

Final Plan Attachment 10.6

Issues in the Estimation of Gamma

A Report by Frontier Economics

September 2016

Page intentionally left blank



Issues in the estimation of gamma

REPORT PREPARED FOR AGN, MULTINET GAS, AUSNET
TRANSMISSION AND AUSNET GAS

September 2016

Issues in the estimation of gamma

1	Executive summary	3
1.2	Author of report	4
2	The distribution rate	6
2.1	Background and context	6
2.2	The key problem with the '20 firms' estimation approach	6
3	The reliability of ATO tax statistics	12
4	AER issues with dividend drop-off analysis	16
5	Conversion of market value estimates into redemption proportion estimates	23
6	Declaration	25

1 Executive summary

1 Frontier Economics has been engaged by AGN, Multinet Gas, AusNet Transmission and AusNet Gas to provide expert advice on certain issues relating to the estimation of the value of dividend imputation tax credits, gamma. The issues we have been asked to address are:

- a. Whether we consider the approach of Lally (2016) provides an appropriate estimate of the imputation credit distribution rate. This approach involves estimating the distribution rate from 20 very large multinational corporations;
- b. Whether we consider that the AER's estimates that are based on Australian Tax Office (ATO) tax statistics are reliable in light of the questions that have been raised about the ATO estimates of 'Credits Distributed';
- c. Whether we consider the issues that the AER has raised in relation to dividend drop-off analysis to be so material as to affect the weight that might reasonably be applied to that evidence; and
- d. Whether we consider that the dividend drop-off estimate of theta should be adjusted to convert it into a pre-personal cost and pre-personal tax estimate.

2 Our primary conclusions are set out below.

Distribution rate

3 Our view is that, of the available estimates of the distribution rate, the traditional all-equity estimate provides the best match to the BEE. This is because the BEE is defined to be an Australian firm that need not be a listed company and which has no foreign operations. The alternative estimates considered by the AER (i.e., the Lally 2016 estimates) are based on large multinationals that have substantial access to foreign profits to assist in the distribution of imputation credits and are therefore inappropriate as they are not consistent with the characteristics of the BEE.

The reliability of ATO tax statistics

4 The AER uses ATO tax statistics in both steps of its estimate of gamma as follows:

$$\gamma = F \times \theta = \frac{\text{Credits Distributed}}{\text{Credits Created}} \times \frac{\text{Credits Redeemed}}{\text{Credits Distributed}}$$

5 Some questions have been raised about the reliability of the ATO estimate of 'Credits Distributed.' However, that term cancels out in the multiplication above so we are left with:

$$\gamma = \frac{\text{Credits Redeemed}}{\text{Credits Created}}$$

and no questions have been raised about either of the quantities above.

6 The AER reports that the most recent tax statistics estimate of gamma is 0.34.¹

7 Our view is that this approach to estimating gamma produces, at best, an upper bound and the Australian Competition Tribunal has recently reached the same conclusion.² Since both elements of the calculation (credits redeemed and credits created) are reliable, this evidence suggests that gamma must be less than 0.34.

Issues relating to dividend drop-off analysis

8 In its Rate of Return Guideline, the AER set out a number of its concerns with dividend drop-off analysis. This list of issues has been repeated in all of the AER's subsequent decisions. None of these issues would cause us to reduce the weight that we would otherwise apply to dividend drop-off analysis.

9 We recognise that there is increased trading around ex-dividend dates. However, to the extent that this increased trading around has any impact on the dividend drop-off estimate of theta, it will tend to *inflate* that estimate.

Adjustment to the dividend drop-off estimate of theta

10 In its decisions since the Guideline, the AER has maintained that theta should not be estimated as the market value of distributed credits but as the proportion of credits that might be redeemed. The AER's view is that since dividend drop-off analysis estimates the market value of credits, there must be an adjustment to convert those estimates to the correct 'pre-personal cost and tax' basis. In its recent decisions, the AER maintains this view.³

11 Our view remains that theta should be interpreted as the value (as in 'worth') of distributed credits, and consequently no such adjustment is relevant. Dividend drop-off analysis provides a direct estimate of the extent to which credits are capitalised into stock prices. Since drop-off analysis already estimates the market value of distributed credits, no adjustment required. The Tribunal concurs with our view that theta should be interpreted as the market value of distributed credits and with our view that no adjustment is required.⁴

1.2 Author of report

12 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

¹ AusNet Draft Decision, Attachment 4, p. 16.

² Applications by Public Interest Advocacy Centre and Ausgrid [2016] ACompT1, Paragraph 1096.

³ AusNet Draft Decision, Attachment 4, Appendix 15.

⁴ PIAC-Ausgrid, Paragraphs 1101-1103.

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 an appendix to this report.

- 13 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.

2 The distribution rate

2.1 Background and context

14 In the Australian regulatory setting, the long-standing approach to estimating the distribution rate is to use data from the Australian Tax Office (ATO) on:

- a. Total credits created; and
- b. Total credits distributed.

