 30 times the equity in the regulated asset base of even a large service provider.⁴⁷ Even the 20th listed company is orders of magnitude larger than the service providers that are regulated by the AER.⁴⁸

101 Frontier (2015 Gamma) and SFG (2015) also note that the 20 largest listed firms have a material amount of foreign sourced profits which enable them to distribute a higher proportion of imputation credits. Specifically, multinational firms are able to attach imputation credits to dividends that they distribute out of foreign sourced profits (since *any* dividend can have credits attached to it). Foreign profits enable any firm to distribute more imputation credits than it would otherwise have been able to.⁴⁹

102 This differentiates the top 20 listed firms from the benchmark entity, which is purely domestic by definition.⁵⁰

103 In its DBP Draft Decision, the ERA acknowledged the SFG (2015) submission on this point and concluded as follows:

The Authority notes SFG's concerns. For that reason, the Authority has determined to rely on the Handley estimate alone, concluding that a reasonable estimate of the distribution rate for listed equity is 0.8.⁵¹

⁴⁶ JEN Preliminary Decision, p. 4-23, 4-86, 4-87.

⁴⁷ A service provider with a \$10 billion RAB would be considered to be large. Such a service provider would have \$4 billion of equity. BHP has a market capitalisation of over \$122 billion.

⁴⁸ For example, Amcor has a market capitalisation of approximately \$16 billion.

⁴⁹ This point is explained in more detail in SFG (2014 QCA Gamma), which is available as Attachment 6 to www.qca.org.au/getattachment/758d9606-657a-4019-9d61-906264bd9122/Aurizon-Network.aspx. The idea is that imputation credits can be distributed by attaching them to any dividends. Thus, foreign-sourced income can be used to help distribute imputation credits. For example, a firm with \$100 of pre-tax domestic income would generate \$30 of credits by paying corporate tax in Australia. If that firm paid a dividend of \$50 (which is close to the average dividend payout rate of 70% of after-tax profit), it could attach only $50 \times 0.3 / (1 - 0.3) = \21.43 of credits. However, if the firm also had foreign-sourced profits that allowed it to increase its dividend to \$70 (or more) it would be able to distribute all of the credits it created because $70 \times 0.3 / (1 - 0.3) = \30 .

⁵⁰ The ERA defines the benchmark efficient entity to be “operating within Australia.” ERA Rate of Return Guideline, Explanatory Statement, Paragraph 114.

⁵¹ DBP Draft Decision, Appendix 5, Paragraph 126.

104 However, that approach simply rejects one estimate that is entirely inappropriate (in that it reflects firms that are able to use foreign income to help distribute imputation credits) in favour of one that is mainly inappropriate (in that the majority of weight is assigned to large multinationals). In our view, a better approach is as follows: When seeking to estimate the distribution rate of a firm “operating within Australia,”⁵² we should consider evidence from firms that are operating within Australia. We should not place all weight or majority weight on firms operating outside Australia.

3.4 Firm-specific and market-wide parameters

105 As set out above, it is generally agreed that the distribution rate is a firm-specific parameter and it is uniformly accepted that theta is a market-wide parameter. Thus, there is broad agreement that gamma should be estimated as the product of:

- a. The distribution rate appropriate for the benchmark efficient entity; and
- b. Theta (or the “utilisation rate” as the ERA now calls it) across the broad market.

106 The product of firm-specific and market-wide parameters also occurs in the Sharpe-Lintner Capital Asset Pricing Model (**SL-CAPM**) where the equity beta (a firm-specific parameter) is multiplied by the market risk premium (**MRP**) (a market-wide parameter). In this case:

- a. Beta is an estimate of the correlation between firm stock returns and market stock returns. Consequently, beta is estimated with reference to firms that are likely to exhibit the same correlation as the benchmark efficient entity; and
- b. MRP is a market-wide parameter, which is estimated with reference to the broadest set of firms for which data is available.

107 In our view, the same applies to the estimation of gamma:

- a. “The distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.”⁵³ Consequently, it should be estimated with reference to firms that are likely to distribute the same proportion of imputation credits as the benchmark efficient entity. This would seem to exclude the top 20 firms, which are able to use foreign-sourced income to distribute more credits – because the benchmark efficient entity has no access to such foreign-sourced income, by definition; and

⁵² The ERA defines the benchmark efficient entity to be “operating within Australia.” ERA Rate of Return Guideline, Explanatory Statement, Paragraph 114.

⁵³ This is the AER’s definition, as set out in the JEN Preliminary Decision, p. 4-23, 4-86, 4-87.

- b. Theta is a market-wide parameter (as it is defined as the market value of distributed imputation credits), which should be estimated with reference to the broadest set of firms for which data is available.

3.5 The ERA's DBP Draft Decision

108 In its DBP Draft Decision, the ERA adopts an approach of estimating the distribution rate and theta using the same data sets. The ERA estimates both parameters with reference to listed equity only, then both parameters with reference to all equity. This is akin to estimating beta and MRP with reference to comparator firms only, or estimating both parameters with reference to market-wide data. In our view, this approach is wrong as it is inconsistent with the proper definition of the distribution rate as the proportion of credits that is distributed by the benchmark efficient entity.

