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Assessment of the Value of Imputation Credits - Gamma

Proposal for 2016 to 2020

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1. The Value of Imputation Credits

1.1 Summary

The National Electricity Rules **(NER)** require an estimate of "*the value of imputation credits*"[1] (also referred to as "gamma") as an input into the calculation of the corporate income tax building block. To promote the National Electricity Objective (**NEO**),[2] the estimate of gamma must reflect the value that equity-holders place on imputation credits (as opposed to simply their face value or the rate at which they are utilised). This is because, although gamma is an input into the corporate income tax calculation, the value adopted for gamma ultimately has a role in determining returns for equity-holders. If the value ascribed to imputation credits is higher than the value that equity-holders place on them, the overall return to equity-holders will be less than what is required to promote efficient investment in, and efficient operation and use of, electricity distribution, and this will not be in the long-term interests of consumers.

The estimation method that United Energy proposes to adopt results in an estimate of gamma which reflects the value equity-holders that place on imputation credits. In particular, United Energy believes that the correct way of calculating gamma for a benchmark efficient entity is to use the Monkhouse formula.[3] In other words, United Energy believes that the correct way of computing gamma is as the product of:

- the distribution rate for a benchmark efficient entity (i.e. the rate at which the entity will distribute the imputation credits that are created when it pays company tax); and
- the value of a dollar of imputation credits to investors (theta).

United Energy proposes that the distribution rate be set at 0.70, which is consistent with both the AER's rate of return guideline (the **Guideline**), explanatory statement (appendices)[4] and findings of the Australian Competition Tribunal (**ACT**).[5] Although the distribution rate is a firm specific parameter, the evidence that NERA provides indicates that an estimate of the distribution rate for a benchmark efficient entity will match, approximately, an estimate of the aggregate distribution rate across all firms. An estimate of the aggregate distribution rate across all firms computed using data from the Australian Taxation Office (**ATO**) is around 0.70.

United Energy proposes that the distribution rate be combined with an estimate of theta computed from market value studies that is no higher than 0.35, thereby leading to an estimate of gamma that is no higher than 0.25. United Energy's proposal is consistent with the expert advice of both Simon Wheatley (of NERA) and Professor Stephen Gray (of SFG Consulting).[6] NERA finds no evidence that the distribution of credits lowers equity returns and so concludes that theta be set to zero. An estimate of theta derived from a carefully executed drop-off study conducted by SFG is 0.35. As both NERA and SFG note, an estimate of

1 Australian Energy Market Commission; *National Electricity Rules Version 69;* cl 6.5.3 page 661 (pdf version).

2 *The National Electricity Law, a Schedule to the National Electricity (South Australia) Act 1996*; Schedule 2, Part 3, section 8.

3 Monkhouse, P. H.L. (1996); *The valuation of projects under the dividend imputation tax system;* Accounting & Finance, 36: 185–212.

4 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline (Appendices)*; December 2013, pages 136-180 (pdf version).

5 ACT; *Application by Energex Limited (Distribution Ratio (Gamma)) (No 3)(2010)ATPR 42-333; [2010] ACompt9*.

6 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA PowerNetworks and United Energy;* March 2015.

NERA; *Do imputation credits lower the cost of equity? Cross-sectional tests: A report for United Energy*: April 2015.

SFG Consulting*; Estimating gamma for regulatory purposes, Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy;* February 2015, paragraph 22, page 4.

theta derived from a drop-off study can provide an upwardly biased estimate of theta if short-term traders seeking to access imputation credits determine the behaviour of prices around ex-dividend days. So an estimate of theta of 0.35 is, from United Energy's perspective, conservative. [7]

United Energy considers that the AER's recent[8] approaches fail to provide unbiased estimates of the value that equity-holders place on imputation credits as the AER:

- Incorrectly asserts that estimates of theta constructed from listed equity must be paired with estimates of the distribution rate constructed from listed equity; [9]
- relies in part on an estimate of the distribution rate computed using listed equity only, when the AER's stated position is that a benchmark efficient network service provider need be neither listed nor large and listed;[10]
- uses redemption rates as estimates of theta, when in fact redemption rates provide no more than an upper bound for theta;
- uses equity ownership rates as estimates of theta, when equity ownership rates, like redemption rates, provide no more than an upper bound for theta;
- has exaggerated the problems associated with the use of market value studies to estimate theta, while understating the problems associated with the use of redemption rates and equity ownership rates to estimate theta;
- has dismissed evidence that indicates that the model that it uses to compute an estimate of the cost of equity, which presumes that the distribution of credits lowers the returns required on equity, does not work; and
- chooses a value for gamma of 0.40 that exceeds the rate at which credits created are redeemed of 0.31, assessed separately by both Neville Hathaway (Capital Research) and Simon Wheatley (NERA), and so violates the upper bound that this rate places on gamma.[11]

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7 NERA; *Do imputation credits lower the cost of equity? Cross-sectional tests: A report for United Energy*: April 2015, page 39.

SFG; *An appropriate regulatory estimate of gamma: Report for Jemena Gas Networks, ActewAGL, APA, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), ENERGEX, Ergon, Transend, TransGrid and SA Power Networks*; 21 May 2014, pages 31-32.

8 AER; *Draft decision for Ausgrid distribution determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

AER; *Draft decision for Directlink determination 2015-16 to 2019-10, Overview;* November 2014 (pdf version).

AER; *Draft decision for Endeavour Energy distribution determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

AER; *Draft decision for Essential Energy distribution determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

AER; *Draft decision for Jemena Gas Networks (NSW) Ltd, Access Arrangement 2015-20, Overview;* November 2014 (pdf version).

AER; *Draft decision for Transgrid transmission determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

9 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd, Access Arrangement 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

10 AER; *Final decision Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters;* May 2009, pages 80 and 105.

11 Hathaway, N.; *Imputation credit redemption ATO data 1988-2011: Where have all the credits gone*? Capital Research, September 2013, page 23.

1.2 Requirements of the rules and law

The key aspects of the NER and National Electricity Law **(NEL)** relating to gamma are:

- Rule 6.5.3 of the NER requires an estimate of γ (gamma), being "*the value of imputation credits*";
- Rule 6.5.2 of the NER, which relates to the rate of return, requires consistency between the approaches to estimating the rate of return and the value of imputation credits;
- As with all of its economic regulatory functions and powers, when assessing United Energy's proposal under the NER and the National Electricity Law (**NEL**), the AER is required to do so in a manner that will or is likely to contribute to the achievement of the NEO;
- To the extent that the AER's decision on the value to be adopted for gamma involves the exercise of discretion, then the AER must take into account the revenue and pricing principles in section 7A of the NEL.[12] The revenue and pricing principles include a provision that a service provider should be provided with a reasonable opportunity to recover at least its efficient costs, and that a price or charge for the provision of a direct control network service should allow for a return commensurate with the regulatory and commercial risks involved in providing the direct control network service to which that price or charge relates;
- United Energy considers that it is clear that what is required under the NER is an estimate of the value of imputation credits to investors. This interpretation is consistent with the broader regulatory framework and the task set by the NER to determine total revenue by reference to the various specified building blocks, as well as being consistent with past regulatory practice, and previous decisions of the Tribunal;
- This interpretation described above is one that best achieves the NEO, as it ensures that the adjustment for imputation credits in the taxation building block properly reflects the actual value of imputation credits to investors, not merely their notional face value or *potential* value. Accounting for gamma in this way ensures that the overall return received by investors (including the value that they ascribe to imputation credits) promotes efficient investment in, and use of, infrastructure, and so is in the long-term interests of consumers.