15 It is broadly accepted that this approach produces an estimate of approximately 0.7.⁵

16 In its recent decisions,⁶ the AER considers three alternative estimates of the distribution rate:

- a. The conventional estimate of 0.7;
- b. An estimate based on listed equity only of 0.75; and
- c. An estimate based on 20 large listed firms of 0.83.

17 In our view, the preferred approach is to select an estimate based on compatibility with the BEE. However, the AER's approach is to maintain three different estimates and to pair those estimates with different estimates of theta. For the reasons set out below, we consider that approach to be unlikely to lead to an appropriate estimate of gamma.

2.2 The key problem with the '20 firms' estimation approach

The '20 firms' estimation approach

18 In its recent decisions,⁷ the AER cites an estimate of the distribution rate developed by Lally (2016).⁸ Lally selects the 20 largest listed companies and for each he estimates:

$$\frac{\text{Credits Distributed}}{\text{Credits Distributed} + \text{Credits Not Distributed}}$$

over a 13-year period, where Credits Distributed is inferred from total dividends paid and Credits Not Distributed is inferred from the change in the firm's

⁵ AusNet Draft Decision, Attachment 4, p. 30.

⁶ AusNet Draft Decision, Attachment 4, p. 30.

⁷ AusNet Draft Decision, Attachment 4, p. 30.

⁸ Lally, M., 2016, *Gamma and the ACT Decision*, Report for the AER, May.

Franking Account Balance. This approach produces a distribution rate estimate of 0.83.⁹

The AER's use of the '20 firms' approach

19 For a number of years, Dr Lally has been providing regulators with an estimate of the distribution rate that is based on his analysis of 20 large multinational firms. In its October 2015 final decisions, the AER cited this evidence, but did not use it when constructing its estimates of gamma. Rather, the AER stated that it took from this evidence nothing more than that it was consistent with the notion that the distribution rate is higher among listed firms than other firms:

Lally examined the financial statements of the 20 largest ASX-listed firms by market capitalisation, and found an aggregate distribution rate across these firms of 0.84. We consider that this broadly reinforces the higher cumulative payout ratio estimate across only listed equity.¹⁰

20 However, in its most recent decisions, the AER has given the Lally estimates equal weight as the standard cumulative payout estimates. The Lally estimates are included in the main table of results and are used directly in the computation of gamma estimates.¹¹

21 The AER does not explain why the same evidence that was used in one way in the 2015 decisions has now been elevated to form the basis of gamma estimates that appear to receive as much weight as any other gamma estimates. In any event, as explained below, the top '20 firms' estimate is an inappropriate basis on which to estimate the distribution rate and should not be used at all.

The key problem with the '20 firms' estimation approach

22 In a previous report submitted to the AER,¹² we identify a fundamental flaw in the 20 firms approach to estimating the distribution rate. The 20 companies in the Lally sample are predominantly very large multinationals with a material amount of foreign-sourced income. This foreign income can be used to distribute imputation credits, so that the distribution rate is higher than it could be for a firm that did not have access to foreign income to assist in the distribution of imputation credits. Since the AER's definition of the BEE is a purely domestic firm, the BEE has no access to foreign income. Consequently, estimating the distribution rate for a firm with *no* foreign income by using a sample of 20 firms with *substantial* foreign income is inappropriate.

23 The problem can be explained via a simple numerical example. Consider two firms that each earn a \$100 profit, pay \$30 tax, and then pay a dividend of \$49 (which represents 70% of the \$70 net profit after tax).

⁹ AusNet Draft Decision, Attachment 4, p. 30.

¹⁰ SAPN Final Decision, Attachment 4, p. 89.

¹¹ AusNet Draft Decision, Attachment 4, Tables 4-3 and 4-4, p. 30.

¹² Frontier Economics, 2015, "An appropriate regulatory estimate of gamma," June.

24 The first firm has no foreign income, so all of the profits and all of the tax occurs within Australia. Thus, the \$30 of corporate tax creates \$30 of imputation credits. The amount of credits that can be attached to the \$49 dividend is only \$21.¹³ Consequently, the distribution rate is:

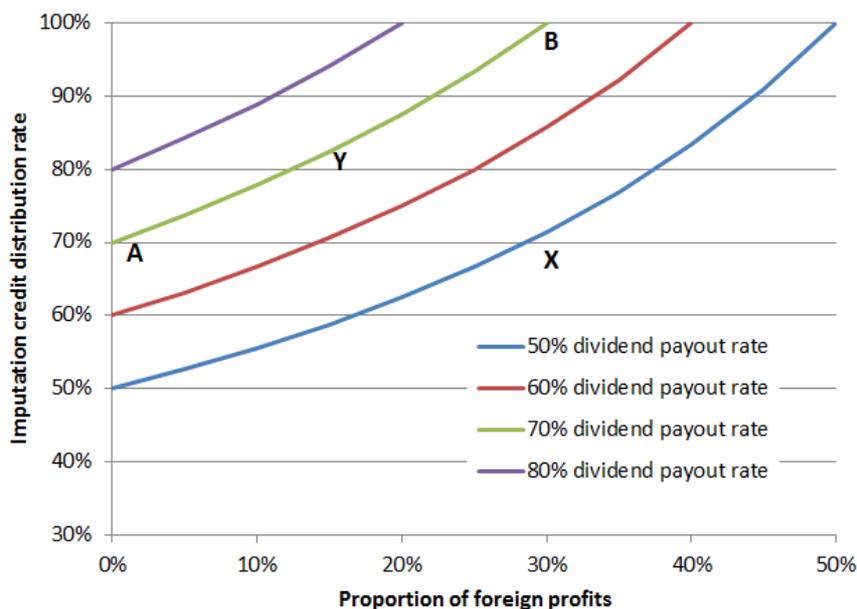
$$\frac{\text{Credits Distributed}}{\text{Credits Created}} = \frac{21}{30} = 70\% .$$

25 The second firm is identical to the first in all respects except that 70% of its business is in Australia and 30% is offshore. This firm will pay 70% of its corporate tax to the ATO and therefore creates \$21¹⁴ of credits. It will then pay the same dividend of \$49, representing the same 70% of its net profit after tax. Like the first firm, \$21 of credits can be attached to the \$49 dividend. This represents a 100% distribution rate:

$$\frac{\text{Credits Distributed}}{\text{Credits Created}} = \frac{21}{21} = 100\% .$$

26 The second firm is able to attach credits to dividends paid out of offshore profits, whereas the first firm has no access to such offshore profits. For any given dividend payout policy, a firm with foreign profits will be able to distribute a larger proportion of its credits than a firm with no access to foreign profits. This is illustrated in Figure 1 below. Point A on the graph represents the purely domestic firm in the above example and Point B represents the multinational.

Figure 1: The effect of foreign profits on imputation credit distribution rates



Source: Frontier Economics calculations based on corporate tax rates of 30%.

¹³ $49 \times 0.3 / (1-0.3) = 21$.

¹⁴ $70\% \times 30 = 21$.

27 In our view, the AER has erred in using a sample of large multinationals with substantial offshore profits to estimate the imputation credit distribution rate. This is because the BEE, being a purely domestic firm has no access to any such offshore profits, by definition.

The AER's response

28 The AER make two points in response to the problems with the 20 firm approach that have been raised above.

Variation in dividend payout policies across firms

29 First, the AER notes that different firms will adopt different dividend payout ratios for a number of reasons.¹⁵ This is self-evidently true. But the problem here is that *for any given dividend payout ratio*, the imputation credit distribution rate is an increasing function of the proportion of foreign profits – as shown in Figure 1 above. Whatever the payout ratio, foreign profits enable the firm to distribute a higher proportion of credits than they would otherwise be able to – and the BEE does not have access to any foreign profits, by definition.

Do large multinationals have higher imputation credit distribution rates?

30 The second response by the AER is based on an examination of 7 of the 20 large multinationals considered by Lally (2016), who concluded that (among these 7 firms) those with relatively more foreign profits had lower imputation credit distribution rates.¹⁶

31 However, the relevant question is whether large multinationals have higher imputation credit distribution rates than other firms. To answer this question, we consider it logical to compare the distribution rate of large multinationals with the distribution rate of other firms. We do not see how this question can be answered by examining a small selected subset of large multinationals only. That is, we fail to see how one can determine whether A is larger than B by examining only a selected sub-set of A. The more logical approach would be to compare A against B.

32 The AER's own figures clearly show that there is a material difference. The AER adopts a distribution rate of 70% for all firms and 83% for the 20 large multinationals. Clearly, the distribution rate for large multinationals *is* greater than the distribution rate for other firms.¹⁷

33 Moreover, 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.

¹⁵ AusNet Draft Decision, Attachment 4, p. 132.

¹⁶ AusNet Draft Decision, Attachment 4, p. 132.

¹⁷ AusNet Draft Decision, Attachment 4, p. 30.

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. 23.¹⁸

34 In our view, the evidence clearly supports the proposition that large multinationals are able to distribute a higher proportion of the imputation credits that they create, relative to the average Australian firm. Since large multinationals have access to foreign profits and the benchmark efficient firm does not, it is not appropriate to use them to estimate the distribution rate.

35 This only leaves the question of why Lally (2016) concludes, from the 7 firms he considered, that more foreign profits did not lead to a higher credit distribution rate. This is because Lally (2016) has not controlled for differences in dividend payout rates. Figure 1 above shows that a firm with a low dividend payout rate and high foreign profits (Point X) can have a lower credit distribution rate than a firm with a higher dividend payout rate and lower foreign profits (Point Y). This is precisely what happens among the 7 firms. For all but the mining firms, the dividend payout ratio is high enough to enable essentially all of the credits to be distributed. The two mining firms have low payout ratios, so even a substantial proportion of foreign earnings is insufficient to enable them to distribute a higher proportion of credits. This is why it is important to consider samples of reasonable size rather than to try to draw conclusions from comparisons among a few companies.