109 The ERA does not dispute the evidence that:

- a. The top 20 listed firms make material use of foreign-sourced profits to distribute imputation credits that they would not otherwise be able to distribute; and
- b. The benchmark efficient entity, by definition, does not have access to any foreign-sourced income to assist it in distributing imputation credits.

110 In our view, excluding firms with material foreign profits when estimating the distribution rate for a benchmark firm with no foreign profits is entirely appropriate. However, the ERA states that identifying a relevant and material difference between the top 20 stocks and the benchmark efficient entity (in relation to the use of foreign income to distribute imputation credits) is insufficient to warrant a change to its approach. The ERA summarises its position as follows:

It is desirable to have an estimate of gamma that is internally consistent. The Authority notes that its preferred measures of the utilisation rate are based on estimates derived using all listed and unlisted equity. As noted, the ATO data covers both listed and unlisted firms, giving estimates for listed equity and all equity.⁵⁴

111 That is, the ERA concludes that it must use the same set of investors to estimate the distribution rate and theta for purposes of “internal consistency.” This is equivalent to suggesting that beta and MRP must be estimated with reference to the same set of investors, which is clearly incorrect. In our view, it is wrong to require estimates of a firm-specific and a market-wide parameter to be made with reference to the same set of data. Estimating a firm-specific parameter with data that reflects the firm, and estimating a market-wide parameter with data that reflects the broad market, is not inconsistent – it is the correct approach.

⁵⁴ DBP Draft Decision, Appendix 5, p. 30.

3.6 Summary and conclusions on the distribution rate

112 In summary, we note that:

- a. The distribution rate for all companies is approximately 70%;
- b. The distribution rate for all listed companies, other than the top 20, is also approximately 70%; and
- c. The top 20 listed companies differ from the benchmark efficient entity in their ability to distribute imputation credits via profits that have been sourced offshore.

113 In our view, whether the benchmark efficient entity is defined narrowly (as the firms that the ERA regulates) or more broadly (including other similar firms), for the purposes of estimating the distribution rate it would not include firms that have foreign-sourced profits to assist in the distribution of imputation credits. Thus, the distribution rate should not be estimated with reference to the top 20 firms, or with reference to any estimate that is materially affected by the top 20 firms. For this reason, we would exclude the influence of the top 20 firms from the estimate of the distribution rate that is based on listed equity. But for the top 20 listed firms, the distribution rate estimate for listed equity is 70%. We also note that the estimate for all equity (which, being a larger sample, is less affected by the top 20 firms) is also 70%.

114 Consequently, our view is that, given the evidence that is currently available, the best estimate of “the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors” is 70%.

4 Current estimates of the redemption rate

4.1 Overview

115 Whether the redemption rate is to be used as a point estimate of theta or as an upper bound for theta, the regulator will require an estimate of it. Two methods have been proposed for estimating the redemption rate: tax statistics and the equity ownership approach.

4.2 Tax statistics estimates

116 The tax statistics approach involves the analysis of ATO data in relation to the quantum of credits redeemed relative to the quantum of credits distributed. In its DBP Draft Decision, the ERA has accepted an estimate of 0.43 from Hathaway (2013).⁵⁵

4.3 Equity ownership

117 The equity ownership approach involves estimating the proportion of Australian shares that are owned by resident investors and then assuming that 100% of the credits distributed to residents will be redeemed.

118 In its DBP Draft Decision, the ERA adopts equity ownership estimates of:

- a. 0.47⁵⁶ and 0.48⁵⁷ for listed equity; and
- b. 0.59 for all equity.⁵⁸

4.4 Summary of estimates

119 The estimates of the redemption rate that are currently available are:

- a. From tax statistics: 0.43 (Hathaway, 2013, all equity); and
- b. From equity ownership: 0.48 (listed equity) and 0.59 (all equity).

4.5 Use of estimates

120 As set out above, our view is that the redemption rate should only be used as an upper bound for theta and not as a point estimate. In Section 5 below, we confirm that our preferred market value estimate of theta is 0.35. Since that estimate is below the upper bound estimates of 0.43, 0.48 and 0.59, it would pass the upper bound test set out by the Tribunal in the *Gamma* case.

⁵⁵ DBP Draft Decision, Appendix 5, p. 31.

⁵⁶ DBP Draft Decision, Appendix 5, Paragraph 67.

⁵⁷ DBP Draft Decision, Appendix 5, Paragraph 131.

⁵⁸ DBP Draft Decision, Appendix 5, Paragraph 131.

- 121 If the redemption rate is to be used as an upper bound, the fact that there are three somewhat different estimates is of less consequence – since the main point is that the proposed market value estimate of 0.35 is below all of the upper bound estimates, and therefore passes the upper bound test. Our view is that the most direct estimate of the (upper bound) redemption rate is the tax statistics estimate of 0.43 which is only moderately above our proposed point estimate of 0.35. The fact that the point estimate is below the upper bound reflects the extent to which investors do not value credits at the full face amount.
- 122 During the NSW merits review hearing, the AER proposed a redemption rate estimate of 0.60, based primarily on its equity ownership estimates. We note that this estimate is higher than any estimate considered by the ERA and (in the subsequent subsection) we explain why the (lower) tax statistics estimate should be preferred, being a more direct estimate.
- 123 If, however, the redemption rate is to be used as a point estimate for theta, then it will be more important to consider the relative reliability of each of the three estimates considered by the ERA. Again, we note that our view is that the tax statistics estimate should be preferred for the reasons set out below.