1.3 Proposal

United Energy proposes that the distribution rate be set at 0.70, theta at no higher than 0.35 and so gamma at no higher than 0.25. This proposal is consistent with the expert advice of Simon Wheatley (NERA) and Professor Stephen Gray (SFG).[13]

The correct approach to estimating gamma, which is the approach adopted by the United Energy in this proposal, is as follows:

- Gamma is estimated as the product of the distribution rate and the value of distributed imputation credits (theta), consistent with the requirements of the NER and NEL;

NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA Power Networks and United Energy; March 2015.

12 *NEL* s 16(2)(a)(i).

13 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA PowerNetworks and United Energy; March 2015.

SFG Consulting, *Estimating gamma for regulatory purposes*, Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015, paragraph 22, page 4.

- The distribution rate is computed using ATO data and data from the annual reports of the largest 20 ASX-listed companies provided by Associate Professor Martin Lally.[14] These data indicate that the distribution rate for a benchmark efficient entity will match, approximately, an estimate of the aggregate distribution rate computed using data for all firms of around 0.70;
- Theta is the value of distributed imputation credits to investors, consistent with the requirements of the NER, and is estimated using the best available market value studies. Market value studies estimate the value of imputation credits to investors from an examination of share price movements. The best estimates of theta from market value studies lie in the range of zero to 0.35;
- Equity ownership rates and credit redemption rates can only be used to provide an upper bound for gamma, and provide a check on a final point estimate – i.e. to confirm that the point estimate is not too high. These measures indicate that an upper bound for gamma is 0.31, and thus confirm that the estimate of gamma of no more than 0.25, on which we plan to rely, based on an analysis of ATO and annual report data and on market value studies, is not too high.

United Energy considers that its approach to determining gamma – which is fundamentally based on estimating the value of imputation credits to investors – is the best approach to achieving the NEO. This approach ensures that the adjustment for imputation credits in the taxation building block properly reflects the actual value of imputation credits to investors, not merely their notional face value or potential value. Accounting for gamma in this way ensures that the overall return received by investors (including the value that they ascribe to imputation credits) promotes efficient investment in, and use of, infrastructure, and so is in the long-term interests of consumers.

In its recent draft decision for Jemena Gas Networks (**JGN**), the AER uses an estimate of the distribution rate of 0.70, drawn from ATO data on both private and public (typically listed) firms, and an estimate of 0.80 drawn from ATO data on public firms only.[15] The reason why United Energy is proposing to rely on a value for the distribution rate of 0.70 is that:

- The AER's stated position is that a benchmark efficient network service provider need be neither listed nor large and listed;[16]
- An estimate of the distribution rate for private firms drawn from ATO data is 0.50, an estimate of the distribution rate for top-20 ASX-listed firms drawn from annual reports and provided by Associate Professor Martin Lally is 0.84 and an estimate of the distribution rate for public firms that are not top-20 ASX-listed firms, drawn from ATO data and Lally's data, is 0.70;[17] and
- Any reasonable weighted average of these estimates that takes into account the AER's stated position that a benchmark efficient entity need be neither listed, nor large and listed will not sit far from 0.70.

14 Lally, M., *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, Victoria University, Wellington, March 2014.

15 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

16 AER; *Final decision Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters;* May 2009, pages 80 and 105.

17 Lally, M., *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, Victoria University, Wellington, March 2014.

NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA PowerNetworks and United Energy;* March 2015.

In its recent draft decision for JGN (the **JGN Draft Decision**), the AER uses estimates of theta drawn from statistics on equity ownership, tax statistics and market value studies, with the estimates ranging from zero to one.[18] The reasons why United Energy is proposing a range for values of theta from zero to 0.35 are that:

- United Energy does not agree with the 'conceptual framework' adopted by the AER for estimating theta, and, in particular, the focus on utilisation evidence rather than market value evidence;
- Estimates of theta based on equity ownership rates or redemption rates will be upwardly biased and so will lead the AER to overestimate gamma and underestimate the return, exclusive of imputation credits, that investors require a benchmark efficient entity to earn. The under-compensation will invariably lead to under investment;
- To provide an acceptable overall return to equity holders, theta must be estimated as the value of distributed imputation credits to investors – it is the value of credits to investors that indicates the extent, if at all, to which the distribution of credits lowers the return that the market requires on an investment in the equity of a benchmark efficient entity;
- There are problems with some of the evidence on which the AER relies in the Guideline and in the JGN Draft Decision – for example, Neville Hathaway (Capital Research) has pointed out a number of serious problems with the work of Handley and Maheswaran (2008), and yet the AER still relies in part on the evidence that they provide on the redemption rate;[19] [20] Hathaway states that:

  "This paper should not be used for application to corporate and regulatory issues within Australia. The results are contrived as they are based on analyses of data that the authors themselves have created by their assumptions."

- The Tribunal has earlier concluded that redemption rates cannot be used to estimate theta but can be used only as an upper bound to check that estimates of theta obtained from an analysis of market prices are reasonable.
- We consider that the only source of evidence capable of providing reasonable estimates of the value of distributed imputation credits to investors is market value studies. Redemption rates and equity ownership rates can only provide upper bounds for theta.

[18] AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

[19] Hathaway, N., *Comment on: "A Measure of the Efficacy of the Australian Imputation Tax System" by John Handley and Krishan Maheswaran*; Capital Research, July 2010.

[20] John C Handley and Krishnan Maheswaran; *A Measure of the Efficacy of the Australian Imputation Tax System*; The Economic Record, Vol 84, No 264, March 2008, 82- 94.

2. Approach

As noted above, gamma is defined in the NER as the value of imputation credits. The initial theory upon which the NER is based was developed by Officer and the AER has asserted that its particular conceptual framework for gamma was developed by Officer but this is not in fact the case. As NERA explains, Officer, in his 1994 paper, defines gamma to be two quantities that will in general differ: [21]

- The proportion of credits created that are redeemed; and
- The value of a dollar of tax credits created to a representative shareholder.

The AER relies on the first definition of gamma and its advisor Associate Professor John Handley argues that the two definitions are not inconsistent with one another.[22] Handley's argument is incorrect as Associate Professor Martin Lally and NERA make clear.[23] In general, the value of a dollar of tax credits created to a representative shareholder will lie below the proportion of credits created that are redeemed and may well sit a substantial distance below. It is the value of a dollar of tax credits created to a representative shareholder, however, that will determine the impact of the distribution of credits on the return, exclusive of credits, that investors require on equity and it is this impact that is important in setting an appropriate rate of return for a regulated energy utility.

As noted above, the relevant valuation is arrived at by taking the product of the distribution rate and the value of a one-dollar credit distributed (theta). While the AER has used an economy wide distribution rate in the past and, in the absence of an energy network specific metric, we consider a value of 0.70 to be acceptable. NERA explains[24] that this parameter can vary across firms because it concerns the choices that companies may make about a range of factors concerning how they manage inflows and outflows of capital. In other words, NERA agrees with both Associate Professor John Handley and Associate Professor Martin Lally that the distribution rate is a firm-specific parameter.[25] On the other hand, NERA explains that a representative shareholder will place the same value on a one-dollar credit distributed no matter which firm provides the credit. In other words, NERA agrees with both Handley and Lally that theta is not a firm-specific parameter but must take on a single value. [26]

2.1 Estimating the distribution rate

The AER argues in the JGN Draft Decision that it would be wrong to pair an estimate of theta constructed using listed equity prices with an estimate of the distribution rate constructed from tax statistics for all firms.[27] So the AER, in the JGN Draft Decision, pairs estimates of theta constructed using listed equity prices with

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21 Lally, M., *Estimating gamma*; Victoria University of Wellington, 25 November 2013.

NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy*; March 2015, page i.

22 John C Handley*; Advice on the Value of Imputation Credits;* 29 September 2014.

23 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy; March 2015, page i.

24 NERA *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy; March 2015, page ii.

25 John C Handley*; Advice on the Value of Imputation Credits;* 29 September 2014.

Lally, M., *Estimating gamma*; Victoria University of Wellington, 25 November 2013.

26 John C Handley*; Advice on the Value of Imputation Credits;* 29 September 2014.

Lally, M., *Estimating gamma*; Victoria University of Wellington, 25 November 2013.

27 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

estimates of the distribution rate constructed from tax statistics for listed equity. The AER's argument, however, makes no sense because theta is not a firm specific parameter. A representative investor will not place one value on a dollar of tax credits provided by a listed firm and a different value on a dollar of credits provided by an unlisted firm. It follows that in computing an estimate of the distribution rate for a benchmark efficient entity, the AER need not concern itself about whether the estimate of theta that it plans to employ was constructed using data for listed or unlisted firms.

The Guideline states that the AER would apply a distribution rate (or payout ratio) of 0.70 and the Tribunal has endorsed a rate of 0.70.[28] [29] A rate of 0.70 is based on an examination of tax statistics that use all firms – both private and public – and recent empirical evidence continues to support a distribution rate of around 0.70.[30]

The distribution rate, however, is a firm specific parameter. One firm, after weighing up the costs and benefits of distributing credits, may decide to distribute all of the credits that have been created over some period. A second firm may rationally decide to distribute no credits – perhaps because it wishes to use internally generated funds to finance new projects. Without some guidance about the identity of a benchmark firm, of course, an appropriate estimate of the distribution rate will continue to be one based on aggregate tax statistics. The AER, though, offers some guidance. The AER's conceptual definition of the benchmark entity is a pure play, regulated energy network business operating within Australia.[31] The AER in its 2009 *WACC Review Final Decision* provides an analysis of what characteristics a benchmark efficient entity will display and states that:

> *"The AER has reviewed the Competitive Neutrality Principles Agreement and notes that this Agreement does not explicitly state that a private sector organisation is a stock market listed business. Nor does the agreement define the nature of private ownership."*
>
> *"the AER does not agree that a benchmark efficient NSP be defined as a large, stock market listed NSP and is a settled concept."*

This statement indicates that when determining the distribution rate for a benchmark efficient entity significant weight should be placed on estimates of the rate for companies that are not listed companies and are not large ASX-listed companies.

NERA provides an estimate of the distribution rate for private firms drawn from ATO data of 0.50, Associate Professor Martin Lally provides an estimate of the distribution rate for top-20 ASX-listed firms drawn from annual reports of 0.84, and NERA computes an estimate of the distribution rate for public firms that are not top-20 ASX-listed firms, using ATO data and Lally's data, of 0.70.[32] As noted by NERA,[33] the AER's views of what characteristics a benchmark efficient entity will display indicate that in determining a distribution rate,

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28 The payout ratio would be estimated using the cumulative payout ratio approach. The cumulative payout ratio is an estimate of the average payout rate from 1987, when the modern imputation system began, to the latest year for which tax data are available. Based on current evidence, this leads to an estimate of 0.70. AER, *Better Regulation: Rate of Return Guideline*, December 2013, page 23 (pdf version).

29 *Application* by *Energex Limited (Distribution Ratio (Gamma))* (No 3) [2010] ACompT 9 (24 December 2010), paragraph 4.

30 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy*; March 2015.

31 AER, *Better Regulation: Rate of Return Guideline*, December 2013, page 7 (pdf version).

32 Lally, M., *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, Victoria University, Wellington, March 2014.

NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA PowerNetworks and United Energy;* March 2015.

33 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Powercor, SA PowerNetworks and United Energy;* March 2015, page 12 – 13.

'*significant weight should be placed on estimates of the rate for companies that are not large ASX-listed companies.*' It follows that any reasonable weighted average of these estimates that takes into account the AER's stated position that a benchmark efficient entity need be neither listed, nor large and listed will not sit far from 0.70.

So even though the distribution rate is a firm specific parameter, the evidence indicates that an estimate of the distribution rate for a benchmark efficient entity will match, approximately, the distribution rate for all firms constructed from tax statistics.

Accordingly, the market-wide distribution rate of 0.70 should be applied. It would be an error to apply a higher distribution rate based on data from a limited set of businesses.

2.2 Value of distributed credits (theta)

2.2.1 Definition of theta

United Energy notes that the AER has recently adopted a different definition of theta to that adopted in the Guideline.

In the Guideline the AER defined theta as:[34]

> *"…the extent to which investors can use the imputation credits they receive to reduce their personal tax."*

This approach implies that gamma would measure the proportion of total company tax payments accounted for by imputation credits that are redeemed (or that can be redeemed) by investors. Such an approach would have been contrary to the requirements of the NER and a departure from conventional regulatory practice which is to define gamma as the *value* of imputation credits to investors.

The AER appears to recognise that theta should reflect the value of imputation credits to investors, not just the proportion of credits that are redeemed or that can be redeemed by investors. The AER defines theta as:[35]

> *"the utilisation value to investors in the market per dollar of imputation credits distributed".*

The "utilisation value" definition is consistent with the advice provided to the AER by Associate Professor Handley. Handley's report states (under the heading *Interpretation of the 'Second Parameter'*):[36]

> *"It is clear from Monkhouse (1996) that the second parameter refers to the utilisation value of a distributed imputation credit. This parameter is commonly denoted and called theta θ. It is also clear from the post-tax basis of the regulatory framework (and the Officer and Monkhouse WACC frameworks) that the item of interest is more precisely described as the after-company-before-personal-tax utilisation value of a distributed imputation credit."*

Handley also observes that:[37]

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34 AER, *Better Regulation: Explanatory Statement Rate of Return Guideline*, December 2013, page 159 (pdf version).

35 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-17 (pdf version).

36 John C Handley*; Advice on the Value of Imputation Credits;* 29 September 2014; page 17.

37 John C Handley; *Advice on the Value of Imputation Credits;* 29 September 2014, page 9.

> *"Implicit in Officer's WACC framework (and the standard classical WACC framework) is the notion of market value and so the relevant measure of utilisation value is that value as determined by the market."*

However the AER qualifies this definition by noting that, consistent with the building block framework, theta should reflect the *before-personal-tax and before-personal-costs value* of imputation credits to investors.[38] The AER then says that this qualified version of its definition of theta is practically equivalent to the definition adopted in the Guideline, because once the effects of personal tax and personal costs are excluded, an investor that is eligible to fully utilise imputation credits should value each dollar of imputation credits received at one dollar.[39] There are two difficulties with this. The first is that, as discussed below, there are good reasons why investors will not value each dollar of imputation credits received at one dollar. The second is that there is no proper basis for excluding the effects of personal tax and costs.

