The appropriate use of tax statistics when estimating gamma

REPORT PREPARED FOR JEMENA ELECTRICITY NETWORKS, ACTEWAGL DISTRIBUTION, AUSNET SERVICES, AUSTRALIAN GAS NETWORKS, CITIPOWER, POWERCOR, AND UNITED ENERGY

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The appropriate use of tax statistics when estimating gamma

Figures

Tables

Executive Summary

1.1 Context

1 Frontier Economics (**Frontier**) has been retained by Jemena Electricity Networks, ActewAGL Distribution, AusNet Services, Australian Gas Networks, CitiPower, Powercor and United Energy to provide our views on a number of issues relating to the process of estimating gamma.

2 Specifically, we have been asked to:

a. Identify and set out the basis for our opinion of the best estimate of the rate of domestic ownership in the benchmark efficient entity.

b. Identify and set out the basis for our opinion of the best estimate of the distribution rate by the benchmark efficient entity.

c. Review the reliability of tax statistics for estimating the utilisation of imputation credits, including on (but not limited to) whether these statistics:

i. provide an unbiased estimate of the pre-personal cost value of distributed imputation credits;

ii. provide evidence of investors not redeeming distributed imputation credits, and, if so, what factors may explain why investors may not redeem distributed imputation credits; and

iii. reconcile with other evidence on the value of distributed imputation credits.

3 In preparing the report, we have been asked to:

a. Consider the theoretical and empirical support for each of the possible approaches;

b. Consider any relevant comments raised by the AER and other regulators, and experts engaged by those regulators; and

c. Use robust methods and data in producing any statistical estimates.

4 A copy of the terms of reference for this report is attached at Appendix 1 to this report.

5 This report has been authored by Professor Stephen Gray. Stephen Gray is Professor of Finance at the UQ Business School, University of Queensland and Director of Frontier Economics, a specialist economics and corporate finance consultancy. He has Honours degrees in Commerce and Law from the University of Queensland and a PhD in Financial Economics from Stanford University. He teaches graduate level courses with a focus on cost of capital issues, he has published widely in high-level academic journals, and he has more than 15 years'

experience advising regulators, government agencies and regulated businesses on cost of capital issues.

6 The author's curriculum vitae is attached as Appendix 2 to this report.

7 The author's opinions set out in this report are based on the specialist knowledge acquired from his training and experience set out above. The author has 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). The author has read, understood and complied with the Expert Witness Guidelines.

1.2 Summary of conclusions

1.2.1 The distribution rate

8 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.

9 In our view, whether the benchmark efficient entity is defined narrowly (as the firms that the AER 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%.

10 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" [1] is 70%.

11 Updating the Handley and NERA estimates of the distribution rate/payout ratio for the additional year of data that has become available generally reduces the

[1] JEN Preliminary Decision, p. 4-23, 4-86, 4-87. The AER makes the same or similar comments in all of its October and November draft, preliminary and final decisions. Throughout this report, we provide references to the JEN preliminary decision as examples.

estimates. The annual all equity payout ratio of the most recent year for which data are available publicly from the ATO is 64% and the cumulative ratio is 67%. However, given the volatility in these estimates, our approach is to maintain the standard 70% estimate of the distribution rate until a clear trend emerges in the data. We note that this approach is conservative in that the use of the (lower) more recent figure would result in higher allowed revenues, other things being equal.

1.2.2 An upper bound for theta

12 Our view is that the redemption rate (whether actual or assumed) should be used as an upper bound for theta and that it should not be used as a point estimate for theta.

13 The AER has the following estimates of the redemption rate available to it:

a. In relation to listed equity, an equity ownership estimate of 0.46; and

b. In relation to all equity, an equity ownership estimate of 0.61 and a tax statistics estimate of 0.45.

14 In our view, the tax statistics estimate (being more direct and not relying on the assumptions required for the equity ownership approach) should be preferred to the equity ownership estimate. There are a number of reasons why the AER's equity ownership estimate of 0.61 is higher than the direct tax statistics estimate of 0.45, including:

a. The AER's "refinement" of the data may not be complete as it is limited by the coarseness of the data provided by the ABS;

b. There are a number of concerns with the quality of the data, as documented by the ABS;

c. The AER's equity ownership estimate will be upwardly biased to the extent that resident investors who receive imputation credits do not redeem them, either due to the 45-day rule or because the administrative costs outweigh the benefits to them (or for some other reason are unable or unwilling to redeem them); and

d. The AER's equity ownership estimate will be upwardly biased to the extent that credits that are distributed to government entities are not redeemed.

15 Consequently, our view is that the best estimate of the redemption rate upper bound for theta is 0.45-0.46. That is, any point estimate of theta, derived from the market prices of traded securities, must be less than this upper bound if it is to be considered reasonable. Because theta is estimated as a market-wide parameter, this upper bound would apply whether the benchmark efficient entity is defined narrowly (as the firms that the AER regulates) or more broadly (as firms that are similar in some respect).

2 The distribution rate: Conceptual issues

2.1 A firm-specific parameter

16 In its October and November 2015 preliminary and draft decisions, the AER notes that:

> …the distribution rate is a firm specific parameter.[2]

17 The AER also notes that there is broad agreement that when estimating the distribution rate, we are seeking an estimate of the proportion of credits that would be distributed by the benchmark efficient entity:

> The distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.[3]

18 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.[4]

19 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.

2.2 The relevant characteristics of the benchmark efficient entity

20 In its 2009 WACC Review the AER stated that the benchmark efficient entity should not be interpreted as a large listed firm:

> …the AER does not agree that a benchmark efficient NSP be defined as a large, stock market listed NSP and is a settled concept.[5]

21 Consistent with this view, the AER's 2013 Rate of Return Guideline defines the benchmark efficient entity without reference to size or listing status:

> The AER's proposed conceptual definition of the benchmark efficient entity is a pure play, regulated energy network business operating within Australia. [6]

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[2] JEN Preliminary Decision, p. 4-21.

[3] JEN Preliminary Decision, p. 4-23, 4-86, 4-87.

[4] Lally (2013 AER), p. 41.

[5] AER 2009 WACC Review, pp. 80, 105.

[6] AER Rate of Return Guideline, p. 7.

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

23 The AER notes that it has adopted a narrow definition of the benchmark efficient entity. In this regard, the AER states that:

> We also note 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.[7]

24 The AER has also decided that the distribution rate should not be estimated 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 incentive for regulated firms to manipulate their dividend payout policies to obtain a higher regulatory estimate of gamma.[8]

25 For these reasons, the AER has determined that a broader data set should be used to estimate the distribution rate.

26 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 AER 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.

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

28 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.

29 In its October and November 2015 preliminary and draft decisions, the AER considers three sets of estimates that are available for the purpose of producing an appropriate estimate of the distribution rate:

a. An estimate pertaining to the 20 largest listed firms;

b. An estimate pertaining to all listed companies; and

c. An estimate pertaining to all companies (listed and unlisted).

30 It is possible that estimates for other samples of firms will be available in the future,[9] 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

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[7] JEN Preliminary Decision, p. 4-90.

[8] AER Rate of Return Guideline, Explanatory Statement, p. 164.

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

use the available estimates to determine an appropriate distribution rate for regulatory purposes.

2.3 The role of the top 20 listed firms

31 The AER relies equally on estimates of the distribution rate for listed equity and for all equity. SFG (2015) demonstrate that these two data sets produce effectively identical estimates, but for the 20 largest listed companies, which have materially higher payout ratios.[10] Specifically, the AER accepts that:

a. Listed firms in aggregate distribute 77% of the credits that they create;[11] and

b. The 20 largest listed firms, which account for 62% of all listed equity, distribute 84% of the credits that they create.[12]

32 This implies that the public firms that are not among the top 20 have an average distribution rate of 66% since:

$$66\% \times 0.38 + 84\% \times 0.62 = 77\%.$$

33 NERA (2015) uses 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.

34 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,

[10] The set of the 20 largest firms is relevant because 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.

[11] JEN Preliminary Decision, p. 4-86.

[12] JEN Preliminary Decision, p. 4-91.

11) confirms that the distribution rate is a firm specific parameter and confirms the NERA estimates set out above.

35 Consequently, given the estimates that are currently available, the question is whether "the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors"[13] is best estimated with reference to the 20 largest listed firms, or with reference to other firms.

36 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 AER 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.

37 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.[14] Even the 20th listed company is orders of magnitude larger than the service providers that are regulated by the AER.[15]

38 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.[16]

39 This differentiates the top 20 listed firms from the benchmark entity, which is purely domestic by definition.[17]

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

14 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.

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

16 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 50×0.3/(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 70×0.3/(1-0.3)=$30.

17 The AER defines the benchmark efficient entity to be "operating within Australia." AER Rate of Return Guideline, p. 7.

40 In its April 2015 final decisions, the AER acknowledged the SFG (2015) submission on this point and then dismissed it after noting that:

> Handley considered SFG's analysis to be 'incomplete and oversimplified to support such a strong conclusion'.[18]

41 Handley's consideration of this issue is reproduced below:

> SFG argues that the estimate of the distribution rate based on data for public companies only is overstated to the extent that foreign sourced income enables large public companies to distribute a higher proportion of imputation credits. The analysis used by SFG is however incomplete and oversimplified to support such a strong conclusion. There are many factors which determine the financing and dividend policies of multinational firms relative to domestic firms. One cannot simply assume (as SFG has done) that both types of firms would seek to pay the same dollar amount of dividends out of the same dollar amount of profits irrespective of its source.[19]

42 This analysis does not address the point that *any* firm with foreign profits will be able to distribute more imputation credits than they would otherwise have been able to. The 20 largest multinational companies have material foreign income and they would be able to distribute fewer imputation credits without that foreign income.[20]

43 The fact that each firm will consider many things before it settles on a particular dividend policy is beside the point. The point is that the 20 large multinationals have foreign profits that inflate their ability to distribute imputation credits, and that the benchmark firm has no such ability. If these multinationals differ from the benchmark domestic entity in other ways as well (e.g., because of their size or other considerations they make in setting their dividend policy) then there would be even more reason to exclude them.