4.6 Reasons for differences between the equity ownership and tax statistics estimates of the redemption rate

- 124 In its DBP Draft Decision, the ERA interprets the redemption rate as a point estimate of theta. We note that, for all equity, the ERA's equity ownership estimate (0.59) is higher than the tax statistics estimate (0.43). There are a number of reasons why such a difference would be expected, principally because the tax statistics estimate is a direct estimate of credits redeemed vs. credits distributed, whereas the equity ownership estimate is based on a set of assumptions.

4.6.1 “Refinement” of the equity ownership estimates

- 125 In its DBP Draft Decision, the ERA relies on refined equity ownership estimates that are “consistent with the method set out by the AER.”⁵⁹ The ERA now:

Excludes from the calculation equity in entities that are wholly owned by the public sector – including equity issued by the ‘central bank’, ‘central borrowing authorities’, ‘national public non-financial corporations’ and ‘state and local public non-financial corporations’.⁶⁰

- 126 Because the ABS data on which the ERA relies for its equity ownership estimates is presented at a coarsely aggregated level, it is difficult to know whether the ERA's refinements are complete and appropriate. It is possible that the inability

⁵⁹ DBP Draft Decision, Appendix 5, Paragraph 62.

⁶⁰ DBP Draft Decision, Appendix 5, Paragraph 62.

to perfectly refine the ABS data is part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.⁶¹

4.6.2 Data quality issues

127 Another relevant consideration is the quality of the data. The ABS sets out a number of notes in relation to its equity ownership data, including the following warning about the deficiencies of the data:

The ABS is aware of the following deficiencies in reported data:

There are some classification and timing problems in the data being reported by some large banks

The quality of the data for the other depository corporations sector is only fair

The data for the rest of world are of only fair quality because of deficiencies in coverage, classification and valuation

Stock lending, repurchase agreements, and short selling in securities markets and inconsistent treatment of these practices by respondents are causing some double counting of asset records for some types of securities

The ABS believes that derivative and synthetic financial products are being treated inconsistently

The estimates of the stock of issued shares of unlisted private non-financial corporations are very poor

For the convenience of survey respondents, the information collected in the ABS survey of private non-financial corporations is consolidated for groups of companies. Hence it is not possible to show, for example, loans between group members as part of the long term loan market. Similarly, as the ABS does not survey households, loans between households are also not shown in these statistics.⁶²

128 Whereas the ABS is clearly satisfied that, all things considered, the data is of sufficient quality to be compiled and published, it has identified a number of specific concerns about the accuracy of some of the data. It is possible that these data issues are also part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.

4.6.3 The 45-day rule

129 Another reason for the difference between the equity ownership estimate and the ATO tax statistics estimate is the 45-day rule, which prevents investors from redeeming credits unless the shares have been held for a 45-day period. The ATO tax statistics approach focuses directly on the amount of credits that have been redeemed, so it takes account of any effect of the 45-day rule. By contrast, the equity ownership approach assumes that 100% of all credits distributed to resident investors will be redeemed.

⁶¹ To be clear, we are not suggesting that the ERA should have (or could have) used more finely calibrated data to produce a more refined estimate. Rather, we are drawing attention to the coarseness of the available data and the inability of anyone to produce more finely calibrated estimates.

⁶² <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5232.0Explanatory%20Notes1Sep%202015?OpenDocument>, accessed on 20 December 2015.

130 Presumably the 45-day rule has some effect (because otherwise it would be redundant), but there is currently no useful evidence about the materiality of that effect. There is certainly no basis to conclude that the 45-day holding rule is not having any effect. Symmetrically, there is no basis to conclude that the 45-day rule is having any particular material effect. In our view, what can be said of the 45-day rule is that it may be part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.

4.6.4 Other unredeemed credits

131 It is also possible that some investors who receive credits do not redeem them due to the administrative burden that is involved or that they are unable or unwilling to redeem for some reason other than the 45-day rule. For example, for investors who would otherwise not have to file a tax return, the cost (including time) of having to maintain records and complete a return may exceed the benefits of redeeming the credit. Dr Abraham raised the prospect of investors electing not to redeem credits due to “administrative costs” during the NSW Tribunal hearing.⁶³ This may be part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.

4.6.5 Treatment of government-owned businesses

132 Another reason for the difference between the ERA’s equity ownership estimate and the ATO tax statistics estimate of the redemption rate is the ERA’s treatment of credits distributed to government entities. Such entities are unable to redeem credits. Thus, the ATO tax statistics would record the credits distributed to those entities and would also reflect the fact that those credits were not redeemed. By contrast, the ERA’s approach is to now remove those credits from consideration entirely. This has the effect of increasing the estimate of the redemption rate. The ERA follows the AER’s approach,⁶⁴ which explains its approach as follows:

In the draft decisions released in 2014, our calculation of the refined domestic ownership share effectively assumed that governments ‘wasted’ the imputation credits they received. We noted in the draft decisions that there was no clear case for making this assumption. In this preliminary decision, consistent with the approach we took for the decisions we released in April and June 2015, we exclude government-held equity from the calculation of the refined domestic ownership share.⁶⁵

133 Thus, the ERA’s approach of disregarding the credits that are distributed to government entities, and which are therefore not redeemed, leads to an increase in its equity ownership estimate. This approach may also be part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.