The AER's new qualified definition of theta is novel. United Energy is not aware of theta having previously been defined as the *before-personal-tax and before-personal-costs value* of imputation credits to investors. It is certainly true that theta must reflect the value of imputation credits to investors. However it is unusual for theta to be defined in a way that excludes the effect of certain factors that may impact on value (and which will be reflected in market value measures), such as personal costs.

United Energy does not agree with the AER's revised definition of theta (i.e. the qualified version which ignores the effects of personal costs and taxation). While United Energy agrees that theta must reflect the value of distributed imputation credits, we do not agree that this value should be assessed before the effects of personal costs and taxation.

As stated in the expert report of Professor Stephen Gray, gamma (and therefore theta) must reflect the value of imputation credits to investors. United Energy considers that this is clear from the NER, which refer to the "value of imputation credits". Furthermore, this approach to estimating gamma (and theta) will best promote the NGO, as it provides for overall returns which promote efficient investment.

As noted by Gray:[40]

> *"Under the building block approach, the regulator makes an estimate of gamma and then reduces the return that is available to investors from dividends and capital gains from the firm accordingly. In my view, it is clear that this is consistent with a value interpretation. If the value of foregone dividends and capital gains is greater than the value of received imputation credits, the investors will be left under-compensated, and vice versa."*

If the value of imputation credits is assessed before personal costs and taxation (i.e. ignoring these costs to investors), the overall return to equity-holders will be less than what is required to promote efficient investment. Quite simply, there will be certain costs incurred by investors – such as transactions costs involved in redeeming credits – that are not accounted for.

The value of imputation credits to investors will necessarily reflect (and will be net of) any transactions costs or other personal costs incurred in redeeming credits. Such costs cannot simply be assumed away. If such costs are assumed away, then the resulting estimate of theta (and therefore gamma) will overstate the true value of imputation credits to investors. Such an approach accords with the manner in which the returns on debt and equity are estimated using bond and share prices that are not adjusted for transactions costs. This approach is also consistent with the manner in which theta should be estimated.

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38 See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-36 (pdf version).

39 See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-36 (pdf version).

40 SFG*; Estimating gamma for regulatory purposes;* Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015, paragraph 12, page 2.

Therefore, United Energy proposes that the estimate of theta must simply reflect the value of imputation credits to investors. It would be an error to seek to estimate theta as a hypothetical before-personal-tax and before-personal-costs value.

2.2.2 Types of evidence relied on by the AER to estimate theta

There are three types of evidence relied on by the AER in relation to theta. These are, in order of weight given by the AER:

- Equity ownership rates (i.e. the share of Australian equity held by domestic investors);
- Redemption rates from tax statistics; and
- Market value studies.

The AER no longer relies on the 'conceptual goalposts' method, which is referred to in the Guideline. Associate Professor Handley advises that the conceptual goalposts approach is not a reasonable approach.[41]

This section will address the relevance of each of the forms of evidence relied on by the AER recently, in terms of their relevance to the task of estimating the value of imputation credits to investors.

2.2.2.1 Equity ownership rates

The AER relies on the equity ownership approach to provide direct evidence about the value of distributed imputation credits. The AER states that its estimate of the value of distributed imputation credits "primarily reflects" the evidence from the equity ownership approach.[42]

In relying on equity ownership rates to provide direct evidence about the value on distributed imputation credits, the AER, at least implicitly, assumes that:

- All domestic investors are eligible to utilise imputation credits, while foreign investors are not (**Assumption 1**); and
- Eligible investors (i.e. domestic investors) value imputation credits at their full face value because each dollar of imputation credits received can be fully returned to them in the form of a reduction in tax payable (**Assumption 2**).[43]

Both of these assumptions are incorrect.

Assumption 1 is known to be incorrect due to certain tax rules which prevent redemption of credits by domestic investors in some circumstances. In particular, as has been acknowledged by the AER, the 45-day holding rule affects the eligibility of short-term investors to claim imputation credits.[44]

The AER has sought to dismiss the impact of tax rules affecting the eligibility of domestic investors to redeem imputation credits by saying that:[45]

41 John C Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, page 31.

42 See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-13 (pdf version).

43 See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-18 (pdf version).

44 See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-53 (pdf version).

> *"…we do not consider that there is clear evidence as to the effect that these rules have or should be expected to have."*

Even if this statement was correct (which it is not), United Energy does not consider that there must be "clear evidence" as to the effect of particular tax rules in order for these to render equity ownership rates an inappropriate guide to a value for theta. The fact is that these rules exist and they will affect the eligibility of certain domestic investors to redeem imputation credits, and therefore mean that theta cannot be equated to the rate of domestic ownership.

In any event, the fact that the redemption rate indicated by tax statistics is significantly below the domestic equity ownership rate strongly indicates that these tax rules (and possibly other factors as discussed below) are affecting domestic investors' ability to redeem imputation credits. The redemption rate indicated by tax statistics is approximately 0.45, which is well below the domestic equity ownership rate for all equity.

As for Assumption 2, there are a number of reasons why even eligible investors will not value imputation credits at their full face value. These include transactions costs associated with the redemption of imputation credits and portfolio effects (discussed below).

Given that neither of these assumptions holds, equity ownership rates cannot be used to provide direct evidence on the value of distributed imputation credits. Equity ownership rates will only indicate what fraction of investors ***may*** be eligible to redeem imputation credits and so may place ***some*** value on imputation credits. Certainly theta cannot be higher than the domestic equity ownership rate, since foreign investors cannot place any value on imputation credits. However the domestic equity ownership rate cannot be used to provide direct evidence about the value of imputation credits, because it does not account for the fact that:

- Some domestic investors may be ineligible to redeem imputation credits; and
- Even eligible investors will not value imputation credits at their full face value.

Therefore, concluding that equity ownership rates provide direct evidence on the value of imputation credits (or evidence from which a value can be inferred) and giving these measures the primary role in the determination of a point estimate for theta would be erroneous.

[45] See for example, AER; *Draft Decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-53 (pdf version).

2.2.2.2 Tax statistics

The AER also appears to have relied on redemption rates from tax statistics to provide direct evidence on the value of distributed imputation credits. In particular, the AER has placed "some reliance" on tax statistics in estimating theta, but less reliance than placed on equity ownership rates.[46]

Redemption rates from tax statistics will be closer to the true value of a one-dollar distributed credit than domestic equity ownership rates. This is because redemption rates account for certain factors impacting on the value of imputation credits which are not accounted for in the domestic equity ownership rate – for example, redemption rates will reflect the fact that some domestic investors are not eligible to redeem credits due to the 45-day holding rule, and that some investors face costs and other barriers that deter them from utilising imputation credits.