2.4 Firm-specific and market-wide parameters

44 In its October and November 2015 preliminary and draft decisions, the AER acknowledges that the distribution rate is a firm-specific parameter, consistent with

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18 TransGrid Final Decision, Attachment 4, p. 66.

19 Handley (2015), p. 21.

20 Consider the following simple example. A domestic firm earns a profit of $100 and pays $30 of corporate tax, creating $30 of imputation credits. The only way that firm would be able to distribute all of those imputation credits is if it pays a dividend of 100% of after-tax profits ($70), which firms typically do not do. If that firm paid a $50 dividend (close to the 70% dividend payout rate of the average firm) it could only attach $21.5 of credits [50×0.3/(1-0.3)]. That is, if a domestic firm distributes 70% of its after-tax profits as a dividend, it can only distribute 70% of the imputation credits it creates.

Now suppose that firm generates 20% of its profits offshore. In this case, the domestic profit is $80 and domestic tax (and imputation credits created) will be $24. If the firm again pays a $50 dividend (again, approximately 70% of after-tax profits) it can again distribute $21.5 of credits, which is a credit distribution rate of 90% [21.5/24]. That is, for *any* given level of dividends, the more offshore profits a firm has, the greater the proportion of its franking credits that it will be able to distribute.

the advice that the AER has received from both Lally and Handley.[21] It is also 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 AER now calls it) across the broad market.

45 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.

46 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."[22] 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

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.

2.5 The AER's October and November 2015 preliminary and draft decisions

47 In its October and November 2015 preliminary and draft decisions, the AER continues to adopt an approach of estimating the distribution rate and theta using the same data sets. The AER estimates both parameters with reference to listed equity only, then both parameters with reference to all equity. This is akin to

[21] JEN Preliminary Decision, p. 4-87, 4-21.

[22] JEN Preliminary Decision, p. 4-23, 4-86, 4-87.

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 (which the AER adopts).

48 The AER 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.

49 However, the AER continues with its approach of using an estimate that materially reflects the use of these foreign-sourced profits. As set out above, Frontier (2015 Gamma) documents this point in some detail and explains that Handley (2015) does not address this point. The AER has not asked Handley to consider the points raised by Frontier and instead dismisses the point on the basis that Frontier (2015 Gamma):

> …have not demonstrated their filtering method [excluding the 20 largest listed firms] will lead to a better estimate of the distribution rate for the benchmark efficient entity.[23]

50 What Frontier (2015 Gamma) demonstrates, and what the AER appears to accept, is that:

a. The top 20 listed firms make material use of foreign-sourced profits to distribute imputation credits;[24] and

b. The benchmark efficient entity, by definition, does not have access to any foreign-sourced income to assist it in distributing imputation credits.

51 Frontier (2015 Gamma) excludes the top 20 listed firms for the purposes of estimating the distribution rate as they are materially different from the benchmark efficient entity in relation to their ability to use foreign income to distribute credits. 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 AER 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 AER does not state why it considers that

[23] JEN Preliminary Decision, p. 4-90.

[24] As set out in Table 1 above, the top 20 firms are able to distribute a higher proportion of the credits that they generate due to their access to foreign-sourced income to help distribute credits. This has the effect of increasing the market-wide estimate of the distribution rate.

evidence to be insufficient or what sort of evidence it would consider to be sufficient.

52 The AER summarises its position as follows:

> To clarify, in theory there may be a single economy-wide theta. However, the practical reality is that a given estimate of theta will reflect the set of investors in the evidence used. Accordingly, for internal consistency and from a practical perspective, we consider that the distribution rate we use in combination with that estimate of theta represent the distribution of credits to that same set of investors (or at least a similarly reflective set). [25]

53 That is, the AER 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.

2.6 Summary and conclusions

54 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.

55 In our view, whether the benchmark efficient entity is defined narrowly (as the firms that the AER 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%.

[25] JEN Preliminary Decision, p. 4-89.

56 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" [26] is 70%.

[26] JEN Preliminary Decision, p. 4-23, 4-86, 4-87.

3 The distribution rate: Updated estimates

57 In this section, we replicate the estimates of the distribution rate (or imputation credit payout ratio) for all companies derived by NERA (2015), and the payout ratio for private and public companies derived by NERA (2015) and Handley (2015). We then update the estimates to include the most recent ATO Taxation Statistics available at present, which is for the 2012-13 income year.

3.1 Cumulative and Annual Payout Ratios

58 NERA (2015) calculates the aggregate cumulative and annual payout ratios for companies using *Company Tax, Table 1* from the ATO Taxation Statistics for the years 1979-80 to 2011-12.[27] We replicate these results and update them to include the 2012-13 ATO Taxation Statistics.[28]

3.1.1 Cumulative payout ratio

59 The cumulative payout ratio is computed as:

$$CUM\ PAYOUT\ RATIO = 1 - \frac{FAB(t)}{\sum_{s=1}^{t} NET\ TAX\ (s)}.$$

60 The ATO changed the method of reporting net tax in 2012, and we adjust for this accordingly; a detailed explanation of this is available in the appendix to this report. Reporting requirements for the Franking Account Balance (FAB) changed in 2002-03, and therefore we must appropriately adjust for these changes also; this explanation is also set out in the appendix.

3.1.2 Annual payout ratio

61 The annual payout ratio, calculated using the "tax measure", is computed as:

$$ANNUAL\ PAYOUT\ RATIO\ (t) = \frac{NET\ TAX(t) - FAB(t) + FAB(t-1)}{NET\ TAX\ (t)}.$$

62 NERA (2013) also calculates the annual payout ratio using the "dividend measure," reporting systematically lower estimates than those obtained using the tax measure. In its updated report, NERA (2015) does not report estimates based on the dividend measure, having concluded that the tax measure is likely to produce more reliable estimates:

> …like Hathaway (2013), we suspect that an estimate of the distribution rate that relies on franking account balances and a measure of taxes paid will be more accurate than an estimate that relies on dividend data.[29]

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[27] ATO Taxation Statistics, Company Tax: Table 1 2011-12: *https://www.ato.gov.au/About-ATO/Research-and-statistics/Previous-years/Tax-statistics/Taxation-statistics-2011-12/*

[28] ATO Taxation Statistics, Company Tax: Table 1 2012-13: *https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-statistics/Taxation-statistics-2012-13/*

[29] NERA (2015), p. 16.

63 We also focus on the tax measure in this report, noting that this approach is conservative in that the dividend measure produces a lower estimate. NERA (2015, p. 15) also notes that the tax measure estimate of the distribution rate is likely to be conservatively high for two other reasons:

a. Companies that go bankrupt with undistributed credits will drop out of the data set and the tax method will assume that the credits have been distributed; and

b. If a company fails to report their franking account balance, the method will assume that that company has distributed all of the credits it had previously reported.

3.1.3 Estimates of aggregate payout ratio

64 Using the ATO Taxation Statistics for the 2011-12 income year, our results are identical to those of NERA. The cumulative payout ratio for 2012 is 0.68, and the annual payout ratio for 2012 is 0.69.

65 Updating the estimates to include the latest ATO data (2012-13) lowered the payout ratios slightly; the cumulative payout ratio for 2012-13 is estimated to be 0.67, and the annual payout ratio for 2012-13 is 0.64.

66 Table 2 shows the estimates for the cumulative and annual payout ratios for all companies, using data from 2011-12 and 2012-13.

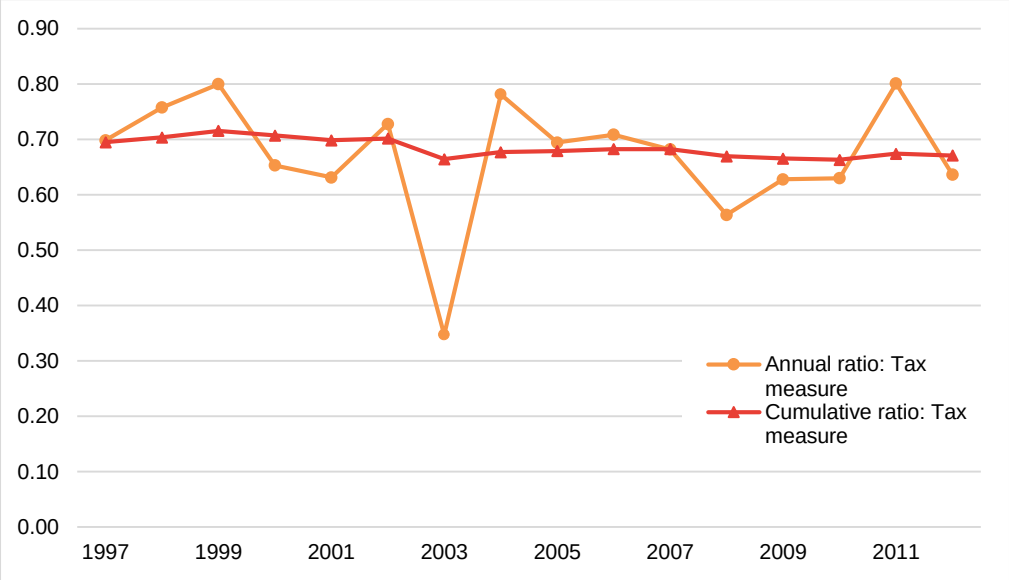
Table 2: Estimates of the cumulative and annual payout ratio