⁶³ NSW Tribunal hearing, Transcript, Day 8, p. 5.

⁶⁴ DBP Draft Decision, Appendix 5, Paragraph 62.

⁶⁵ JEN Preliminary Decision, p. 4-97.

134 If the objective is to estimate the market wide redemption rate – the ratio of redeemed credits to distributed credits across the whole economy – the approach of eliminating particular classes of investors who are known to be unable to redeem credits will lead to an inflated estimate.

5 Market value estimates of theta

5.1 Our preferred estimate

135 In our previous report to the ERA,⁶⁶ we submitted that:

Our view is that theta should be interpreted as the value of distributed credits and that dividend drop-off analyses are designed to provide a direct estimate of that value. In our view, the SFG estimate of 0.35 should be preferred to any other estimate.⁶⁷

136 We remain of the view that 0.35 is a conservative estimate of the market value of distributed imputation credits for the reasons set out in this report and our earlier report. We note that SFG (2014, pp. 27-28) summarises the Tribunal's scrutiny of the SFG dividend drop-off study and its adoption of the SFG estimate.

137 In the remainder of this section of the report, we briefly summarise the divergence of views between us and the ERA on two key issues relating to market value studies.

5.2 Econometric estimation issues

138 In its Rate of Return Guideline, the ERA adopted the standard market value interpretation of theta and used dividend drop-off analyses to determine a range for theta.⁶⁸

139 We agree with the ERA that if theta is re-defined so that it no longer represents the market value of distributed credits, then market value studies such as dividend drop-off analysis will be of limited relevance.

140 In its DBP Draft Decision, the ERA raises a number of econometric issues. We note that none of these issues precluded the ERA from relying exclusively on dividend drop-off analyses for the purposes of its Guideline.

Trading around the ex-dividend date

141 Specifically, in the DBP Draft Decision the ERA notes that dividend drop-off analyses are based on the change in share prices over ex-dividend dates. The ERA makes the point that the estimate will reflect the trading that occurs around the ex-dividend event, which may not be representative of the providers of long-term equity capital.

⁶⁶ SFG (2014).

⁶⁷ SFG (2014 DBP), Paragraph 253.

⁶⁸ ERA Rate of Return Guideline, p. 9.

142 This point was addressed in great detail in our previous report to the ERA, SFG (2014 DBP), where we stated that:

The ERA questions whether the trading activity around the ex-dividend date is representative of long-term providers of equity capital.⁶⁹ 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.

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 active in the market, 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."⁷⁰

The ENA submission on the AER's Draft Guideline contained a detailed discussion on this point,⁷¹ none of which has been addressed or acknowledged in the Final Guideline materials. 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 credits highly. These investors purchase shares to capture the dividend and imputation credit, causing a run-up in the cum-dividend price.⁷²

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.⁷³

143 Appendix 3 to SFG (2014 DBP) considers this point in even further detail.

144 In its DBP Draft Decision, the ERA simply restates that:

...the composition of investors around ex-dividend dates may not be representative of long term investors,⁷⁴

and concludes that this may have some (unspecified) effect on dividend drop-off estimates.

145 If the ERA were to present some empirical evidence or even a conceptual argument about why dividend drop-off estimates might systematically underestimate the market value of distributed credits, we could respond to it. However, it is impossible to respond to the proposition that there might be some unspecified reason that causes an unspecified effect on dividend drop-off estimates.

⁶⁹ ATCO Gas Draft Decision, pp. 442-443, Paragraphs 89 and 91.

⁷⁰ AER Rate of Return Guideline, Explanatory Statement, Appendix H, p. 170.

⁷¹ ENA Submission, 11 October 2013, Section 7.9, pp. 119-123.

⁷² The same point is made by McKenzie and Partington (2011), pp. 9-10.

⁷³ SFG (2014 DBP), Paragraphs 235-239.

⁷⁴ DBP Draft Decision, Appendix 5, Paragraph 92.

The ERA dividend drop-off analysis

146 In our previous report to the ERA, we address the relative weight that should be applied to the SFG dividend drop-off estimates of theta and the ERA dividend drop-off estimates. We concluded that:

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 any 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.⁷⁵

147 We remain of the view that the ERA study should be given no weight vis-à-vis the SFG studies, for the reasons set out in our previous report to the ERA, SFG (2014 DBP), where we concluded as follows:

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 studies occurs when the ERA study uses raw prices and returns, contrary to the accepted practice in the literature.

In our March 2014 submission to the ERA, we compared the relative merits of these two studies.⁷⁶ We noted that the Australian Competition Tribunal has adopted the SFG study in full but that we are unaware of any external verification of the ERA study.

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.”⁷⁷ 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.⁷⁸

⁷⁵ SFG (2014 DBP), Paragraph 227.

⁷⁶ SFG (2014 ERA Gamma).

⁷⁷ ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

⁷⁸ SFG (2014 DBP), Paragraphs 27-29.