36 Finally, we note that our Figure 1 cannot be compared directly with Lally (2016) Table 1 because Lally uses a cash-based estimate of the dividend payout rate whereas we use dividends relative to after-tax profits, and because Lally's Table 1 combines some figures from 2015 with other figures averaged over several years. However, the conceptual points are clear:

- a. Mathematically, *for any given dividend payout ratio*, the imputation credit distribution rate is an increasing function of the proportion of foreign profits; and
- b. The evidence clearly supports the proposition that large multinationals are able to distribute a higher proportion of the

¹⁸ NERA, 2015, "Estimating distribution and redemption rates from taxation statistics," March.

imputation credits that they create (83%), relative to the average Australian firm (70%).

Conclusion on the 20 firms approach

37 Our conclusion is that, since large multinationals have access to foreign profits and the benchmark efficient firm does not, it is not appropriate to use them to estimate the distribution rate for the BEE.

3 The reliability of ATO tax statistics

38 ATO tax statistics are used for two purposes:

- a. To estimate the credit distribution rate as the ratio of credits distributed to credits created; and
- b. As an upper bound for theta, estimated as the ratio of credits redeemed to credits distributed.¹⁹

39 In its recent decisions, the AER questions the reliability of using tax statistics to inform the estimate of theta and states that it applies limited weight to such estimates.²⁰ The issue is as follows:

- a. Each year a certain amount of credits are created, some of those are distributed to shareholders, and some of those are redeemed by shareholders.
- b. The ATO provides data on the quantum of credits that are created each year and on the quantum of credits that are redeemed each year. There has never been any dispute about either of these items.
- c. The ATO does not provide direct data on the number of credits that are distributed each year – so that quantity has to be derived. Two approaches have been proposed:
 - i. The FAB approach – whereby the amount of distributed credits is derived as the sum of all credits created less those that are retained by firms as reported in the firms' franking account balances; and
 - ii. The dividend approach – whereby the amount of distributed credits is estimated by tracking dividend payments and making assumptions about the flow of dividends between companies, trusts and life offices.
- d. The FAB and dividend approaches produce different estimates of the amount of credits that are distributed each year.

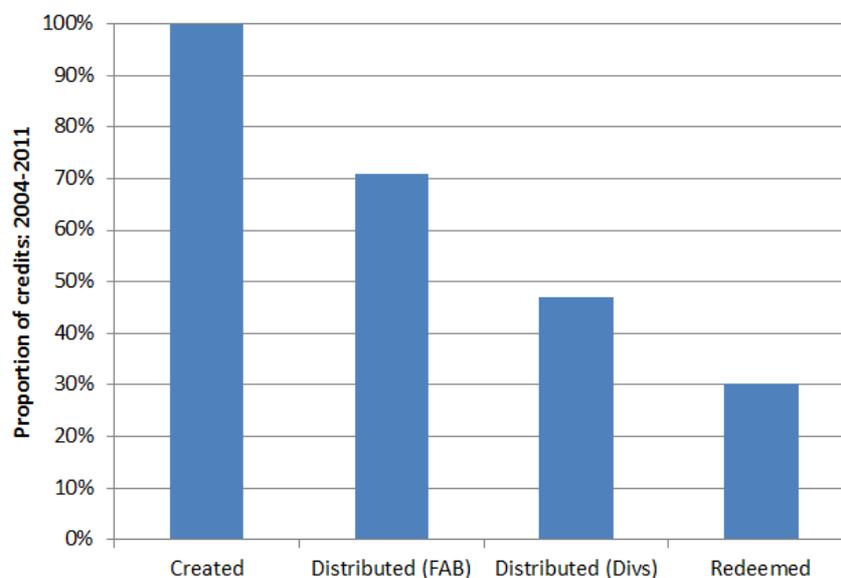
40 The difference between the FAB and dividend estimates of the amount of credits distributed was first identified by Hathaway (2013).²¹ His estimates are summarised in Figure 2 below.

¹⁹ We note below that the AER considers this to be a point estimate of theta.

²⁰ AusNet Draft Decision, Attachment 4, p. 13.

²¹ Hathaway, N., 2013, "Franking credit redemption ATO data 1988 to 2011," Capital Research, September.

Figure 2: Summary of ATO tax statistics



Source: Hathaway (2013), p. 9.

41 Figure 2 shows that the FAB method indicates that 71% of created credits are distributed, whereas the dividend method produces a distribution rate of 47%.