	NERA (2015) and Frontier (2011-12 data)				Frontier (2012-13 data)			
Year	Cumulative net tax	Net tax	Cumulative payout ratio	Annual payout ratio	Cumulative net tax	Net tax	Cumulative payout ratio	Annual payout ratio
1995-96	118,840	16,856	0.69		118,840	16,856	0.69	
1996-97	137,851	19,011	0.70	0.70	137,851	19,011	0.70	0.70
1997-98	159,646	21,795	0.70	0.76	159,646	21,795	0.70	0.76
1998-99	182,610	22,963	0.72	0.80	182,610	22,963	0.72	0.80
1999-00	211,270	28,660	0.71	0.65	211,270	28,660	0.71	0.65
2000-01	238,904	27,634	0.70	0.63	238,904	27,634	0.70	0.63
2001-02	267,117	28,213	0.70	0.73	267,117	28,213	0.70	0.73
2002-03	298,380	31,263	0.66	0.35	298,380	31,263	0.66	0.35
2003-04	334,933	36,553	0.68	0.78	334,933	36,553	0.68	0.78
2004-05	376,419	41,486	0.68	0.69	376,419	41,486	0.68	0.69
2005-06	425,648	49,229	0.68	0.71	425,648	49,229	0.68	0.71
2006-07	484,759	59,111	0.68	0.68	484,759	59,111	0.68	0.68
2007-08	543,434	58,676	0.67	0.56	543,434	58,676	0.67	0.56
2008-09	602,211	58,777	0.67	0.63	602,211	58,777	0.67	0.63
2009-10	655,137	52,926	0.67	0.69	646,291	44,080	0.66	0.63
2010-11	717,486	62,349	0.68	0.85	702,121	55,830	0.67	0.80
2011-12	778,157	60,671	0.68	0.69	763,421	61,300	0.67	0.64
2012-13					823,236	59,815	0.67	0.64

Source: ATO data, Frontier calculations.

67 Figure 1 below shows the two payout series over the previous 15 years. The annual payout ratio is more volatile than the cumulative payout ratio due to tax timing issues that apply to certain years, and we therefore agree with NERA's conclusion to adopt the cumulative payout ratio. Based on the Taxation Statistics for 2012-13, the cumulative payout ratio is 0.67, which is slightly above the 0.64 annual payout ratio.

Figure 1: Payout ratios by year



Source: ATO data, Frontier calculations.

3.2 Payout Ratio by type of company

68 NERA (2015) also estimates the cumulative payout ratio for public and private companies. We replicate these results and provide an update of the ratio using the latest Taxation Statistics. Handley (2014)[30] and Handley (2015) also estimate these ratios, however our results for net tax differ slightly to Handley's, and we believe this is due to Handley rounding his estimates in the intermediate steps to his calculations. Handley has calculated the change in franking account balance differently to NERA, and we include this discrepancy between the two reports in our following discussion.

3.2.1 Net tax

69 Handley (2014) calculates the disaggregated payout ratio in response to NERA (2013), who calculates the aggregate ratio. To calculate the net tax for private and public companies, Handley uses Company Tax: Table 2E (2000-01 – 2009-10), Company Tax: Table 3E (2010-11), and Company Tax: Table 3 (2011-12) of the ATO's Taxation Statistics. He notes that the total net tax reported in a certain year is consistently and slightly different from the total net tax reported for that year in the latest Taxation Statistics, Company Tax: Table 1.[31] To adjust for this, he divides the public (private) net tax by the total net tax reported in that year. This proportion is then multiplied by the total net tax reported for that year in the latest

[30] In this report Handley does not adjust for the change in reporting requirements for net tax. He updates his methodology in his 2015 report to reflect the methodology of NERA (2015).

[31] In the case of NERA (2015) and Handley (2015), this was the ATO Taxation Statistics for 2011-12.

Taxation Statistics.[32] Handley has apparently rounded the proportions to whole percentage points, accounting for the discrepancy with our figures below.

70 NERA (2015) use the same methodology as this to distinguish between private and public net tax. NERA (2015) and Handley (2015) adjust for the change in reporting requirements for net tax in slightly different ways, as explained in the appendix to this report.

3.2.2 Franking Account Balance

71 To calculate the change in franking account balances for private and public companies, both Handley and NERA use franking account balance data from Company Tax: Table 2E (1999-2000) and Company Tax: Table 3 (2011-12) of the ATO's Taxation Statistics. The change in the FAB is calculated as the change for the whole period (therefore the FAB for 2000 subtracted from the FAB for 2012).

72 Handley (2015) uses the same proportion method as is used when calculating net tax. He therefore uses the FAB data from the 2011-12 Company Tax: Table 1. NERA (2015), however, does not use this proportion method to calculate the FAB for public and private companies. NERA uses only the totals for public company FAB and private company FAB for a given year without proportioning them to the total FAB in that year.

73 The ATO changed its reporting requirements for the franking account balance in 2002-03, which both Handley and NERA have consistently accounted for, and we discuss this adjustment in the appendix.

3.2.3 Estimating the payout ratio by type of company

74 Table 3 compares the original and our replicated estimations of NERA's and Handley's methods for computing the cumulative payout ratio for public and private companies. Our results are exactly identical to NERA's, however there is a discrepancy between our replicated results and Handley's for net tax. We believe that this is due to a rounding error with regards to the proportions; however we are not certain as to why this is. Due to the fact that Handley reported his results in billions of dollars, we are unable to discern the exact difference between our estimates.

75 The 2012 financial year payout ratio for public companies is 0.76 according to Handley and 0.755 according to NERA. The payout ratio for private companies is 0.52 according to Handley and 0.505 according to NERA.

---

[32] For example: In billions of dollars, the total net tax for private companies in the 2000-01 reporting year from Table 2E is $9.142. The total net tax reported in that year, calculated from Table 2E, is $26.300, compared with $27.634 as reported in the 2011-12 Company Tax: Table 1 ATO statistics. Dividing $9.142 by $26.300 gives a proportion of 0.348. This is then multiplied by $27.634 to give an adjusted total private company net tax for 2000-01 of $9.606.

Table 3: Comparing the payout ratio by type of company (for the period 2001-12)

	Handley		NERA	
	Original	Replication	Original	Replication
	$billion	$billion	$million	$million
Public Companies				
Cumulative net tax	347.8	347.3	347,304	347,304
Change in FAB	83.8	83.9	85,099	85,099
Payout ratio	0.76	0.76	0.755	0.755
Private Companies				
Cumulative net tax	204.3	204.8	204,812	204,812
Change in FAB	98.8	98.8	101,441	101,441
Payout ratio	0.52	0.52	0.505	0.505

Source: ATO data, Frontier calculations.

76 We have used both methodologies to update the cumulative payout ratio for public and private companies to include the most recent data (the 2012-13 ATO Taxation Statistics). In updating the estimates, we included data for net tax and franking account balances from Company Tax: Table 3 (2012-13) and Company Tax: Table 1 (2012-13) from the ATO's latest Taxation Statistics. As we were able to perfectly replicate NERA's previous results, we are inclined to prefer this methodology to Handley's. Table 1.3 shows the updated results; the payout ratio has dropped slightly from 2012. The updated 2013 payout ratio for public companies is 0.742 and 0.495 for private companies.

Table 4: Updated payout ratio by type of company (for the period 2001-13)

	Handley method	NERA method
	$million	$million
Public Companies		
Cumulative net tax	384,656	384,655
Change in FAB	98,128	99,333
Payout ratio	0.745	0.742
Private Companies		
Cumulative net tax	226,780	226,780
Change in FAB	111,777	114,438
Payout ratio	0.507	0.495

Source: ATO data, Frontier calculations.

3.3 Summary and conclusions

77 Updating the Handley and NERA estimates of the distribution rate/payout ratio for the additional year of data that has become available generally reduces the estimates. The annual all equity payout ratio of the most recent year is 64% and the cumulative ratio is 67%. However, given the volatility in these estimates, our

approach is to maintain the standard 70% estimate of the distribution rate until a clear trend emerges in the data.

78 We note that this produces an estimate that is conservative in that a higher payout ratio (and consequently a higher gamma) results in lower allowed revenues. We note that the 0.70 estimate is also conservative for the reasons set out in Paragraphs 62 and 63 above.

4 The redemption rate: Conceptual issues

4.1 Background and context

4.1.1 Redemption vs. value

79 The redemption rate is the proportion of distributed credits that is redeemed by shareholders. The AER considers two approaches for estimating the redemption rate:

a. The **equity ownership** approach – an estimate of the proportion of Australian shares that are owned by resident investors. This approach is based on the assumptions that:

   i. The equity ownership data has been properly filtered to remove the inclusion of equity in government businesses and the central bank;

   ii. Resident and foreign investors hold similar portfolios such that both receive the same type of dividend payments from the Australian firms that they invest in; and

   iii. Resident investors will redeem 100% of all imputation credits that they receive; and

b. The **ATO tax statistics** approach – an estimate of the ratio of redeemed credits to distributed credits from the ATO's tax records.