148 The ERA has responded to this point by asserting that its study has also now
been scrutinised:

The Authority considers that its studies have been subject to extensive
scrutiny, including by regulators, experts, and DBP and SFG itself.⁷⁹

149 However, the point is not about how many people might have read a study, but
about what informed parties might think of it. For example, a study that has
been carefully performed using state-of-the-art methods and which has been
accepted in full by the Tribunal would reasonably receive materially more weight
than a study that had been rejected as flawed by those who had considered it.

150 In its DBP Draft Decision, the ERA notes that its study produces the same
estimate as the SFG study when the SFG methodology is used.⁸⁰ The ERA goes
on to note that when its study employs a different methodology, which is not
employed elsewhere in the literature because it is flawed, it obtains different
results. In our view, this is a good reason to use the SFG empirical methodology
which has been heavily scrutinised and approved by the Tribunal and to give no
weight to the results from the flawed methodology. However, the ERA
concludes that:

...these differences undermine the credibility of results from all such studies.⁸¹

151 In our view, the ERA's conclusion on this point has no logic to it. A whole body
of evidence should not be eliminated by producing a flawed study that produces
inconsistent results.

5.3 Adjustments to dividend drop-off estimates of theta

5.3.1 Overview

152 In its DBP Draft Decision, the ERA proposes that the SFG dividend drop-off
estimate of 0.35 should be adjusted upwards to 0.4 by dividing by the coefficient
on cash dividends.⁸² SFG (2015, pp. 39-40) explains why that would be
inappropriate and why the proposed adjustment would drive an illogical and
perverse outcome. Handley (2015) advises that the SFG estimate is an
appropriate estimate of the market value of imputation credits, but that:

...an inconsistency would arise if no adjustment was made since the estimate
of theta from the SFG dividend drop-off study would then not represent the
value of credits before personal taxes and before personal costs.⁸³

153 In our view, a market value estimate of theta is entirely appropriate, so no
adjustment is required to convert it into an estimate of the "value of credits

⁷⁹ DBP Draft Decision, Appendix 5, Paragraph 112.

⁸⁰ DBP Draft Decision, Appendix 5, Paragraph 113.

⁸¹ DBP Draft Decision, Appendix 5, Paragraph 116.

⁸² DBP Draft Decision, Appendix 5, p. 25.

⁸³ Handley (2015), p. 30.

before personal taxes and before personal costs,” and that consideration of this issue can finish here.

5.3.2 Further analysis

154 If further consideration of this issue is required, it can be best considered in the following way. Suppose the dividend drop-off regression produced a coefficient of 1 on cash dividends and a coefficient of 0.35 on imputation credits. This would suggest that 100% of the face amount of dividends and 35% of the face amount of imputation credits is capitalised into the stock price. In this case, the ERA’s proposed adjustment would be to divide the 0.35 estimate by 1, leaving it at 0.35.

155 Now consider a case that is identical, except that the coefficient on cash dividends is 0.9. This implies that dividends are worth only 90% of their face amount and imputation credits are still worth 35% of their face amount. In this case, the allowed return would need to be higher to leave investors equally well off. This would enable the firm to pay dividends with a higher face amount, which would be necessary if investors value dividends at less than their face amount. Regulators in some jurisdictions (e.g., New Zealand) allow higher returns in relation to dividends being valued at less than the face amount, but the ERA does not.

156 Rather than allowing a *higher* return, the ERA proposed adjustment would result in a *lower* allowed return. The ERA would propose that the 0.35 estimate should be divided by 0.9 to produce an adjusted estimate of 0.39. This higher theta would then result in shareholders receiving a *lower* return than they otherwise would. That is, rather than compensating investors for the lower value of dividends, the effect of the ERA’s proposed adjustment would be to compound the problem by *reducing* the amount of dividends that the firm is able to distribute. Thus, such an adjustment produces a perverse outcome.

157 Perhaps an even more important point is the fact that throughout all of the above example, the evidence shows that 35% of the face amount of imputation credits is capitalised into the stock price. In our view this is the most appropriate point estimate of theta.

6 Compiling the evidence into an estimate of gamma

158 Our approach is consistent with the standard practice of estimating gamma as the product of:

- a. The distribution rate, F ; and
- b. The value of distributed credits, θ .

159 The distribution rate is a firm specific parameter because it depends upon dividend payout policies, which vary across firms according to their characteristics and circumstances. θ is a market wide parameter because the value of a credit in the hands of an investor is independent of its source – in the hands of any particular investor, all imputation credits are identical.

160 Consequently, there is no reason to impose a constraint that the same data source must be used to estimate both parameters. Rather, any data that is relevant to the estimation of the distribution rate should be used to estimate that parameter, and any data that is relevant to the estimation of θ should be used for that purpose. The best estimates of each parameter should then be multiplied to produce the best estimate of gamma.

161 In our view, the ERA's approach of using different subsets of the available evidence (e.g., all equity vs. listed equity) to establish a range of ranges for each parameter, and consequently for gamma, is neither transparent, nor necessary, nor correct.

162 Specifically, the ERA considers that if listed equity is used to estimate θ , then only listed equity must be used to estimate the distribution rate – and that other data that is relevant to the estimation of the distribution rate must be set aside. In our view, this would be a mistake. The distribution rate and θ are separate parameters. It is not the case that the estimate of one depends on, or builds on, the estimate of the other. In our view, all of the relevant estimation methods that are relevant to the estimation of a parameter should be used to inform the estimate of that parameter.