42 The AER's recent decisions propose that the ATO tax statistics can be used to estimate theta, and consequently gamma. Under this approach:

$$\gamma = F \times \theta = \frac{\text{Credits Distributed}}{\text{Credits Created}} \times \frac{\text{Credits Redeemed}}{\text{Credits Distributed}}.$$

43 Note that the amount of credits distributed cancels out, so we are left with:

$$\gamma = \frac{\text{Credits Redeemed}}{\text{Credits Created}}.$$

44 In this case, there is no issue with the measurement of either term, so no reason to consider the estimate to be unreliable. Hathaway (2013) recognises this point and reports that the proportion of credits redeemed to credits created is 30%.²²

45 Moreover, it is clear from Figure 2 above that the same outcome would be obtained whether one adopted the FAB approach:

$$\gamma = F \times \theta = \frac{\text{Credits Distributed}}{\text{Credits Created}} \times \frac{\text{Credits Redeemed}}{\text{Credits Distributed}} = \frac{71}{100} \times \frac{30}{71} = 0.30$$

or whether one adopted the dividend approach:

$$\gamma = F \times \theta = \frac{\text{Credits Distributed}}{\text{Credits Created}} \times \frac{\text{Credits Redeemed}}{\text{Credits Distributed}} = \frac{47}{100} \times \frac{30}{47} = 0.30.$$

46 In its October 2015 Final Decisions, the AER recognised that it must adopt the same estimate of credits distributed in the two places it appears in the above

²² Hathaway (2013), Paragraph 99.

equation.²³ The AER favoured the FAB method and adopted an (updated) gamma estimate of 0.31 based on that approach,²⁴ and would clearly have arrived at the same estimate of gamma if it had used the dividend approach in both places in the above equation.

47 In its most recent decisions, the AER has updated this estimate to 0.34.²⁵

48 We note that the Tribunal has concluded, and we agree, that the redemption proportion is at most an upper bound for theta so that:

$$\theta < \frac{\text{Credits Redeemed}}{\text{Credits Distributed}},$$

which implies that $\gamma < 0.34$.

49 Thus, the only point of contention is whether the 0.34 figure should be interpreted as a point estimate or an upper bound. There is no question about the reliability of either of the two terms that are required to estimate it.

50 However, in its most recent decisions, the AER raise concerns about the reliability of tax statistics :

In this final decision, we consider there are potential underlying data issues with tax statistics and as a result, the utilisation rate cannot be estimated reliably from this data. As outlined by Lally, the data issues with tax statistics are generally accepted by service providers, the Tribunal, Hathaway, NERA, Handley and Frontier. For this reason, in this decision, we have placed limited weight on tax statistics.²⁶

51 In this regard, the AER notes that Lally (2016) has restated the issue relating to using the tax data to estimate the amount of distributed credits. Lally (2016) does not present any new evidence, but simply restates the well-known issue in relation to the quantum of credits distributed:

...variation arising from two possible approaches (ATO dividend data and ATO tax data) whose results should match and the divergence cannot be reconciled. This variation casts doubt on all estimates using ATO data, and this problem with the ATO data alleged by Hathaway is generally accepted.²⁷

52 As set out above, the fact that it is generally accepted that there are two different estimates of the amount of credits distributed does not mean that the ATO data should be abandoned entirely. The 0.34 upper bound (which had been used as a point estimate by the AER) does not require an estimate of the amount of credits distributed. It is a ratio of redeemed credits to created credits, and there has been no question raised about the reliability of either of these quantities.

²³ See, for example, SAPN Final Decision, Attachment 4, p. 18.

²⁴ See, for example, SAPN Final Decision, Attachment 4, p. 18.

²⁵ AusNet Draft Decision, Attachment 4, p. 16.

²⁶ AusNet Draft Decision, Attachment 4, p. 15.

²⁷ Lally (2016), p. 20.

53 Moreover, the AER has been inconsistent in its treatment of the ATO data. The AER relies on the FAB estimate of credits redeemed when it estimates the distribution rate²⁸ as $F = \frac{\text{Credits Distributed}}{\text{Credits Created}}$ but it questions the use of that

same figure when estimating theta as $\theta = \frac{\text{Credits Redeemed}}{\text{Credits Distributed}}$. Both require the

same estimate of credits distributed, so it cannot be that the same figure is reliable in one case and unreliable in the other.

54 In our view, the 0.34 upper bound for gamma is relevant evidence that is unaffected by any concerns about the estimate of the quantum of distributed credits. In our view, the 0.34 figure is a reliable estimate of the upper bound for gamma that is entirely consistent with our preferred point estimate of 0.25 being somewhat below that upper bound. The issues raised by Dr Lally and the AER about the unreliability of tax statistics are not relevant to the calculation of the 0.34 upper bound for gamma. The 0.34 figure is independent of the estimate of the quantum of credits distributed, which is the only figure about which concerns have been raised. Consequently, 0.34 remains a robust upper bound for gamma, against which point estimates can be compared for reasonableness.

²⁸ AusNet Draft Decision, Attachment 4, p. 11.

4 AER issues with dividend drop-off analysis

55 In its recent decisions, the AER sets out what it considers to be a number of limitations relating to dividend drop-off analysis.²⁹ This list of limitations was first raised by the AER during the Guideline process and again in its November 2014 draft decisions. My previous report, SFG (2015, pp. 38-39), provides responses to these issues and provides references to where responses were provided on two previous occasions: as part of the Guideline process and prior to the 2014 draft decisions.