80 There is broad agreement between the AER, stakeholders, and experts that estimates of the value of imputation credits that is reflected in traded share prices are lower than estimates of the redemption rate. This evidence is consistent with the proposition that investors do not value imputation credits at the full face amount.

81 In our previous reports,[33] we have set out a number of reasons why investors are likely to value credits at less than the full face amount. Of course, even if an investor were to value a credit at less than the face amount, it would still be rational for the investor to redeem that credit. Thus, seeing that an investor redeems a credit tells us nothing about the value of that credit to the investor, other than that it has some positive value to that investor.

4.1.2 Redemption as an upper bound

82 In the *ENERGEX Gamma* Case, the AER initially proposed to use the ATO tax statistics estimate of the redemption rate as a point estimate of theta. However,

[33] SFG (2014), SFG (2015), Frontier (2015).

the Tribunal held, and the AER accepted, that the redemption rate can only be used as an upper bound for theta and not as a point estimate:

> The AER accepted that utilisation rates derived from tax statistics provide an upper bound on possible values of theta. Setting aside the manner in which the AER derived a value from the tax statistics study, it correctly considered that information from a tax statistics study was relevant. However, its relevance could only be related to the fact that it was an upper bound. No estimate that exceeded a genuine upper bound could be correct. Thus the appropriate way to use the tax statistics figure was as a check.[34]

83 On several occasions, Dr Handley has also advised the AER that the redemption rate provides 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. For example, Handley (2008) concludes that:

> …this estimate [i.e., the redemption rate] may be interpreted as a reasonable upper bound on the value of gamma.[35]

84 Handley (2015) now says that the redemption rate does provide 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.

85 We agree that it is the market value of credits that is reflected in market prices. We also agree that the market value cannot exceed the redemption rate, because the redemption rate is an upper bound. 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.

86 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.[36] 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.

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

[35] Handley (2015), p. 14.

[36] Handley (2008), p. 22.

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

87 In its October and November 2015 preliminary and draft decisions, the AER interprets the redemption rate as a point estimate of theta. Frontier (2015 Gamma) explains that the AER simply redefines theta to be the redemption rate, in which case estimates of the redemption rate would be (tautologically) also estimates of theta.

88 The AER rationalises this approach by asserting that all of the reasons why real-world investors value imputation credits at less than the face amount are not relevant to estimating theta – that the proper task is not to estimate what the value of credits actually *is* to investors in the market, but what the value would be in the absence of all of the reasons why the actual value is less than the face amount. The AER calls this the "pre-personal tax and pre-personal cost" interpretation of "value."

89 In its October and November 2015 preliminary and draft decisions, the AER has regard to the following estimates of the redemption rate:[37]

a. Equity ownership approach:

   i. From all equity, an estimate of 0.56 to 0.68, with a most recent estimate of approximately 0.61; and

   ii. From listed equity only, an estimate of 0.38 to 0.55, with a most recent estimate of approximately 0.46; and

b. ATO tax statistics approach: An estimate of 0.45.

90 We note that, for all equity, the equity ownership estimate (0.61) is higher than the tax statistics estimate (0.45). 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 as set out in Paragraph 79 above.

4.2.1 "Refinement" of the equity ownership estimates

91 In its post-Guideline decisions, the AER relies on "refined"[38] equity ownership estimates. The AER explains that its approach is to now:

[37] JEN Preliminary Decision, p. 4-18-19.

[38] JEN Preliminary Decision, p. 4-97.

> Exclude from the calculation equity in entities that are wholly owned by the public sector. In the National Accounts, this is equity issued by the 'central bank', 'central borrowing authorities' and 'public non-financial corporations'.[39]

92 Because the ABS data on which the AER relies for its equity ownership estimates is presented at a coarsely aggregated level, it is difficult to know whether the AER's refinements are complete and appropriate. It is possible that the inability 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.[40]

4.2.2 Data quality issues

93 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.[41]

94 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.

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[39] JEN Preliminary Decision, p. 4-97.

[40] To be clear, we are not suggesting that the AER 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.

[41] http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5232.0Explanatory%20Notes1Sep%202015?Open Document, accessed on 20 December 2015.

4.2.3 The 45-day rule

95 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.

96 In its October and November 2015 preliminary and draft decisions,[42] the AER relies upon a comparison of estimates of imputation credits received and imputation credits redeemed for individuals and superannuation funds. The AER uses data from Hathaway (2013) and concludes that:

> …the amount of credits utilised is effectively the same as the amount of credits that are implied to have been received. This suggests that the 45-day holding rule is not having a material effect. [43]

97 However, Hathaway (2013) – in the same paper as the AER uses to support its conclusion above – documents problems with the very comparison that the AER makes. He concludes that the estimate of credits received is likely to reliable, but the estimate of credits redeemed (which comes from a different set of ATO data) is not.[44] Thus, any comparison would be invalid.

98 The AER now states that:

> …we acknowledge the limitations of the tax data used for this analysis. [45]

99 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 a material 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.

4.2.4 Other unredeemed credits

100 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

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[42] JEN Preliminary Decision, Table 4-6, p. 4-72.

[43] JEN Preliminary Decision, pp. 4-71-72.

[44] Hathaway (2013), Paragraphs 60-61.

[45] JEN Preliminary Decision, pp. 4-73.

redeeming the credit. Dr Abraham raised the prospect of investors electing not to redeem credits due to "administrative costs" during the NSW Tribunal hearing.[46] This may be part of the explanation for why the equity ownership estimate exceeds the more direct ATO tax statistics estimate.

4.2.5 Treatment of government-owned businesses

101 Another reason for the difference between the AER's equity ownership estimate and the ATO tax statistics estimate of the redemption rate is the AER'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 AER's approach is to now remove those credits from consideration entirely. This has the effect of increasing the estimate of the redemption rate. The AER 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.[47]

102 Thus, the AER'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.

103 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.

4.3 The appropriate use of estimates of the redemption rate

104 For the reasons set out above, our view is that the redemption rate should be used as an upper bound for theta and that it should not be used as a point estimate for theta.

105 The AER has the following estimates of the redemption rate available to it:

a. In relation to listed equity, an equity ownership estimate of 0.46; and

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[46] NSW Tribunal hearing, Transcript, Day 8, p. 5.

[47] JEN Preliminary Decision, p. 4-97.

b. In relation to all equity, an equity ownership estimate of 0.61 and a tax statistics estimate of 0.45.

106 Logically, where two estimates of an upper bound are available, the higher is effectively redundant. For the all equity sample, the equity ownership estimate suggests that theta must be lower than 0.61, but the tax statistics estimate already suggests that theta must be lower than 0.45. Thus the equity ownership upper bound estimate is effectively redundant.

107 In any event, our view is that the tax statistics estimate (being more direct and not relying on the assumptions required for the equity ownership approach) should be preferred to the equity ownership estimate. This produces upper bound estimates of 0.45 and 0.46 for all equity and listed equity, respectively.

108 An upper bound of 0.45 (or 0.46) is consistent with our preferred point estimate of 0.35 for theta.[48] This is because the point estimate is expected to be below the upper bound as the upper bound does not reflect the extent to which investors do not value credits at the full face amount.

109 In summary, our view is that the best estimate of the redemption rate upper bound for theta is 0.45-0.46. That is, any point estimate of theta, derived from the market prices of traded securities, must be less than this upper bound if it is to be considered to be reasonable. Because theta is estimated as a market-wide parameter, this upper bound would apply whether the benchmark efficient entity is defined narrowly (as the firms that the AER regulates) or more broadly (as firms that are similar in some respect).[49]

[48] See SFG (2014), SFG (2015), Frontier (2015).

[49] Moreover, if the redemption rate was to be estimated as a firm-specific parameter, rather than as a market-wide upper bound, the best estimate would be 0.45-0.46. This is because there are two groups of firms for which redemption rate estimates are available – listed equity and all equity – and (as set out above) the best estimate for both groups is essentially the same, being 0.45-0.46. This same estimate would apply however the redemption rate evidence was to be used. In this regard, we note that (a) neither the AER nor stakeholders have advocated that the redemption rate should be used as a firm-specific parameter, and (b) there is no evidence to suggest that the redemption rate should be used as a firm-specific parameter.

5 Updated estimates of the redemption rate

110 In this section, we replicate the estimates of the redemption rate for all companies derived by NERA (2015). We then update the estimates to include the most recent ATO data; the 2012-13 income year.

5.1.1 Replication

111 The redemption rate is calculated as:[50]

$$\frac{CREDITS\ REDEEMED}{NET\ TAX - \Delta FAB}$$

112 We use data from the 2003-04 to 2011-12 ATO Company Tax: Table 1 statistics.[51] This is due to the fact that a number of reporting requirements with regards to franking were implemented throughout 2002-03, so we rely on the later data to give us consistent estimates.

113 The explanation of the calculation of credits redeemed is set out in the appendix to this report. We obtain slightly different results for this compared to NERA, due to a difference in the data used for calculating credits redeemed from Charities, as explained in the appendix.

114 Table 5 below shows the original NERA results compared to our replicated estimation for the period 2003-04 to 2011-12, recorded in millions of dollars.

Table 5: Estimating the redemption rate

Estimate	Credits Redeemed	Cumulative Net tax	Change in FAB	Redemption rate (dividend data)
NERA	149,538	479,777	145,583	0.45
Frontier	148,958	479,777	145,583	0.45

Source: ATO data, Frontier calculations.

5.1.2 Updated redemption rate

115 We update the estimation for gamma using the latest Taxation Statistics for 2012-13, for the period 2004-2013. Table 6 shows that there has been a slight increase in the redemption rate for 2013, increasing to 0.46.