However redemption rates from tax statistics also cannot be used to provide direct evidence on the value of distributed imputation credits, because redemption rates do not take into account the fact that investors may value redeemed credits at less than their full face value. There are a number of reasons why investors will not value imputation credits at their full face value, including:

- **Transactions costs**. Transactions costs associated with the redemption of credits may include the costs of keeping records and following administrative processes. Unlike imputation credits, cash dividends are paid directly into bank accounts. The transactions costs associated with redeeming imputation credits will tend to reduce their value to investors (meaning that the value of credits redeemed will be less than their face value) and may also dissuade some investors from redeeming credits (thus reducing the redemption rate);
- **Time value of money**. There will typically be a significant delay (which can be years) between credit distribution and the investor obtaining a tax credit. This may be a period of several years in some cases, for example where credits are distributed through other companies or trusts, or where the ultimate investor is initially in a tax loss position. Over this period, the value of the imputation credit to the investor may be expected to diminish, due to the time value of money;
- **Portfolio effects**. Since imputation credits are of some use to domestic investors, domestic investors will rationally harvest credits up to the point where the costs of harvesting credits match the benefits of doing so. The ATO places limits on the extent to which domestic investors can harvest imputation credits without being exposed to the risks associated with holding domestic equities. So harvesting credits necessarily requires that domestic investors place a larger fraction of their wealth in domestic equities than they would in the absence of an imputation system. The additional risk that domestic investors must bear by placing a larger fraction of their wealth in domestic equities is one of the costs that they face in harvesting imputation credits. To the extent that an investor reduces the value of their overall portfolio simply to increase the extent to which they can redeem imputation credits, this lost value will be reflected in a lower valuation of the imputation credits. These portfolio effects are further explained in the expert report of Professor Stephen Gray. [47]

Redemption rates from tax statistics can only provide an upper bound for theta. Theta clearly cannot be higher than the proportion of credits that are redeemed by investors, since credits that will never be redeemed have no value. However, theta may be (and for the reasons referred to above, is likely to be) less than the redemption rate.

Therefore, giving redemption rates a direct role in determining a point estimate for theta would be an error.

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[46] See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 4-17 (pdf version).

[47] SFG; *Estimating gamma for regulatory purposes*, Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015; page 17.

2.2.2.3 Market value studies

The AER places 'less weight' on market value studies, as it considers that these studies have a number of limitations.

The limitations identified by the AER are:[48]

- The results of these studies can reflect factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate;
- These studies can produce nonsensical estimates of the utilisation rate – that is, estimates that are greater than one or less than zero;
- The results of these studies might not be reflective of the value of imputation credits to investors in the market as a whole;
- These studies can be data intensive and employ complex and sometimes problematic estimation methodologies; and
- Dividend drop off studies provide an estimate of the value of a package of dividends and imputation credits, and there is no consensus among experts on how to separate the value to the market of dividends from the value to the market of imputation credits (this is referred to as the 'allocation problem').

In effect, the AER is raising two concerns in relation to market value studies:

1. Whether market value studies are measuring the right thing (reflected in the first point above); and
2. Whether the methodology employed in market value studies is sufficiently robust such that these studies will accurately measure that thing (reflected in the other four points).

Each of these concerns is addressed below.

1. Are market value studies capturing the right concept and targeting the right value?

The first concern flows from the AER's conceptual definition of theta, which seeks to exclude the effects of personal taxes and personal costs. Since market values will reflect the impact of personal costs and taxation, the AER considers that a market value approach may not be compatible with its revised definition of theta.

As noted above, United Energy does not agree with the AER's revised definition of theta (i.e. the qualified version which ignores the effects of personal costs and taxation). Theta must reflect the value of distributed imputation credits to investors, which will necessarily reflect (and will be net of) any transactions costs or other personal costs incurred in redeeming credits.

If the conventional definition of theta is adopted – i.e. theta is defined to be the value of distributed imputation credits to investors – then the use of market value studies is entirely compatible with this definition. Market value studies will deliver estimates of the value of imputation credits to investors, as reflected in the market prices of traded securities.

Indeed, of the three approaches that have been identified by the AER to estimate theta, only market value studies offer a method of estimating theta in a way that is consistent with the NER. As discussed above, both equity ownership rates and redemption rates from tax statistics will overstate the true value of theta, since they will not reflect certain factors which affect the value of imputation credits to investors.

[48] See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014, page 4-22 (pdf version).

The use of market value studies – and more generally, the adoption of a market value measure – is also consistent with how other rate-of-return parameters are estimated.[49] Other rate-of-return parameters such as the market risk premium and debt risk premium are estimated based on the return required by investors as reflected in market prices. The market value measures of these parameters are not adjusted to account for personal costs or other factors which may be reflected in market prices.

2. Do market value studies accurately measure that thing?

The AER has listed several methodological concerns with market value studies.

As an example, the AER states that: [50]

"*The limitations of implied market value studies include:*

- *These studies can produce nonsensical estimates of the utilisation rate; that is, greater than one or less than zero."*

This statement suggests that the AER has strong prior beliefs about the value of theta and is not open to the idea that theta may be approximately zero. In other words, the statement suggests that the AER is not entirely willing for the data to direct its choice of a value for theta. To see this, note that one argument to which Lally (2013) and NERA (2014) refer is the argument that, because Australia is a small open economy, a representative individual will most closely resemble a foreign investor to whom imputation credits are of little use, and so theta should be approximately zero. [51] If this argument were to be correct and theta were to be zero, then the mean of an unbiased estimator for theta would be zero. If, however, the estimator were to be symmetrically distributed, then on average one half of the estimates produced using the estimator would be negative and would be deemed to be 'nonsensical' by the AER. Thus, an unwillingness to consider estimates of theta that are negative implies that the AER is unwilling to contemplate the idea that theta may be close to zero.

Lajbcygier and Wheatley (2012) and NERA (2013) test the version of the Sharpe-Lintner Capital Asset Pricing Model (CAPM) that the AER uses to set the return on equity and report estimates of theta that are negative and which the AER deems to be 'nonsensical', and Lally (2013) deems to be 'implausible'. [52] Lally suggests that the results must reflect:

- An artefact of the methodology;
- Erroneous estimates of variables such as betas; or
- Simply data input errors.

The AER similarly states in its 2013 guideline that: [53]

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49 As noted above, the NER requires the rate of return and the value of imputation credits to be measured on a consistent basis (see NER, rule 6.5.2(d)(2)).

50 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement, 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

51 Lally, M., *Estimating gamma*; Victoria University of Wellington, 25 November 2013.

NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy*; March 2015.

52 Lajbcygier , P. and S. M. Wheatley, *Imputation credits and equity returns*, Economic Record, 2012, pages 476-494.

Lally, M., *Estimating gamma*; Victoria University of Wellington, 25 November 2013.

NERA; *Imputation credits and equity prices: A report for the Energy Networks Association*, October 2013.

53 AER, *Better Regulation, Explanatory Statement Rate of Return Guideline (Appendices)*, December 2013, pages 173-174.

'We consider the large negative results from the NERA equity returns study are implausible, and indicate this study is not reliable. This accords with Lally's advice in his expert report.'

We note, by way of background, that the AER and its advisor Handley have stated that they endorse the use of yield studies like those that Allen and Michaely (2003) cite that search for a relation between yields and returns in determining whether cash dividends should be fully valued when using the CAPM to estimate the cost of equity. [54] It would be reasonable to assume, therefore, that the AER and Handley would endorse the use of similarly constructed studies, like those of Lajbcygier and Wheatley (2012) and NERA (2013), that examine whether imputation credits distributed should be assigned a value when using the CAPM to estimate the cost of equity. [55]

NERA's empirical work, like the empirical work of Lajbcygier and Wheatley (2012), uses the method of Fama and MacBeth (1973). [56] Among the papers that Allen and Michaely (2003) cite prominently are papers authored by Litzenberger and Ramaswamy (1979), Miller and Scholes (1982) and Kalay and Michaely (2000) and all these authors use the method of Fama and MacBeth – either in its original form or using the modification that Litzenberger and Ramaswamy suggest that one employ. [57]

NERA, therefore uses a standard methodology to estimate theta. Morover, what Lally does not say is that the results of Lajbcygier and Wheatley and NERA have been independently verified by Siau, Sault and Warren (2013) of the Australian National University in a working paper to which NERA referred in its 2013 submission on behalf of the Energy Networks Association. [58] The working paper has subsequently been published in the journal Accounting and Finance. [59]

What Lally also does not say is that while estimates of theta that NERA produces use the Sharpe-Lintner Capital Asset Pricing Model (CAPM) – the model that the AER uses – are significantly below zero, estimates that use the Black CAPM – a model on which we suggest that the AER place more reliance – do not lie significantly below zero and so should not be deemed 'implausible'.