163 Handley (2015 JGN) agrees that the distribution rate is a firm-specific parameter and that θ is a market-wide parameter, but he disagrees with the proposition that all of the relevant estimation methods that are relevant to the estimation of a parameter should be used to inform the estimate of that parameter. Rather, he concludes that “it is obvious that both components should be based on consistent data sets that relate to the same market.” To show why this conclusion is far from obvious, consider the case where there are sufficient comparator firms to properly estimate a firm-specific distribution rate. The Handley approach would then have us estimate θ with reference to only the data for those comparator firms, even though θ is a market-wide parameter and would be properly informed by data from all firms.⁸⁴

⁸⁴ Handley (2015 JGN), p. 8.

164 After considering all of the relevant evidence, we adopt a distribution rate of 70% for the reasons set out in Section 3 of this report:

- a. That estimate is consistent with data for all companies;
- b. That estimate is consistent with data for all listed companies excluding the top 20; and
- c. The distribution rate is a firm-specific parameter and the top 20 firms are very large multinationals that are able to distribute imputation credits via profits earned offshore and the benchmark entity operates only within Australia.

165 For the reasons set out in Section 2 of this report, we consider that theta should be interpreted as the value of distributed credits – as in the price that an investor would be prepared to pay for a credit in the market for equity funds, or (equivalently) the extent to which credits are capitalised into stock prices.⁸⁵ In our view, the best available estimate of theta is 0.35. The source of this estimate is dividend drop-off analysis applied to data from 2000-2013. Other market value estimates of theta tend to be lower, in which case the 0.35 estimate would be conservative.

166 Our view is that redemption rates should be interpreted as an upper bound for theta. The estimates of the redemption rate that the ERA has adopted are:

- a. From tax statistics: 0.43 (Hathaway, 2013); and
- b. From equity ownership: 0.48 (listed equity) and 0.59 (all equity).

Our preferred estimate of theta of 0.35 lies below these upper bound estimates, satisfying that test.

167 Our preferred estimate of gamma is 0.25, which is the product of the distribution rate (0.7) and theta (0.35). In our view this is the best estimate of gamma that is currently available.

⁸⁵ That is, the extent to which stock prices have been bid up to reflect the market's assessment of the value of imputation credits.

7 Views from recent academic work

168 In this section, we summarise the views expressed in a recent paper co-authored
by Associate Professor Partington, one of the primary advisors to the AER on
issues relating to the allowed return on equity and gamma.

169 Ainsworth, Partington and Warren (2015) “examine the implications of the
imputation system for...cost of capital,” among other things. They begin by
drawing the important distinction between what they call “value in use” and
“value in exchange.” Specifically, they make the point that just because some
investors may receive a benefit at the time they redeem an imputation credit, it
does not necessarily follow that credits must have a material effect on traded
stock prices or the cost of capital. This is because share prices (and consequently
the cost of capital) will be the equilibrium outcome of the complex interaction of
trading among all investors, and certain types of investors may be more
influential in determining the equilibrium price:

Also relevant is the basic economic distinction between ‘value in use’ and
‘value in exchange’. There is no doubt that imputation credits have
considerable value in use to Australian resident investors, who can use them to
reduce taxes. Whether they have value in exchange – in other words, whether
they are priced – is a separate matter.⁸⁶

170 Ainsworth, Partington and Warren (2015) also set out the basic economic
principle that the fact that an investor receives and redeems an imputation credit
does not mean that the investor must value that credit at the full face amount:

The fact that a domestic investor holds a stock and can fully utilise any
imputation credits does not provide incontrovertible evidence that they attribute
full value to imputation in exchange. It is entirely possible that a domestic
investor could be holding a domestic stock due to expectations of receiving
high pre-tax returns or other reasons, and not pricing in the imputation credits
in the process. Just because an investor receives imputation credits does not
necessarily mean they fully price them, and hence require a commensurately
lower pre-imputation return from the company as a consequence.⁸⁷

171 I note that the ERA’s current approach to gamma is based entirely on the
proposition that every domestic investor who receives imputation credits *does*
fully price every one of them and hence require a commensurately lower pre-
imputation return from the company as a consequence.

172 Ainsworth, Partington and Warren (2015) go on to suggest that the relevant
consideration is an empirical one – whether stock prices in financial markets are
bid up to reflect some value for imputation credits:

This fundamental issue can be posed as follows. Consider two companies with
identical assets, with the exception that one also has a positive balance in its
franking account and can distribute imputation credits, while the other has a

⁸⁶ Ainsworth, Partington and Warren (2015), p. 9.