[50] See Hathaway (2014).

[51] Only the 2011-12 Table 1 is used to find this data.

Table 6: Updated estimates of the redemption rate

Estimate	Credits Redeemed	Cumulative Net tax	Change in FAB	Redemption rate (dividend data)
Frontier	172,171	545,238	172,671	0.46

Source: ATO data, Frontier calculations.

6 Declaration

116 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.

_____

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8 Appendix 1: Instructions

Expert Terms of Reference

Estimating the value of imputation credits

Jemena Electricity Networks (Vic) Limited
2016-20 Electricity Distribution Price Review

EDPR-5700-0009

Version B – 5 January 2016

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Contents

1 Background

Jemena Electricity Networks (**JEN**) is an electricity distribution network service provider in Victoria. JEN supplies electricity to approximately 300,000 homes and businesses through its 10,285 kilometres of distribution system. JEN's electricity distribution system services 950 square kilometres of northwest greater Melbourne. JEN's electricity network is maintained by infrastructure management and services company, Jemena Asset Management (**JAM**).

JEN submitted its initial regulatory proposal with supporting information for the consideration of the Australian Energy Regulator (**AER**) on 30 April 2015. This proposal covers the period 2016-2020 (calendar years). The AER published its preliminary determination on 29 October 2015. JEN is currently preparing its submission in response to the preliminary decision, to be submitted to the AER by 6 January 2016.

As with all of its economic regulatory functions and powers, when making the distribution determination to apply to JEN under the National Electricity Rules and National Electricity Law, the AER is required to do so in a manner that will or is likely to contribute to the achievement of the National Electricity Objective, which is:

> *to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system.*

The equivalent National Gas Objective is set out in section 23 of the National Gas Law.

Where the AER is making a distribution determination and there are two or more possible decisions that will or are likely to contribute to the achievement of the National Electricity Objective, the AER is required to make the decision that the AER is satisfied will or is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

The AER must also take into account the revenue and pricing principles in section 7A of the National Electricity Law when exercising its discretion in making those parts of a distribution determination relating to direct control network services. The revenue and pricing principles include the following:

> *A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs in:*
>
> *(a) providing direct control network services; and*
>
> *(b) complying with a regulatory obligation or requirement or making a regulatory payment.*

The equivalent revenue and pricing principles for gas network regulation are set out in section 24 of the National Gas Law.

Some of the key rules governing the making of a distribution determination are set out below.

Clause 6.4.3(a) of the National Electricity Rules provides that revenue for a regulated service provider is to be calculated adopting a "building block approach". It provides:

> *The annual revenue requirement for a Distribution Network Service Provider for each regulatory year of a regulatory control period must be determined using a building block approach, under which the building blocks are:*
>
> *(1) indexation of the regulatory asset base – see paragraph (b)(1);*
>
> *(2) a return on capital for that year – see paragraph (b)(2);*
>
> *(3) the depreciation for that year – see paragraph (b)(3);*
>
> *(4) the estimated cost of corporate income tax of the Distribution Network Service Provider for that year – see paragraph (b)(4);*
>
> *(5) the revenue increments or decrements (if any) for that year arising from the application of any efficiency benefit sharing scheme, capital expenditure sharing scheme, service target performance incentive scheme, demand management and embedded generation connection incentive scheme or small-scale incentive scheme – see subparagraph (b)(5);*
>
> *(6) the other revenue increments or decrements (if any) for that year arising from the application of a control mechanism in the previous regulatory control period – see paragraph (b)(6);*
>
> *(6A) the revenue decrements (if any) for that year arising from the use of assets that provide standard control services to provide certain other services – see subparagraph (b)(6A); and*
>
> *(7) the forecast operating expenditure for that year – see paragraph (b)(7).*

Clause 6.5.2 of the National Electricity Rules, relating to the allowed rate of return, states:

> *Calculation of return on capital*
>
> *(a) The return on capital for each regulatory year must be calculated by applying a rate of return for the relevant Distribution Network Service Provider for that regulatory year that is determined in accordance with this clause 6.5.2 (the allowed rate of return) to the value of the regulatory asset base for the relevant distribution system as at the beginning of that regulatory year (as established in accordance with clause 6.5.1 and schedule 6.2).*
>
> *Allowed rate of return*
>
> *(b) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.*
>
> *(c) The allowed rate of return objective is that the rate of return for a Distribution Network Service Provider is to be commensurate with the efficient financing costs of a*

benchmark efficient entity with a similar degree of risk as that which applies to the Distribution Network Service Provider in respect of the provision of standard control services (the allowed rate of return objective).

(d) Subject to paragraph (b), the allowed rate of return for a regulatory year must be:

(1) a weighted average of the return on equity for the regulatory control period in which that regulatory year occurs (as estimated under paragraph (f)) and the return on debt for that regulatory year (as estimated under paragraph (h)); and

(2) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in clause 6.5.3.

(e) In determining the allowed rate of return, regard must be had to:

(1) relevant estimation methods, financial models, market data and other evidence;

(2) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(3) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Return on equity

(f) The return on equity for a regulatory control period must be estimated such that it contributes to the achievement of the allowed rate of return objective.

(g) In estimating the return on equity under paragraph (f), regard must be had to the prevailing conditions in the market for equity funds.

Return on debt

(h) The return on debt for a regulatory year must be estimated such that it contributes to the achievement of the allowed rate of return objective.

(i) The return on debt may be estimated using a methodology which results in either:

(1) the return on debt for each regulatory year in the regulatory control period being the same; or

(2) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the regulatory control period.

(j) Subject to paragraph (h), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:

(1) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the making of the distribution determination for the regulatory control period;

(2) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the regulatory control period; or

(3) some combination of the returns referred to in subparagraphs (1) and (2).

(k) In estimating the return on debt under paragraph (h), regard must be had to the following factors:

(1) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

(2) the interrelationship between the return on equity and the return on debt;

(3) the incentives that the return on debt may provide in relation to capital expenditure over the regulatory control period, including as to the timing of any capital expenditure; and

(4) any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one regulatory control period to the next.

(l) If the return on debt is to be estimated using a methodology of the type referred to in paragraph (i)(2) then a resulting change to the Distribution Network Service Provider's annual revenue requirement must be effected through the automatic application of a formula that is specified in the distribution determination."

[Subclauses (m)–(q) omitted].

The equivalent National Gas Rules are set out in rule 87.

Clause 6.5.3 of the National Electricity Rules, relating to the estimated cost of corporate income tax, states:

The estimated cost of corporate income tax of a Distribution Network Service Provider for each regulatory year (ETCt) must be estimated in accordance with the following formula:

$$ETCt = (ETIt \times rt)(1 - \gamma)$$

where:

ETIt is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of standard control services if such an entity, rather than the Distribution Network Service Provider, operated the business of the Distribution Network Service Provider, such estimate being determined in accordance with the post-tax revenue model;

rt is the expected statutory income tax rate for that regulatory year as determined by the AER; and

γ is the value of imputation credits.

The equivalent National Gas Rule is in rule 87A.

In its initial proposal, JEN submitted the expert report from SFG (the **Earlier Report**) on the value of imputation credits (γ or gamma) to be applied in estimating the cost of corporate income tax.[1] The AER preliminary decision considered this report.

In this context, JEN seeks a report from Frontier Economics, as a suitably qualified independent expert (**Expert**), that reviews and, where appropriate, responds to matters raised in the preliminary decision on the value of imputation credits. JEN seeks this report on behalf of itself, ActewAGL Distribution, Ausnet Services, Australian Gas Networks, Citipower, Powercor, and United Energy.

2 Scope of Work

In its preliminary determination, the AER relied on equity ownership statistics and imputation credit distribution statistics (among other evidence) to estimate a value of imputation credits of 0.4. The AER also had regard to tax statistics on the utilisation of imputation credits to estimate this value.

The Expert will provide an opinion report that:

1. Identifies and sets out the basis for, the Expert's opinion of the best estimate of the rate of domestic ownership in the benchmark efficient entity

2. Identifies and sets out the basis for, the Expert's opinion of the best estimate of the distribution rate by the benchmark efficient entity.

3. Reviews the reliability of tax statistics for estimating the utilisation of imputation credits, including on (but not limited to) whether these statistics:

   (a) provide an unbiased estimate of the pre-personal cost value of distributed imputation credits;

   (b) provide evidence of investors not redeeming distributed imputation credits, and, if so, what factors may explain why investors may not redeem distributed imputation credits; and

[1] *SFG*, 6 February 2015, *Estimating gamma for regulatory purposes*.

(c) reconcile with other evidence on the value of distributed imputation credits.

In preparing the report the Expert will:

A. consider the theoretical and empirical support for each of the possible approaches;

B. consider any relevant comments raised by the AER and other regulators, and experts engaged by those regulators; and

C. use robust methods and data in producing any statistical estimates.

3 Information to be Considered

The Expert is also expected to consider the following information:

- such information that, in Expert's opinion, should be taken into account to address the questions outlined above;
- relevant literature on the value of imputation credits;
- the AER's Rate of Return Guideline, including explanatory statements and supporting expert material;
- material submitted to the AER as part of its consultation on the Rate of Return Guidelines; and
- previous decisions of the AER, other relevant regulators and the Australian Competition Tribunal on the value of imputation credits and any supporting expert material, including the recent final decisions for Jemena Gas Networks and electricity networks in ACT, NSW, Queensland, South Australia and Tasmania.