As another example, the AER states that: [60]

> *"The limitations of implied market value studies include that:*

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54 Allen, F. and R. Michaely, *Payout policy*, In the Handbook of Economics and Finance, Volume 1A, Corporate Finance, edited by George Constantinides, Milton Harris, and Rene Stulz, 2003, Chapter 7.

55 Lajbcygier , P. and S. M. Wheatley, *Imputation credits and equity returns*, Economic Record, 2012, pages 478.

NERA; *Imputation credits and equity prices: A report for the Energy Networks Association*, October 2013.

56 Fama, E. F. and J. D. Macbeth, *Risk, return and equilibrium: Empirical tests*, Journal of Political Economy, 1973, pages 607-636.

Lajbcygier , P. and S. M. Wheatley, *Imputation credits and equity returns*, Economic Record, 2012, pages 478.

57 Fama won the Nobel Prize in 2013, Miller in 1990 and Scholes in 1997.

Allen, F. and R. Michaely, *Payout policy*, In the Handbook of Economics and Finance, Volume 1A, Corporate Finance, edited by George Constantinides, Milton Harris, and Rene Stulz, 2003, Chapter 7.

Fama, E. F. and J. D. Macbeth, *Risk, return and equilibrium: Empirical tests*, Journal of Political Economy, 1973, pages 607-636.

Kalay, A. and R. Michaely, *Dividends and taxes: A reexamination*, Financial Management 29, 2000, pages 55-75.

Litzenberger, R. and K. Ramaswamy, *The effects of personal taxes and dividends on capital asset prices: Theory and empirical evidence*, Journal of Financial Economics, 1979, pages 163-195.

Miller, Merton and Myron Scholes, *Dividends and taxes: Empirical evidence*, Journal of Political Economy 90, 1982, pages 1118-1141.

58 Siau, K-W., S. Sault and G.J. Warren, *Are imputation credits capitalised in stock prices?* Working paper, ANU, June 2013.

59 Siau, K-W., S. Sault and G.J. Warren, *Are imputation credits capitalised in stock prices?* Accounting and Finance, March 2015, pages 241-277.

60 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

- *These studies can be data intensive and employ complex and sometimes problematic estimation methodologies."*

A general rule in statistics is that more data is to be preferred to less unless there is something wrong with the data and so it is difficult to see that a limitation of a study is that it is data intensive. A study may use a complex method (whether a method is complex is, of course, subjective) because the method represents the best method that one can use. So, as long as the method used is transparent, it is also difficult to see that a limitation of a study is that it uses a complex method. If a study uses an estimation methodology that is problematic, then, of course, there will be limitations to the study. It is likely to be the case, though, that all estimation methodologies are problematic in some way and so the fundamental issue will be how problematic one methodology is relative to another.

One of the studies on which United Energy relies is the drop-off study that Professor Stephen Gray has executed. The methodology used in Gray's study is the product of a consultative development process involving the AER and several regulated businesses and overseen by the Tribunal in the *Energex* review. The methodology used in Gray's study was designed specifically to overcome methodological shortcomings of previous studies (e.g. shortcomings in the methodology employed by Beggs and Skeels (2006), which were identified by the Tribunal in the *Energex* review). In accepting the conclusions of Professor Gray's study, the Tribunal expressed confidence in those conclusions in light of the careful scrutiny to which the methodology had been subjected, and the way in which it had been designed to overcome shortcomings of previous studies.[61]

Professor Gray notes that the dividend drop-off literature has evolved over time, and that the SFG studies use current state-of-the-art techniques. Gray explains:[62]

> *"In relation to dividend drop-off studies, I first note that the dividend drop-off literature has evolved over time, as do all areas of scientific investigation. This evolution has seen the development of different variations of the econometric specification, different variations of regression analysis, and different types of sensitivity and stability analyses. It has also seen material growth in the available data. The SFG studies use the latest available data, and they apply a range of econometric specifications, regression analysis and sensitivity and stability analyses that have been developed in the literature. The SFG estimate of 0.35 is based on this comprehensive analysis. It is not as though the SFG studies use one of the reasonable approaches and other studies use different reasonable approaches. The SFG studies are comprehensive state-of-the-art studies."*

Box 1 below outlines the process by which the methodology used in Professor Gray's study was developed, and the conclusions of the Tribunal in relation to that methodology. In light of this, it cannot be said that Gray's study shares the same methodological issues as previous market value studies. Rather, this study was specifically designed to overcome the shortcomings of previous studies.

As a third example, the AER states that: [63]

"*The limitations of implied market value studies include...*

- *The results of these studies might not be reflective of the value of imputation credits to investors in the market as a whole."*

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61 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [22].

62 SFG; *Estimating gamma for regulatory purposes*, Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015, paragraph 177 page 36.

63 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

Box 1: Key conclusions of the Tribunal in Energex in relation to the SFG methodology

- In Application by Energex Limited (No 2) [2010] ACompT 7, the Tribunal had before it two market value studies which produced different estimates of theta – a study by Beggs and Skeels (2006) and a study by SFG (2010) which sought to replicate the Beggs and Skeels (2006) methodology. The Tribunal identified shortcomings in the methodology used in both studies and observed that the results of both studies should be treated with caution.
- The Tribunal therefore sought a new "state-of-the-art" dividend drop-off study.[64] To this end, the Tribunal directed that the AER seek a re-estimation by SFG of theta using the dividend drop-off method, but without the constraint that the study replicates the Beggs and Skeels (2006) study. The Tribunal encouraged the AER to seek expert statistical or econometric advice to review the approach prior to the estimation proceeding and to consider any possible enhancements to the dataset. It was said that the new study should employ the approach that is agreed upon by SFG and the AER as best in the circumstances.
- The terms of reference for the new study were settled between the AER and the businesses involved in the Energex review (Energex, Ergon and ETSA Utilities), with oversight from the Tribunal. The AER and the businesses also had the opportunity to comment on a draft of the report, and SFG's responses to those comments are incorporated in the final report.
- In submissions to the Tribunal, the AER raised eight "compliance" issues with the final SFG (2011) study – these were perceived issues of non-compliance by SFG with the agreed terms of reference. The Tribunal was not concerned by any of these issues and considered that they raised no important or significant questions of principle. The Tribunal concluded that any departures from the agreed terms of reference were justified, or even necessary and observed that calling them "major compliance issues" was unnecessarily pejorative.[65]
- The Tribunal was ultimately satisfied that the procedures used by SFG (2011) to select and filter the data were appropriate and did not give rise to any significant bias in the results obtained from the analysis. It was also not suggested by the AER that the data selection and filtering techniques had given rise to any bias.[66]
- In relation to the model specification and estimation procedure, the Tribunal concluded:[67]

  "In respect of the model specification and estimation procedure, the Tribunal is persuaded by SFG's reasoning in reaching its conclusions. Indeed, the careful scrutiny to which SFG's report has been subjected, and SFG's comprehensive response, gives the Tribunal confidence in those conclusions. In that context, the Tribunal notes that in commissioning such a study, it hoped that the results would provide the best possible estimates of theta and gamma from a dividend drop-off study. The terms of reference were developed with the intention of redressing the shortcomings and limitations of earlier studies as far as possible."