⁸⁷ Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

zero balance. The question is: "Do the two companies sell for the same price?"⁸⁸

173 Ainsworth, Partington and Warren (2015) note that the evidence generally suggests that the two companies above *do* sell for the same price.⁸⁹

174 The fact that share prices might be independent of the amount of imputation credits the firm has available is consistent with the observation that, in practice, firms have little regard to imputation when estimating the cost of capital that they would use when evaluating potential new projects. In this regard, Ainsworth, Partington and Warren (2015) conclude that:

Removing imputation would probably have no major impact on the manner in which most companies estimate cost of capital and evaluate investments. Imputation is typically *not* built into the cost of capital for most companies.⁹⁰

175 Ainsworth, Partington and Warren (2015) give special consideration to the regulatory approach to lowering allowed returns to reflect the assumed effect of imputation credits on the corporate cost of capital. They note that this approach is very different from the commercial practice of making no adjustments at all to corporate valuation or cost of capital estimates in relation to imputation:

The treatment of imputation credits for regulatory purposes stands in stark contrast to the approach elsewhere. Regulators make explicit allowance for imputation in their regulatory decisions (e.g. see AER, 2015). The regulators employ the model of Officer (1994), where imputation is taken into account and other tax effects incurred by investors are ignored. The application involves reducing the cost of corporate tax by the 'value of imputation credits', which lowers the pre-tax return that utilities are allowed to earn on regulatory capital. This has the effect of limiting the prices that utilities are permitted to charge.⁹¹

176 They go on to summarise the AER's recent approach, which is identical in all relevant respects to the approach adopted by the ERA in the DBP Draft Decision, as follows:

The regulators estimate the value of imputation credits as the product of the distribution rate (i.e. the portion of income that is assumed to be distributed to shareholders), and the utilisation rate. The latter parameter reflects an estimate of the value of imputation credits in the hands of investors. In a recent decision, the Australian Energy Regulator (AER) applied a value of 0.4 to imputation credits (AER, 2015). While this value was formed with reference to a range of estimates and measures, it roughly equates to the product of a 70% distribution rate and a 60% utilisation rate. That is, regulatory practice assumes that distributed imputation credits are worth about \$0.60 in the dollar.

A notable feature of the regulatory approach is the hierarchy that is applied in considering various estimates of the utilisation rate. The AER firstly relies on the proportion of Australian equities holdings held by domestic investors, which it indicates to be in the range of 0.56 to 0.68 for all equity, and 0.38 to 0.55 for listed companies. They secondly consider the reported utilisation of imputation credits according to taxation statistics, suggesting a range for the utilisation

⁸⁸ Ainsworth, Partington and Warren (2015), p. 9.

⁸⁹ Ainsworth, Partington and Warren (2015), p. 17.

⁹⁰ Ainsworth, Partington and Warren (2015), p. 27.

⁹¹ Ainsworth, Partington and Warren (2015), p. 27, emphasis added.

rate for all equity of 0.4 to 0.6, with reference to analysis by Hathaway (2013). They place least reliance on what they call ‘implied market value studies’. Thus least weight is placed on the body of research aiming to extract the value of imputation credits from market prices and returns, as described in Section 4.1. Their reasons are that the equity holding and tax data provide more direct and simple evidence, meanwhile downplaying market-based studies based on their methodological limitations and variable estimates.⁹²

177 Ainsworth, Partington and Warren (2015) then call into question the basis of the AER/ERA approach, in the context of their discussion about the standard economic concept of market equilibrium:

The discussion in Section 3.2 around how market equilibrium is determined is directly relevant to this issue. It raises some questions over the philosophy underpinning the regulatory approach.⁹³

178 They further spell out the problems with the AER/ERA approach. They note that investors will consider many factors when determining what assets they will purchase and what price they would be prepared to pay for them. This prevents problems for the AER/ERA “aggregation” approach, which simply counts up the number of credits that are distributed to domestic investors and *assumes* that those investors value all credits at the full face amount *and* that this is reflected in the equilibrium share price and cost of capital:

In practice, an investor’s demand for assets may reflect a whole range of considerations, including their expectations, the broader portfolio context, their liabilities, constraints, other costs, etc. This issue is particularly problematic for applying the aggregation approach through reference to observed holdings.⁹⁴

179 In our view, Ainsworth, Partington and Warren (2015) reinforce many of the points made in Section 2 above. The AER’s approach of simply counting up the number of credits that are distributed to domestic investors has no proper basis to it and is inconsistent with standard economic concepts of equilibrium and with standard commercial practice.

180 However, the AER concludes that this paper, co-authored by one of its main advisors, provides no reason to question the AER’s approach:

...we do not consider the paper provides evidence that our equity ownership approach that uses the aggregation approach to estimate the value of theta is not reasonable.⁹⁵

181 It is, of course, open to the AER to argue that Ainsworth, Partington and Warren (2015) are wrong in their analysis or conclusions, but the AER has not done that. Rather, the AER has argued that there is nothing in that paper to suggest that the AER’s approach is unreasonable. In our view, there is no basis for such a conclusion given that Ainsworth, Partington and Warren have contrasted the AER’s approach with standard notions of equilibrium and have concluded that the AER’s approach is “particularly problematic.”

⁹² Ainsworth, Partington and Warren (2015), p. 27.

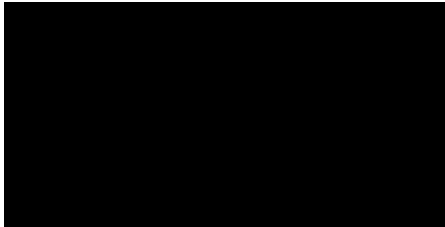
⁹³ Ainsworth, Partington and Warren (2015), Footnote 21, p. 27, emphasis added.

⁹⁴ Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

⁹⁵ JEN Preliminary Decision, Appendix 4, p. 4-63.