4 Deliverables

At the completion of its review the Expert will provide an independent expert report which:

- is of a professional standard capable of being submitted to the AER;
- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines [2];
- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);

[2] Available at: http://www.federalcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;

- summarises JEN's instructions and attaches these term of reference;

- includes an executive summary which highlights key aspects of the Expert's work and conclusions; and

- (without limiting the points above) carefully sets out the facts that the Expert has assumed in putting together his or her report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the five parts defined in the scope of works (Section 2).

5 Timetable

The Expert will deliver the final report to Jemena Regulation by **6 January 2016**.

6 Terms of Engagement

The terms on which the Expert will be engaged to provide the requested advice shall be:

- as provided in accordance with the Jemena Regulatory Consultancy Services Panel arrangements applicable to the Expert.

ATTACHMENT 1: FEDERAL COURT PRACTICE NOTE

Practice Note CM 7

EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

Commencement

1. This Practice Note commences on 4 June 2013.

Introduction

2. Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the *Evidence Act 1995* (Cth)).

3. The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[3], and to assist experts to understand in general terms what the Court expects of them. Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1. General Duty to the Court[4]

1.1 An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2 An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3 An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2. The Form of the Expert's Report[5]

2.1 An expert's written report must comply with Rule 23.13 and therefore must

(a) be signed by the expert who prepared the report; and

(b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

(c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

(d) identify the questions that the expert was asked to address; and

(e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

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[3] As to the distinction between expert opinion evidence and expert assistance see *Evans Deakin Pty Ltd v Sebel Furniture Ltd* [2003] FCA 171 per Allsop J at [676].

[4] The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

[5] Rule 23.13.

(f) set out separately from the factual findings or assumptions each of the expert's opinions; and

(g) set out the reasons for each of the expert's opinions; and

(ga) contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[6]; and

(h) comply with the Practice Note.

2.2 At the end of the report the expert should declare that "[the expert] has *made all the inquiries that* [the expert] *believes are desirable and appropriate and that no matters of significance that* [the expert] *regards as relevant have, to* [the expert's] *knowledge, been withheld from the Court*."

2.3 There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4 If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[7].

2.5 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6 The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[8].

3. Experts' Conference

3.1 If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement. If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

J L B ALLSOP
Chief Justice
4 June 2013

[6] See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

[7] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565

[8] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565-566. See also Ormrod *"Scientific Evidence in Court"* [1968] Crim LR 240

9 Appendix 2: Curriculum vitae – Professor Stephen Gray

Stephen Gray is Professor of Finance at the University of Queensland Business School and Chairman of Frontier Economics (Australia). He has Honours degrees in Commerce and Law from the University of Queensland and a PhD in financial economics from the Graduate School of Business at Stanford University.

In his university role, he teaches a range of award and executive education courses in financial management, asset valuation, and corporate finance. He has received a number of teaching awards, including a national award for university teaching in the field of business and economics. He has published widely in highly-ranked journals and has received a number of manuscript awards, most notably at the *Journal of Financial Economics*.

Stephen is also an active consultant to industry on issues relating to valuation, cost of capital, and corporate financial strategy. He has acted as a consultant to many of Australia's leading companies, government-owned corporations, and regulatory bodies. His clients include the Independent Pricing and Regulatory Tribunal (IPART), Australian Competition and Consumer Commission (ACCC), Melbourne Water, Qantas, Telstra, Origin Energy, AGL, Foxtel, ENERGEX, Queensland Treasury Corporation, Rio Tinto Alcan and the Australian Securities and Investments Commission (ASIC). Projects include corporate cost of capital reviews, asset valuation, independent valuation of executive stock options, and the assessment of capital structure and financing strategies.

He has also appeared as an independent expert in several court proceedings relating to the valuation of assets and businesses and the quantification of damages.

Key experience

Cost of capital

Energy sector

- **TransGrid (2015) –** Advised the electricity transmission operator in NSW on the appropriateness of the Australian Energy Regulator's (AER's) proposed transitional arrangements before the full introduction of a trailing average approach to setting the cost of debt allowance for regulated networks. The AER recently revised its rate of return methodology. In doing so, the AER announced that it would adopt a trailing average approach to setting cost of debt allowances (similar to the approach used by Ofgem in Great Britain). However, the AER argued that it should phase this approach in to allow businesses sufficient time to align their debt management practices to the new methodology. Frontier prepared a report on behalf of TransGrid explaining

the circumstances in which such transitional arrangements would not be appropriate.

- **Australian Energy Markets Commission (AEMC) (2012)** – The regulator (AER) and a group of large energy users (EURCC) proposed changes to the National Electricity Rules and National Gas Rules (Rules). The AEMC, which is the government agency that is responsible for maintaining the Rules, conducted a year-long review and consultation process in relation to the proposed rule changes. Stephen was appointed to advise the AEMC on rate of return issues. His role involved the provision of advice to the AEMC secretariat and board, the preparation of a number of public reports, the co-ordination and chairing of public hearings, and a series of one-on-one meetings with key stakeholders. The process resulted in material changes being made to the Rules, with revised Rules being published in November 2012.

- **Energy Networks Association (2013) –** The National Electricity Rules and National Gas Rules (Rules) require the regulator to publish a series of regulatory guidelines every three years. The Australian Energy Regulator (AER) conducted a year-long process in 2013 that ended with the publication of its first Rate of Return Guideline. Throughout this process, Stephen advised the Energy Networks Association (ENA) on rate of return issues. This involved working with the ENA's Regulatory Affairs Committee, specialist working groups, and legal advisors, preparing expert reports, drafting submissions, and representing the ENA at stakeholder forums.

- **TransGrid (2013) Return on Debt Analysis –** The 2012 changes to the National Electricity Rules included, inter alia, a provision that permitted the allowed return on debt to be set according to a trailing average approach. TransGrid sought an analysis of the effect that such a change would have on the residual cash flows that were available to its shareholders. Stephen developed a Monte Carlo simulation model that generated many scenarios for the possible future evolution of interest rates, incorporating empirical relationships between government bond yields, credit spreads, and inflation. His analysis quantified the extent to which the trailing average approach would better match the actual cost of servicing debt under TransGrid's longstanding debt management approach, thereby reducing the volatility of the cash flow to equity holders.

- **Aurizon Network (2014) Split Cost of Capital Analysis –** In a discussion paper, the Queensland Competition Authority advocated consideration of a split cost of capital regulatory approach. Under the proposed approach the regulator would allow a standard "debt and equity" regulated return on assets during their construction, but a "100% debt" return once the asset had been included in the firm's regulatory asset base. Stephen was retained by Aurizon

(operator of a regulated coal rail network). His role was to prepare an expert report that considered the economic and financial basis for the proposed approach, and which considered the likely consequences of such an approach. After his presentation to the QCA board, the proposal was shelved indefinitely.

- **Energy Networks (2014-15) Regulatory Reviews –** Stephen has prepared expert reports and submissions on behalf of all businesses that are in the current rounds of regulatory resets. These reports cover the whole range of regulatory cost of capital issues. Clients over the last year include ATCO Gas, DBP, ActewAGL, TransGrid, Jemena, United Energy, CitiPower, Powercor, SA Power Networks, Ausgrid, Essential Energy, Endeavour Energy, ENERGEX, and Ergon Energy.

- **Legal and Appeal Work –** Stephen has assisted a number of regulated business, and their legal teams, through merits review and appeal processes. One example is the 2011 *Gamma* case in the Australian Competition Tribunal. That case involved the "gamma" parameter, which quantifies the impact that dividend imputation tax credits have on the cost of capital. The regulator (AER) proposed an estimate that was based on (a) an assumption that was inconsistent with the observed empirical evidence, and (b) a point estimate that was based partly on a paper with questionable reliability and partly on data that was irrelevant to the task at hand. Stephen's role was to prepare a series of expert reports, to assist the legal team to understand the issues in detail, and to attend the hearings to advise as the matter was heard. The end result was that the Tribunal set aside the entire basis for the AER's proposed estimate and directed us to perform a "state of the art" empirical study. Stephen performed the required study and its results were accepted in full by the Tribunal, who set the estimate of gamma on the basis of it.

Water sector

- **Melbourne Water (2015) –** In preparation for the 2016 Victorian price review, Stephen is part of the Frontier team currently advising Melbourne Water on ways in which the rate of return methodology used by the Victorian regulator, the Essential Services Commission (ESC), could be improved, and the likely revenue impact of any methodological changes. At the last (i.e. 2013) price reset, the ESC indicated that it intended to review its rate of return methodology but to date has not done so. By comparison, most other major Australian regulators have revised their methodologies significantly, in part due to recognition of the need to make their estimation approaches more resilient to the effects of global financial crises. A comparison of the methodologies used by different regulators in Australia suggests that the ESC's methodology is out of line with best regulatory practice. Frontier's advice has focused on

identifying the areas for improvement, and the development of the economic arguments that would support the case for change.

- **Unity Water, SEQ Water, Gladstone Area Water Board (2013-14) –** Stephen has prepared a series of reports for a number of Queensland water utilities. These reports include (a) a response to the QCA's (Queensland regulator) proposed split cost of capital approach (which has now been shelved indefinitely), and (b) a response to the QCA's proposed cost of capital estimates.

Telecommunications sector

- **NBN Co (2012-13) –** Stephen advised NBN Co on a range of cost of capital issues in relation to their proposed special access undertaking. This work included the drafting of expert reports, meetings with and presentations to various NBN Co committees and working groups, and representing NBN Co in discussions with the regulator (ACCC). Key issues included the length of the proposed access arrangement, the extent to which higher risk during the construction and proof-of-concept phases justified a higher allowed return, and the process by which early year losses might be capitalized into the regulatory asset base.