- Ultimately, the Tribunal was satisfied that the SFG (2011) study was the best study available at that time for the purposes of estimating gamma in accordance with the Rules.[68] The Tribunal did not accept the submission of the AER that either minor issues in the construction of the database or econometric issues would justify giving the SFG study less weight and earlier studies some weight.

The possibility that the results of drop-off studies might not be reflective of the value of credits to investors in the market as a whole – has previously been considered and addressed by Professor Stephen Gray. The issue is again addressed in Gray's most recent report.[69] The issue is whether estimates of theta from drop-

64 *Application by Energex Limited (No 2)* [2010] ACompT 7, [146]-[147].

65 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [18].

66 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [19].

67 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [22].

68 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [29].

69 **See note Error! Bookmark not defined..** SFG; *Estimating gamma for regulatory purposes*, *Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid,*

off studies reflect the value of credits to investors in the market as a whole or whether there may be some impact on drop-off estimates of theta from 'abnormal trading' around ex-dividend days. Gray notes that to the extent this issue is material it would result in the dividend drop-off (and therefore the theta estimate) being higher than it otherwise would be.[70] This is because any increase in trading around ex-dividend days would be driven by a subset of investors who trade shares to capture the dividend and imputation credit and who are therefore likely to value imputation credits highly (i.e. higher than the average investor). These investors tend to buy shares shortly before the shares go ex-dividend (which pushes up the share price) and tend to sell shortly thereafter (which pushes down the share price) – the overall effect of which is to increase the size of the price drop-off.

As a fourth and final example, the AER states that: [71]

"*The limitations of implied market value studies include:...*

- *regarding dividend drop off studies, it is only the value of the combined package of dividends and imputation credits that can be observed in the market, and there is no consensus among experts on how to separate the value to the market of dividends from the value to the market of imputation credits (this is referred to as the 'allocation problem').*"

The allocation problem has also previously been considered and addressed by Professor Gray and is again addressed in Gray's most recent report.[72] Professor Gray notes that empirical evidence provides a very clear and consistent view of the combined value of cash and imputation credits.[73] The evidence indicates that the combined value is one dollar. The relevant evidence includes the recent studies by SFG (2011 and 2013) and Vo et al (2013). An allocation can be made based on this clear evidence as to the combined value of the cash/credit package.

In summary, the set of 'limitations' referred to by the AER do not provide a justification for placing limited weight on the market value studies upon which United Energy relies. The AER and its advisors have misrepresented the results of the tests that NERA has supplied.[74] In addition, several of the limitations to which the AER points do not apply to the SFG study on which United Energy in part relies, and the other concerns have been comprehensively addressed by Professor Gray.[75]

Market value studies should be the primary source of information on what value should be chosen for theta. Equity ownership rates and redemption rates should only be used to check that the estimates produced by market value studies do not violate the upper bounds that the rates place on theta. By placing only limited weight on market value studies in estimating theta the AER has erred. United Energy considers the approach adopted by the AER to be incorrect.

Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015, paragraph 185, page 38.

70 SFG; *An appropriate regulatory estimate of gamma*, Report for Jemena Gas Networks, ActewAGL, APA, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), ENERGEX, Ergon, Transend, TransGrid and SA Power Networks; May 2014, paragraphs 150-153, pages 31 - 32.

71 AER; *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangements 2015-20, Attachment 4 – Value of imputation credits;* November 2014 (pdf version).

72 SFG; *Estimating gamma for regulatory purposes*, Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausnet Services Directlink, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), Citipower, Powercor, ENERGEX, Ergon, SA Power Networks, Australian Gas Networks and United Energy; February 2015, paragraph 185, page 38.

73 SFG; *An appropriate regulatory estimate of gamma*, Report for Jemena Gas Networks, ActewAGL, APA, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), ENERGEX, Ergon, Transend, TransGrid and SA Power Networks; May 2014, paragraphs 158-163, pages 32 - 33.

74 NERA; *Imputation credits and equity prices: A report for the Energy Networks Association*, October 2013.

75 SFG; *An appropriate regulatory estimate of gamma*, Report for Jemena Gas Networks, ActewAGL, APA, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), ENERGEX, Ergon, Transend, TransGrid and SA Power Networks; May 2014, paragraphs 150-153, pages 31 - 32.

2.3 Estimates of theta

2.3.1 Estimates of the equity ownership rate relied upon by the AER

Again, United Energy believes that an estimate of the rate at which domestic investors own domestic equity should only be used to check that estimates of theta produced by market value studies do not violate the upper bound the estimate places on theta. United Energy does not believe that equity ownership rates should be used directly to estimate theta.

Setting this fundamental issue aside, United Energy considers that the AER has erred in its construction of ranges for the equity ownership rate.

The AER has recently concluded that a reasonable estimate of the equity ownership rate is between:

- 0.55 and 0.70, if all equity is considered; and
- 0.40 and 0.60, if only listed equity is considered.

However these ranges were not supported by the AER's analysis of equity ownership statistics. The AER's analysis – based on a refinement of the ABS dataset to focus on types of equity considered most relevant to the benchmark entity – indicates:[76]

- The equity ownership rate for listed equity is currently around 0.44[77], and it has averaged approximately 0.43 over the past five years. At no time since June 1988 (the period covered by the ABS dataset) has the equity ownership rate for listed equity reached 0.60, and for most of that period it has remained below 0.50. In other words, there is no support for the upper end of the AER's 0.40 to 0.60 range and the 0.60 must be reduced even if one adopts the data sources that the AER advocates one use; and
- The equity ownership rate for listed and unlisted equity is currently around 0.59, and it has averaged approximately 0.57 over the past five years. At no time since June 1988 (the period covered by the ABS dataset) has the equity ownership rate for all equity reached 0.70, and on only a few occasions has it exceeded 0.60. Again there is insufficient evidence to support an upper bound to the range of as high as 0.70.

Table 2.1 below shows the domestic equity ownership rate as at September 2014 (the most recent period for which data are available), and for the same month in each of the previous four years. This shows the proportion of the equity stock held by domestic investors at the relevant points in time, for listed equity and all equity respectively. These calculations are based on the AER's refined methodology, as recently described.[78]

To the extent that equity ownership rates are relevant at all to the estimation of theta, the only relevant measure is the current domestic equity ownership rate – that is, the proportion of the equity stock currently held by domestic investors. The current equity ownership rate indicates the maximum proportion of current investors in the benchmark business who ***may*** be eligible to redeem imputation credits and who may therefore place ***some*** value on those credits. Historical equity ownership rates are of no relevance in the context of considering the eligibility of current investors to redeem imputation credits.

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76 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd Access arrangement, 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 57 (pdf version).

77 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd Access arrangement, 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 59, footnote 197 (pdf version).

78 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd Access arrangement, 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 56 (pdf version).