56 Also, my previous report, SFG (2014, pp. 27-28), summarises the Tribunal's scrutiny of the SFG drop-off study and its adoption of the SFG estimate.

57 In its recent final decisions,³⁰ the AER summarises some empirical estimation issues in relation to the SFG dividend drop-off analyses. As set out above, these points have been responded to twice before, but I briefly summarise them here:

Possibly implausible estimates

58 The AER again raises the point that it is possible for dividend drop-off analyses to produce implausible estimates. Of course it is possible that any empirical analysis might produce an implausible estimate, particularly if it is a low-quality study that has not been carefully performed and which has not been scrutinised. The AER now accepts that the fact the SFG study produces a stable, precise and plausible estimate means that this criticism is irrelevant.³¹

Drop-off studies measure the market value of credits

59 The AER considers that dividend drop-off studies reflect the actual market value of credits, whereas the AER seeks an estimate of what the value would be in the absence of considerations such as personal taxes and personal costs such that all redeemed credits were valued at the full face amount by the redeeming investor. In our view, the fact that dividend drop-off analysis measures the market value of credits is a great advantage because the approaches that assume that redeemed credits are valued at the full face amount produce nothing more than an upper bound. In this regard, the Tribunal has recently stated that:

Given that two of the three approaches adopted by the AER are considered no better than upper bounds, it follows that the assessment of theta must rely on market studies. The Tribunal considers that, of the various methodologies for estimating gamma employed by the AER, market value studies are best placed to capture the considerations that investors make in determining the worth of imputation credits to them.³²

²⁹ AusNet Draft Decision, Attachment 4, p. 173.

³⁰ AusNet Draft Decision, Attachment 4, p. 173.

³¹ AusNet Draft Decision, Attachment 4, p. 173.

³² PIAC-Ausgrid, Paragraph 1096.

Dividend drop-off estimates might be affected by trading around the ex-dividend date

60 In its Guideline materials, the AER cites evidence of abnormal trading being associated with an increase (or “run-up”) in the cum-dividend price.³³ The AER cites the report that it commissioned from McKenzie and Partington (2011), who survey the relevant research and report that there is:

Direct evidence of the presence of short term trading about the ex-dividend date in Australia,³⁴

and that:

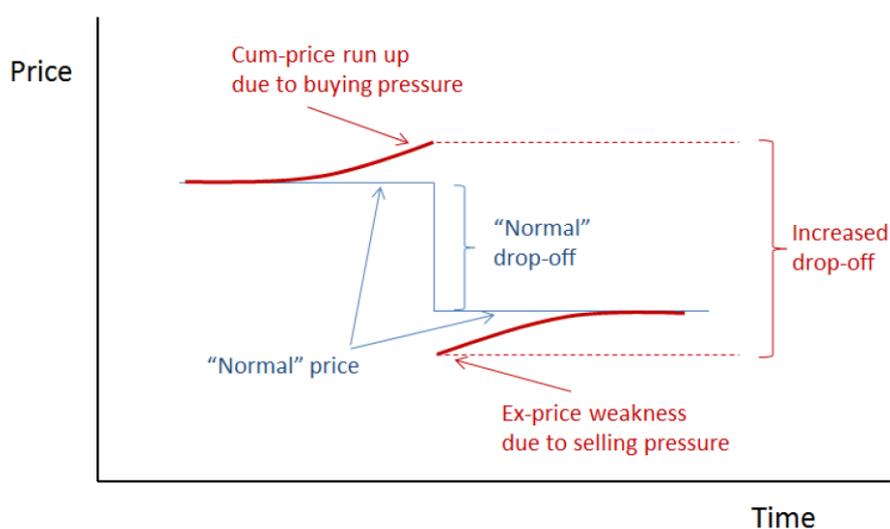
Short term traders appear to be arbitraging higher yield franked dividends and low spread stocks.³⁵

61 They conclude that the result is:

Buying pressure cum dividend, selling pressure ex dividend, and an abnormal volume of trades. Note however, that these price effects are not just from short term trading.³⁶

62 In summary, McKenzie and Partington advise that there is buying pressure from a range of investor types that causes the cum-dividend price to be higher than it would otherwise be (the price run-up) and selling pressure from a range of investor types that causes the ex-dividend price to be lower than it would otherwise be. The result is that the abnormal trading volume causes the dividend drop-off to be *larger* than it would have been if trading among market participants had been at more normal levels. This is illustrated in Figure 3 below.

Figure 3: Trading activity and drop-off ratios



³³ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 170.

³⁴ McKenzie, M. and G. Partington, 2011, *Report to the AER: The estimation and theory of theta*, March, p. 9.

³⁵ McKenzie and Partington (2011), p. 10.

³⁶ McKenzie and Partington (2011), p. 10.

63 That is, to the extent that the increased trading around the ex-dividend date (that is identified by McKenzie and Partington) has an impact on the dividend drop-off estimate of theta, it will tend to *inflate* that estimate.