- **C7 Case (2006-07), Federal Court of Australia**

  The Seven Network brought an action against a number of Australian media and entertainment firms in relation to the abandonment of its cable TV business, C7. Seven alleged that the respondents colluded to prevent C7 from securing the rights to broadcast AFL and NRL matches and that this prevented its C7 business from being economically viable.

  Stephen was retained by a group of respondents including PBL, Telstra, and News Corporation. His role was to address various matters relating the quantification of damages. He prepared several reports, was involved in several discussions with other valuation expert witnesses, and was cross examined in the Federal Court.

  The Court found in favour of the respondents.

Transport sector

- **CBH Group (2015) –** Stephen was part of the Frontier team that developed, on behalf of CBH (a major Australian grain producer and access seeker to rail infrastructure in Western Australia) and its legal counsel, a submission to the Economic Regulation Authority (ERA) of Western Australia on the regulator's approach to estimating WACC. The submission focused on, amongst other issues, the ERA's approach to estimating the market risk premium, the estimation approach to beta, and the way in which the WACC

ought to be used within the negotiate-arbitrate arrangements within the rail access regime.

- **Brockman Mining Australia (2015) –** Stephen was part of the Frontier team that advised Brockman, a potential access seeker to rail infrastructure in Western Australia, on its submission to the Economic Regulation Authority (ERA) of Western Australia in relation to the ERA's approach to WACC under the Railways (Access) Code 2000. Subsequently, the ERA released a Revised Draft Decision on its proposed WACC methodology. Frontier was engaged again by Brockman to help develop its submission to the ERA on the Revised Draft Decision. The submissions focused on the appropriateness of the beta estimates proposed by the ERA, the methodology used to estimate the market risk premium (and consistency between the methodologies used by the ERA in different sectors), the appropriateness of the ERA's credit rating assumption for the benchmark efficient entity (which affects the cost of debt allowance under the ERA's methodology).

- **Brookfield Rail (2014) –** The WA Railways (Access) Code requires railway operators to provide certain information to access seekers to enable them to compute "floor" and "ceiling" prices as defined in the Code. Brookfield provided access seekers with certain information and other relevant information was available from public sources. Stephen prepared an expert report that considered whether the information available to an access seeker, together with specialist assistance from relevant experts, would be sufficient to compute floor and ceiling prices.

- **Brisbane Airport Corporation (2013-14) –** Stephen was engaged by Brisbane Airport Corporation (BAC) to advise on a range of regulatory and cost of capital issues in relation to the development of the airport's new parallel runway (NPR). BAC identified the need for an additional runway to accommodate steadily increasing demand. The development of a new runway required a large capital commitment ($1.5 billion) and would take approximately eight years to complete. BAC proposed that the airlines would contribute to the financing of the NPR during construction – the alternative being the capitalisation of a return on capital expenditure until completion and a sharp spike in landing fees when the NPR become operational. One of the key issues in the negotiations with airlines was the WACC that would be used to determine the return on capital. Stephen's role was twofold. He produced an expert report providing a strong basis for BAC's proposed WACC. He also advised BAC on the likely approach of the ACCC (the regulator in question) should they become involved – the regulatory arrangements provide for the parties to negotiate a commercial outcome and for the regulator to become involved if they are unable to do so. BAC was successful in their negotiations with the relevant airlines and the NPR is now under construction.

- **Abbott Point Coal Terminal (2014) –** Stephen was engaged by a consortium of mining companies in relation to arbitration with Adani, the owner and operator of the Abbott Point Coal Terminal. The parties had in place a user agreement that was similar to a regulatory-style building block model. Stephen advised on a range of cost of capital and other issues including detailed reports on the cost of debt and the level of corporate costs.

Financial litigation support

- **APLNG (2014-15)**
  The Australia-Pacific LNG (APLNG) project is a joint venture between Origin Energy, ConocoPhillips and Sinopec that involves the extraction of coal seam methane and processing into liquefied natural gas (LNG) for export. The relevant Queensland royalties legislation provides that a 10% royalty is to be levied on the value of the gas at the first point of disposal. Since the project is integrated from end-to-end, there is no arm's length price at the relevant point. Stephen was retained by APLNG to prepare an expert report on the process for determining what the arm's length price at the first point of disposal would be if such a thing existed. This involves estimating the costs, including a fair return on capital, for a hypothetical upstream gas producer and a hypothetical downstream LNG operator, and allocating any excess profit between the parties.

- **CDO Case (2013)**
  This case involved a class action against the Australian distributor of collateralised debt obligations (CDOs) and the international credit ratings agency that assigned credit ratings to them. The CDOs in question were financial products with a payoff that depended on the number of defaults (or "credit events") among a reference set of 150 different corporate bonds issued by companies in different industries and different geographical locations. A typical CDO structure would involve the investor being repaid all of their initial investment plus an attractive rate of interest so long as there were less than say 7 defaults out of the reference set of 150 bonds during the five-year life of the CDO. However, if there were say 11 or more defaults, the investor would lose their entire investment. If the number of defaults was between 7 and 11, the return to the investor would be proportional (e.g., 8 defaults would involve a 25% loss of principal).

  The CDOs in question were created by US investment banks and were distributed in Australia by a large Australian commercial bank. One of the key issues in the case was whether the Australian distributor made proper disclosures about risk to investors, which included individuals, self-managed superannuation funds, and local councils. The CDOs in question were assigned strong investment grade credit ratings by an international ratings agency. The process used to assign those ratings did not properly take into

account the correlation between defaults – the empirical fact that during recessions and financial crises many bonds default at the same time.

Stephen's role was to prepare an expert report that explained to the Court how CDOs were structured, how they operated, and what risks were involved. His report also examined the risk disclosures that were contained in the materials that were provided to potential investors and the process by which the credit rating agency assigned ratings.

- **Wright Prospecting litigation (2012-14)**
  Wright Prospecting Pty Ltd (WPPL) is involved in several legal disputes about the payment of royalty streams in relation to iron ore and coal mining operations. WPPL had assigned various rights and licenses in relation to iron ore mines in WA and coal mines in Queensland to other parties, in return for royalties on the revenues received from the sale of the ore. Stephen's role was to prepare a series of expert reports quantifying the present value of the royalty streams.

- **Public Trustee of QLD v. Octaviar Ltd (2009), Supreme Court of Queensland**
  The Octaviar Group (formerly the MFS Group) is a Gold Coast based group of listed companies with funds management and leisure services businesses. Octaviar was unable to refinance a loan in early 2008 and sought to raise equity via a rights issue as part of a substantial corporate restructure. The stock price fell some 70% on this announcement and Octaviar subsequently sold a 65% interest in its leisure business known as Stella. Octaviar then sought to make arrangements with its creditors, including the Public Trustee, as trustee for note holders.

  Stephen was retained by the Public Trustee. His role was to prepare several reports on (a) whether the companies in the Octaviar Group were insolvent, (b) the date the companies became insolvent, and (c) whether the note holders would be made better or worse off by the proposed arrangement, relative to a liquidation. He was cross examined by four parties with an interest in these proceedings on issues relating to the date of the insolvency.

- **Telstra v. ACCC (2008), Federal Court of Australia**
  Telstra brought an action against the ACCC in relation to access charges that Telstra was allowed to charge its retail competitors for access to its fixed line and broadband networks – arguing that the return on capital allowed by the ACCC was unreasonably low.

Stephen was retained by Telstra. His role was to prepare several reports on the issue of whether the ACCC has been inconsistent in its application of valuation methods – in a way that reduced Telstra's allowed return. He was also involved in several discussions with other valuation expert witnesses, prepared a joint statement of experts, and was cross examined in the Federal Court individually and in a "hot tub" setting.

- **Alcan Northern Territory Alumina Pty Ltd v. Commissioner of Taxes (2006-07), Supreme Court of Northern Territory**
  First Engagement: Consulting Expert

Alcan bought out the equity of its joint venture partner in a combined bauxite mine and alumina refinery in the Northern Territory. The NT Revenue Authority claimed that the transaction was caught by the NT "land rich" provision, under which the transaction would be subject to stamp duty if more than 60% of the consideration was attributable to land assets.

The key economic issue is the apportionment of value between the mine (predominately land assets) and the refinery (substantially intangible assets arising out of intellectual property and expertise).

Stephen was retained by Alcan as consulting experts. Their role was to prepare a range of financial models and analysis to support the view that a substantial portion of the value of the transaction was attributable to non-land assets in the refinery. This involved complex financial modelling and market analysis. A full integrated model was produced, allowing users to select whether they preferred the appellant's or respondent's submission on each input parameter, and automatically re-calculating the land-rich ratio.

Stephen worked closely with Alcan's legal team, Counsel, and various independent experts. Stephen assisted the legal team during the trial and in preparing sections of final submissions.

Second Engagement: Independent Expert

The initial judgment contained findings about certain matters and was sent back to the Commissioner for re-assessment. A dispute arose between the parties about the effect of the judgment. In particular, the value of a primary 10-year lease had to be disaggregated from the value of an option to continue the project.

Stephen was retained by Alcan to produce an expert valuation report that addressed the matters in dispute. Two expert reports were prepared and Stephen was cross-examined on this material. Stephen prepared an easy to use spreadsheet calculator to assist the Court in testing how different input assumptions (where the experts could not agree) affected the bottom line. This was used by His Honour as an *aide memoire* and was considered to be particularly helpful in the case in terms of simplifying the effects of a number of complex matters.