8 Declaration

182 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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10 Appendix 1: Instructions

In its *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016 -2020*, dated 22 December 2015 (**Draft Decision**), the ERA did not accept DBP's proposed value for gamma (0.25) in its Access Arrangement Proposal dated 31 December 2014. Instead, the ERA determined a value for gamma of 0.4 (page 113 of the Draft Decision; Appendix 5 to the Draft Decision). In doing so, it has presented arguments on gamma which appear to be similar to those adopted in its (revised) Final Decision dated 10 September 2015 for the Mid-West and South-West Gas Distribution System (ATCO) and in its Draft Decision dated 17 December 2015 for Goldfields Gas Pipeline; there do not appear to be any new arguments in the Draft Decision which have not been raised and considered elsewhere. Further, the ERA's position is consistent with that adopted by the AER.

Given the nature of the wide-ranging discussions and debate on gamma that have occurred already (including most recently before Australian Competition Tribunal), DBP is seeking a brief expert report which:

1. Considers the main aspects of the ERA's approach to gamma, including whether they have (or have not) been addressed in other submissions on the topic of gamma made to the ERA or AER and are thus currently under consideration by the Australian Competition Tribunal.
2. Provides your opinion on whether the approach adopted by the ERA in the Draft Decision, alternatively that contended for by DBP in its Access Arrangement Proposal, or some other approach, represents the best estimate for gamma in the circumstances which accords with (the requirements of the National Gas Rules and the National Gas Law, including the National Gas Objective and Revenue and Pricing Principles.

It is not anticipated, given the nature and scale of work already undertaken, that this project would involve significant new work, but would rather involve a brief synthesis of existing work along the lines outlined above.

Since it is possible that your expert report may be relied on in future proceedings before the Australian Competition Tribunal, we require that the work be undertaken in accordance with the Federal Court Guidelines for Expert Witnesses (attached). Further, your report should contain a declaration that you have been given and have read, understood and complied with Practice Note CM7 issued by the Federal Court of Australia concerning guidelines for expert witnesses. It should also contain a declaration that you have made all the inquiries that you believe are desirable and appropriate and that no matters of significance that you regard as relevant have, to your knowledge, been withheld.

11 Curriculum vitae of Professor Stephen Gray

Stephen F. Gray

Professor of Finance
University of Queensland
Business School
Brisbane 4072
AUSTRALIA
Office: +61-7-3346 8032
Email: s.gray@business.uq.edu.au

Director
Frontier Economics
Email: Stephen.Gray@frontier-economics.com.au

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

- 2014 E Yetton Prize for best paper in the Australian Journal of Management, Brailsford, T., S. Gray and S. Treepongkaruna, (2013), "Explaining the bid-ask spread in the foreign exchange market: A test of alternate models."
- 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)

- Institute of Teaching and Learning Innovation Grant 2016-17, Technology-enhanced Learning Grant (\$200,000), with K. Benson, B. Oliver and J. Birt.

- 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

- Faff, R., S. Gray, and H. Norton, (2015), “Yes, one-day international cricket ‘in-play’ strategies can be profitable!” *Journal of Banking and Finance*, forthcoming.
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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

2012 - Present: Director, Children's Hospital Foundation, Queensland.

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

2003 - 2012: Director, Moreton Bay Boys College Ltd. (Chairman from 2007).

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

Consulting

SFG Consulting: 1997-2014.

Frontier Economics: 2014-Present.

Twenty years' experience in consulting to companies, government-owned corporations, government and regulatory agencies. Examples include:

- *Regulatory cost of capital:* Preparation of submissions in regulatory determinations. Clients include all Australian energy transmission and distribution businesses, FOXTEL, Telstra, BBI, ACCC, IPART, ERA.
- *Corporate cost of capital reviews:* Review of cost of capital estimates for project evaluation and impairment testing purposes. Clients include QANTAS, Stanwell Corporation, Ecowise.
- *Executive stock option valuation:* Clients include Collins Foods Group, Ground Probe, Crater Gold Mining, Beach Petroleum.
- *New Project Evaluation:* Assisting companies and GOCs to evaluate proposed new projects. Particular focus is on quantifying risk and uncertainty and presenting possible outcomes in a probabilistic framework. Clients include Queensland Treasury Corporation, Queensland Accommodation Group, Stanwell, EnerTrade.
- *Financial modelling and forecasting:* Clients include ATO (forecasting delinquent payments), ASX (forecasting trading volumes), Compass Resources (integrated mine valuation model).

Retained as a valuation expert in many litigation cases; produced many expert witness reports; appeared in Court for cross examination many times including:

- *Macquarie Generation:* Witness for AGL in competition case.
- *Telstra v. ACCC:* Witness for Telstra in rate of return regulation case.
- *C7 Case:* Witness for PBL, NewsCorp, Telstra re valuation of Seven's failed cable TV network.
- *Alcan v. NT Commissioner of Revenue:* Witness for Alcan re valuation of combined bauxite mine and alumina refinery for stamp duty purposes.

FRONTIER ECONOMICS | MELBOURNE | SYDNEY

Frontier Economics Pty Ltd 395 Collins Street Melbourne Victoria 3000

Tel: +61 (0)3 9620 4488 Fax: +61 (0)3 9620 4499 www.frontier-economics.com

ACN: 087 553 124 ABN: 13 087 553 124