64 In its recent decisions, the AER cites a report by Lally (2013)³⁷ which pre-dates the Guideline. Lally agrees that the abnormal trading set out above would tend to inflate the estimate of theta but rejects the drop-off estimate on the basis that it does not reflect the complex weighted-average utilisation rate that the AER is seeking to estimate under its conceptual definition of gamma.

65 In our view, these are two separate issues. Conditional on seeking an estimate of the market value of credits, the analysis above suggests that, if anything, trading around the ex-date will tend to inflate the estimate of theta – as that trading may be motivated by traders who value the credits most.

66 The AER's recent decisions also cite a report by SACES (2015)³⁸ which pre-dates the recent Tribunal decision. SACES conclude that the SFG studies are high-quality and consistent with best practice, but they reject all dividend drop-off analyses on the basis that the traders who are most active around ex-dates may not reflect the broad market. SACES do not address the analysis presented by McKenzie and Partington (2011) or the analysis above which shows that, to the extent that the increased trading around the ex-dividend date has an impact on the dividend drop-off estimate of theta, it will tend to *inflate* that estimate.

67 The AER's recent decisions do not respond to our previous submissions that this trading is, if anything, likely to inflate the estimate of theta. Nor do the AER's recent decisions cite McKenzie and Partington (2011) in this regard.

Dividend drop-off analysis uses a large data set and 'complex' estimation methods

68 The AER's recent decisions follow all of its decisions since the Guideline in noting that the SFG studies use a large data set with many observations.³⁹ In my view, this is a strong positive as large data sets are more able to provide robust and precise estimates, and can be used to demonstrate the stability of the estimate over time.

69 The AER's recent decisions also follow its previous decisions in commenting on the 'complexity' of dividend drop-off analysis.⁴⁰ However, the methodology applied is regression analysis, which is the same as the AER uses to estimate beta. Moreover, dividend drop-off analysis is a standard empirical approach that has been performed in many empirical studies. We would also make the general

³⁷ AusNet Draft Decision, Attachment 4, p. 174. See Lally, M., 2013, *The estimation of gamma*, November.

³⁸ AusNet Draft Decision, Attachment 4, p. 175. See SA Centre for Economic Studies, 2015, *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January.

³⁹ AusNet Draft Decision, Attachment 4, p. 176.

⁴⁰ AusNet Draft Decision, Attachment 4, p. 176.

point that estimation techniques should be selected primarily on the basis of whether they are appropriate for the task at hand – we should not adopt inappropriate estimation techniques on the basis that they are simple.

The combined value must be allocated between dividend and imputation credits

70 The AER’s recent decisions follow all of its decisions since the Guideline in noting that dividend drop-off analysis provides separate estimates of the value of cash dividends and the value of imputation credits.⁴¹ The former is estimated with reference to unfranked dividends and the latter is estimated with reference to franked dividends. In an ideal world, we would have access to traded prices of imputation credits or to stocks that distributed credits in the absence of dividends. However, because such data does not exist, it is necessary to use a mixture of franked and unfranked dividends to separate the value of dividends from the value of imputation credits.

Academic ‘concerns’ about dividend drop-off analysis.

71 The AER’s recent decisions follow all of its decisions since the Guideline in setting out a set of ‘academic concerns’ with dividend drop-off analysis.⁴²

72 The examples provided by the AER fall into two groups:

- a. Those expressed by consultants for energy users and the AER; and
- b. Those that suggest that dividend drop-off analysis might *overestimate* theta.

73 The AER does not reference any of the dozens of dividend drop-off analyses that have been published over many years in the world’s leading finance journals.

74 The AER also does not reference Ainsworth, Partington and Warren (2015)⁴³ who “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

⁴¹ AusNet Draft Decision, Attachment 4, p. 176.

⁴² AusNet Draft Decision, Attachment 4, p. 178.

⁴³ Ainsworth, A, G. Partington and G. Warren, 2015, “Do franking credits matter?” Research working paper, Centre for International Finance and Regulation.

reduce taxes. Whether they have value in exchange – in other words, whether they are priced – is a separate matter.⁴⁴

75 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.⁴⁵

76 We note that the AER'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.

77 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 zero balance. The question is: "Do the two companies sell for the same price?"⁴⁶

78 Ainsworth, Partington and Warren (2015) note that the evidence generally suggests that the two companies above *do* sell for the same price.⁴⁷

79 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.⁴⁸

80 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

⁴⁴ Ainsworth, Partington and Warren (2015), p. 9.

⁴⁵ Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

⁴⁶ Ainsworth, Partington and Warren (2015), p. 9.

⁴⁷ Ainsworth, Partington and Warren (2015), p. 17.

⁴⁸ Ainsworth, Partington and Warren (2015), p. 27.

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.⁴⁹

81 They go on to summarise the AER’s recent approach 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 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.⁵⁰

82 Ainsworth, Partington and Warren (2015) then call into question the basis of the AER’s 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.⁵¹

83 They further spell out the problems with the AER’s 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’s “aggregation” approach, which simply counts up the number of credits that are distributed to domestic investors and *assumes* that

⁴⁹ Ainsworth, Partington and Warren (2015), p. 27, emphasis added.