Judgment was in favour of Alcan. Stephen's evidence was accepted and endorsed by the Court.

Career: Professional

2014-Present	Chair, Frontier Economics
1997-2014	Director, SFG Consulting

Career: Academic

2000 - Present	Professor of Finance, UQ Business School, University of Queensland
1997-1999	Associate Professor of Finance, UQ Business School, University of Queensland
1997-2001	Research Associate Professor of Finance, Fuqua School of Business, Duke University
1995-1997	Assistant Professor of Finance, Fuqua School of Business, Duke University

Education

1987	Bachelor of Commerce (Hons), University of Queensland
1989	Bachelor of Laws (Hons), University of Queensland
1995	PhD, Stanford University

Papers and publications: Cost of capital

- Gray, S. and J. Nowland, 2015, "The Diversity of Expertise on Corporate Boards in Australia," *Accounting and Finance*, forthcoming.
- Darat, A., S. Gray, J. C. Park and S. Wu, (2014), "Corporate governance and bankruptcy risk" *Journal of Accounting, Auditing and Finance,* forthcoming.

- Gray, S., I. Harymawan and J. Nowland, (2014), "Political and government connections on corporate boards in Australia: Good for business?" *Australian Journal of Management,* forthcoming.
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10 Appendix 3: ATO tax statistics calculations

117 In this appendix, we explain in detail our calculations for the following:

a. Section 10.1 presents our calculations and variables needed to adjust for the change in reporting requirements for net tax which occurred in the 2011-12 income year.

b. Section 10.2 explains the calculations necessary to adjust for the change in reporting requirements in 2002-03 for franking account balances.

c. Section 10.3 presents the variables and calculations needed to compute credits redeemed, used to derive the redemption rate in Section 2.

10.1 Adjusted Net Tax

118 The reporting of net tax changed between 1987-88 to 2008-09 and the years 2009-10 to 2012-13.

10.1.1 Based on NERA (2015)

119 Taking into account NERA's comments,[52] net tax for aggregated companies is calculated for the selected years as shown in Table 7 and Table 8.

Table 7: Data to calculate adjusted aggregate net tax

Variable	ATO row reference (2012)	ATO row reference (2013)	Years
Foreign income tax offset	336	378	2009-10 to 2010-11
Tax assessed	360	411	2009-10 to 2010-11
Refundable tax offsets	370	421	2011-12 to 2012-13
Franking deficit tax offset	374	425	2009-10 to 2012-13
R&D tax offset	396	445	2002-03 to 2010-11
Other refundable credits	398	447	2009-10 to 2010-11
Remainder of refundable tax offsets	402	451	2011-12 to 2012-13
Net tax (old definition)	408	459	1987-88 to 2008-09
Net tax (new definition)	410	457	2011-12 to 2012-13

Source: ATO data, Frontier calculations. "ATO row references" are to row numbers in the ATO tax tables.

[52] NERA (2015), pp. 33-37.

Table 8: Computing net tax

Years	Net tax calculation
1987-88 to 2001-02	Net tax = net tax (old definition)
2002-03 to 2008-09	Net tax = net tax (old definition) – R&D tax offset
2009-10 to 2010-11	Net tax = tax assessed – foreign income tax offset – franking deficit tax offset – R&D tax offset – other refundable credits
2011-12 onwards	Net tax = net tax (new definition) – refundable tax offsets – remainder of refundable offsets

Source: ATO data, Frontier calculations.

120 For disaggregated data (i.e., private and public companies net tax), R&D tax offset is not reported for the years 2002 to 2010. Therefore, net tax is calculated as net tax (old definition) for the years 2000-01 to 2010-11, and for the years 2011-12 and 2012-13, it is calculated as reported in the aggregate net tax computations above.

10.1.2 Based on Handley (2015)

121 Handley (2015)[53] follows NERA's method for calculating the adjustment in net tax, except for one small alteration:

Net tax (2010, 2011) = net tax – R&D tax offset – other refundable credits.

All other years are calculated in the same was as NERA above.

10.2 Franking Account Balance

122 The franking account balance prior to 2000-01 consisted of Class A, B and C franking account balances. Since 2001-02 the FAB has consisted of only Class C balances. Therefore, when using the most recent Taxation Statistics (2011-12 or 2012-13), we extract the Class A franking account balance from the 2010-11 ATO Taxation Statistics,[54] and add it to the total FAB for years prior to 2002.

123 The ATO changed the reporting requirements for franking account balances in July 2002. Before 1 July 2002, franking account balances were reported as the amount of franked dividends that the companies could distribute. Prior to this date (i.e., from 2002-03 income year), FABs are the amount of franking credits that can be attached to dividends.

124 In order to account for this change in reporting, an adjustment factor must be applied to Class A and Class C franking account balances for all years leading up to 2002-03. The adjustment factors are:

[53] Handley (2015), p. 10.

[54] Company Tax, Table 1.

$$Class\ C\ FAB\ Adjustment\ Factor = \frac{TAX\ (t)}{1-TAX(t)}$$ [55]

$$Class\ A\ FAB\ Adjustment\ Factor = 0.64$$ [56]

where TAX(t) is the corporate tax rate for a given year.

125 Applying these adjustment factors to the years prior to 2002-03 provides consistent amounts for the franking account balances. NERA (2013, Footnote 14, p. 4) also makes a note of this issue.

10.3 Credits Redeemed

126 Total credits redeemed is disaggregated into the following components:

a. Life offices, endorsed income tax exempt entities and deductible gift recipients;

b. Persons;

c. APRA regulated and other funds;

d. Self-managed funds; and

e. Charities.

127 Table 9 shows where the data for each section is sourced from, and what variables are used for the calculations.

[55] A more detailed explanation can be found at *https://www.ato.gov.au/Business/Imputation/In-detail/Simplified-imputation---the-franking-account/?page=7*.

[56] A more detailed explanation can be found at *http://www.iknow.cch.com.au/#!/document/atagUio699437sl24417273/section-205-15-converting-the-franking-account-balance-to-a-tax-paid-basis-companies-whose-2001-02-franking-year-ends-before-30-june-2002*.

Table 9: Variables and source for calculating credits redeemed[57]

	Variables extracted	ATO row reference (2011-12)	ATO row reference (2012-13)
Life offices	See Table 3.4		
Persons	Dividends franking credit + Share of franking credits from franked dividends	100 + 307	102 + 302
APRA	Franking credit tax offset + refundable franking credit	167 + 189	146 + 168
Self-managed	Franking credit tax offset + refundable franking credit	134 + 156	152 + 170
Charities	Total credits	16	16

Source: ATO data, Frontier calculations. "ATO row references" are to row numbers in the ATO tax tables.

10.3.1 Life offices, endorsed income tax exempt entities, and deductible gift recipients

128 Imputation credits for life offices, endorsed income tax exempt entities, and deductible gift recipients are refundable. Table 10 describes how redeemed credits are calculated for these company types.

[57] Data for each of the sections can be found from the ATO Taxation Statistics (2011-12) for 2012, and (2012-13) for 2013:
i) Life offices - Company Tax: Table 1
ii) Persons – Individuals Tax: Table 1
iii) APRA regulated funds – Superannuation funds Tax: Table 1
iv) Self-managed funds – Superannuation funds Tax: Table 2
v) Charities – Charities and deductible gifts: Table 1

Table 10: Imputation credits redeemed

Type	Variables extracted	Years	Row[58]	Amount 2012	Amount 2013
Refundable tax offsets *2003-04 to 2010-11*	National rental affordability scheme tax offset	2008-09 to 2010-11	280 306	10	8
	Income tax payable on no-TFN contributions income	2010-11	326 368	0	0
	Other refundable credits	2003-04 to 2010-11	398 447	6,959	6,963
Refundable franking tax offsets			398 – 280 – 326 447 – 306 – 368	6,949	6,956
Refundable tax offsets *2011-12, and 2011-13 for 2013 Amount*	National rental affordability scheme	2011-12	280 306	3	24
	Income tax payable on no-TFN contributions income		326 368	0	0
	Refundable R&D tax offset	2011-12 to 2012-13	346 393	1,632	3,632
	Refundable tax offsets		370 421	2,156	5,227
	Remainder of refundable tax offsets		402 451	1,325	3,070
Refundable franking tax offsets			370 + 402 – 280 – 326 – 346 421 + 451 – 306 – 368 – 393	1,847	4,640
Total Credits redeemed				**8,795**	**11,596**

Source: ATO data, Frontier calculations.

10.3.2 Computation of credits redeemed

129 Table 11 below shows the amount of credits redeemed, recorded in millions of dollars for both the 2004-2012 and 2004-2013 periods. We note here that NERA reports $4,554 million credits redeemed for "charities", however we report only $3,974 million. This is because NERA has included an amount for the 2013 charities credits redeemed in their total for the 2004-2012 period. We have not included this in our total, including it instead in our updated 2004-2013 estimates. All other results for the 2004-2012 period are identical to those of NERA.

Table 11: Credits redeemed

	Credits Redeemed (2012)	Credits Redeemed (2013)
Life offices	8,795	11,596
Persons	94,277	107,882
APRA	25,504	29,037
Self-managed	16,408	19,103
Charities	3,974	4,554
Total Credits Redeemed	148,958	172,171

Source: ATO data, Frontier calculations.

[58] The top number(s) is the row for the 2011-12 Taxation Statistics, Company Tax: Table 1 and the bottom number(s) is the row for the 2012-13 Taxation Statistics

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