⁵⁰ Ainsworth, Partington and Warren (2015), p. 27.

⁵¹ Ainsworth, Partington and Warren (2015), Footnote 21, p. 27, emphasis added.

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.⁵²

84 In my view, Ainsworth, Partington and Warren (2015) reinforce the view that the AER's approach of simply counting up the number of credits that might be distributed to domestic investors has no proper basis to it and is inconsistent with standard economic concepts of equilibrium and with standard commercial practice.

85 In response to the concerns that are expressed in this paper, the AER has concluded that:

...while the paper raises a number of points highlighted by Gray (for Frontier), we do not consider the paper provides evidence that the equity ownership approach that uses the aggregation approach to estimate the value of theta is not reasonable.⁵³

86 The AER then cites a passage from Ainsworth, Partington and Warren (2015) that summarises a number of dividend drop-off estimates and other market value studies and notes that the average estimated value of distributed credits (theta) is 0.38,⁵⁴ which is of course very close to our own preferred dividend drop-off estimate of 0.35.

87 In our view, a paper that "raises some questions over the philosophy underpinning the regulatory approach",⁵⁵ concludes that there are issues that are "particularly problematic"⁵⁶ for the regulatory approach, and which reports an average theta estimate over a number of studies of 0.38 is very much consistent with what we have proposed in relation to the estimation of gamma and quite inconsistent with the AER's approach and estimates.

⁵² Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

⁵³ AusNet Draft Decision, Attachment 4, p. 95.

⁵⁴ AusNet Draft Decision, Attachment 4, p. 96.

⁵⁵ Ainsworth, Partington and Warren (2015), Footnote 21, p. 27, emphasis added.

⁵⁶ Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

5 Conversion of market value estimates into redemption proportion estimates

88 In its decisions since the Guideline, the AER has maintained that theta should not be estimated as the market value of distributed credits but as the proportion of credits that might be redeemed. The AER's view is that since dividend drop-off analysis estimates the market value of credits, there must be an adjustment to convert those estimates to the correct 'pre-personal cost and tax' basis. In its recent decisions, the AER maintains this view.⁵⁷

89 Our view remains that theta should be interpreted as the value (as in 'worth') of distributed credits, and consequently no such adjustment is relevant. Dividend drop-off analysis provides a direct estimate of the extent to which credits are capitalised into stock prices. Since drop-off analysis already estimates the market value of distributed credits, no adjustment required. The Tribunal concurs with our view that theta should be interpreted as the market value of distributed credits and with our view that no adjustment is required.⁵⁸

90 We have previously provided two other reasons why any such adjustment should not be made, as set out below.⁵⁹

The proposed adjustment produces perverse outcomes

91 First note that the proposed adjustment is to divide theta by the estimated value of cash dividends, which can be defined as δ . Suppose the regulator applies the scaling approach, but that the dividend drop-off analysis suggests that $\delta = 1$, so that the scaling has no effect. The regulator then determines the allowed revenue for the firm of say \$X.

92 Now consider a case that is identical in all respects to the one above, except that the drop-off analysis produces an estimate of $\delta < 1$. In this case, *everything* is identical to the previous case, except that shareholders do not value dividends as highly. If anything, this should require an *increase* in the allowed revenues – because shareholders do not value dividends as highly, they would need to receive more of them in order to be left equally well off.⁶⁰ However, under the proposed approach the drop-off estimate of theta would be increased (by dividing by $\delta < 1$) which would in turn result in *lower* allowed revenues.

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

⁵⁷ AusNet Draft Decision, Attachment 4, Appendix 15.

⁵⁸ PIAC-Ausgrid, Paragraphs 1101-1103.

⁵⁹ SFG, 2015, *Estimating gamma for regulatory purposes*, 6 February, p. 40.

⁶⁰ See for example, Lally, M. and T. van Zijl, 2003, "Capital gains tax and the Capital Asset Pricing Model," *Accounting and Finance*, 43, 187-210.

The proposed adjustment would need to apply throughout the regulatory process

- 94 In using the Sharpe-Lintner CAPM to estimate the required return on equity, the AER imposes an estimate of $\delta = 1$ – it estimates the required return on the basis that shareholders value dividends at their full face value. There are more complex versions of the CAPM that allow for $\delta < 1$, but the AER does not use them. For example, Lally and van Zijl (2003) develop a version of the CAPM that allows for the case where $\delta < 1$. These more complex models simplify to the Sharpe-Lintner CAPM for the case where $\delta = 1$.
- 95 It would be inconsistent and wrong for a regulator to adjust the estimate of theta on the basis that $\delta < 1$, but then to estimate the required return on equity in the same WACC estimation process on the basis that $\delta = 1$. That is, if $\delta < 1$ when estimating theta, then $\delta < 1$ should apply throughout the WACC estimation process.

6 Declaration

96 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