It is not appropriate to simply refer to a wide range of estimates for the equity ownership rate based on historical data, in circumstances in which the current rate is clearly observable. Such an approach would be in error.

Table 2.1: Domestic equity ownership rate, based on AER refined methodology

	Listed equity	All equity
September 2010	0.45	0.57
September 2011	0.39	0.55
September 2012	0.40	0.56
September 2013	0.44	0.59
September 2014	0.44	0.59

Source: ABS, Australian National Accounts: Finance and Wealth, September 2014 (Cat no. 5232.0), table 47, 48.

If equity ownership rates are to be used, a current point estimate must be observed from the ABS dataset. As noted above, the AER's analysis indicates that the current domestic equity ownership rate is 0.44 for listed equity and 0.58 for all equity.

2.3.2 Estimates from tax statistics

Again, United Energy believes that an estimate of the rate at which investors redeem credits distributed should only be used to check that estimates of theta produced by market value studies do not violate the upper bound the estimate places on theta. United Energy does not believe that redemption rates should be used directly to estimate theta.

The AER has observed that the rate at which credits distributed are redeemed can be computed from tax statistics. The resulting value is 0.43, based on analysis by Hathaway. NERA updates Hathaway's work and reports an estimate of the rate of 0.45.[79]

However the AER also states that tax statistics "*support an estimate of the utilisation rate between 0.4 and 0.6*".[80]

As is clear from the analysis of the AER and from NERA's recent work, tax statistics clearly support a point estimate for the redemption rate of 0.45 (paired with a distribution rate of 0.70). Given that the Guideline adopts a distribution rate of 0.70, the only redemption rate estimate that would be consistent with this is 0.45.

It would be an error to adopt a redemption rate any higher than 0.45, based either on the Handley and Maheswaran (2008) study or Hathaway's alternative estimate of 0.61. This is because:

- The Handley and Maheswaran (2008) study cannot be relied on for an empirical estimate of the redemption rate for the post-2000 period. As Hathaway (2010) makes clear, there are a number of problems with the work of Handley and Maheswaran. For example, there is double counting of dividends and credits. Handley and Maheswaran combine final recipients (individuals and funds) with pass-through investors (trusts and partnerships) ignoring the fact that many of these pass-through investors return their dividends and credits to the very companies that issued them. As a

[79] NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy; March 2015, page 27.

[80] See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd Access arrangement, 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014, page 56 (pdf version).

result of this problem and other problems, Hathaway advises that with regards to the work of Handley and Maheswaran:

  - *"This paper should not be used for application to corporate and regulatory issues within Australia."*

- Hathaway's alternative estimate of 0.61 corresponds to a distribution rate of around 0.50, whereas the AER adopts a distribution rate of 0.70.[81]

Again, United Energy is concerned by the use of redemption rates computed from tax statistics to estimate theta because the redemption rate provides only an upper bound on theta. Redemption rates from tax statistics should not be used to provide direct estimates of the value of distributed imputation credits because redemption rates can sit far above the value placed by a representative investor on a dollar of credits.

If redemption rates from tax statistics are to be used to provide an upper bound for theta, the appropriate point estimate for the redemption rate is 0.45.

2.3.3 Estimates from market value studies

The AER has recently considered that market value studies support a range for theta of between zero and one.[82]

Underpinning this position appears to be a view that all market value studies should be given equal (or similar) weight, regardless of:

- The time period for estimation (including whether the study relates to the period before or after changes to the tax law in 2000);
- Robustness of the methodology; and
- Quality of data and filtering techniques.

This is an erroneous and unreasonable approach to considering market value studies. As the AER is aware, many of the earlier market value studies have methodological shortcomings and rely on very old data.

United Energy relies primarily on two market value studies – one authored by Simon Wheatley (NERA) and the other by Professor Stephen Gray (SFG).

NERA explains that if imputation credits are to affect the value of a benchmark efficient entity, then they must do so by cutting the cost of equity, exclusive of credits, that the entity faces. The version of the Sharpe-Lintner CAPM that the AER uses presumes that there should be a negative relation between risk-adjusted mean returns in excess of the risk-free rate and risk-adjusted credit yields. If the model that the AER uses is right, then firms that offer higher risk-adjusted credit yields can get away with offering lower risk-adjusted excess returns on equity, exclusive of credits distributed.

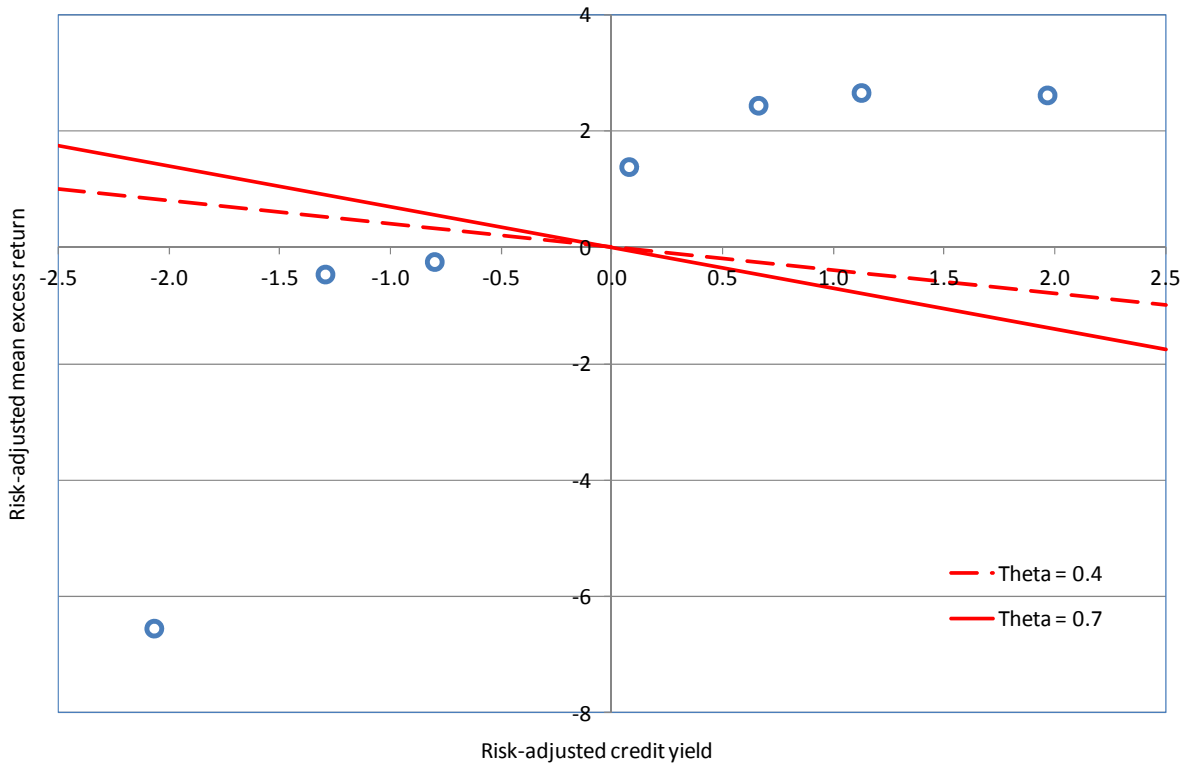
Using the version of the Sharpe-Lintner CAPM that the AER employs, NERA finds that the data do not support the idea that there is a negative relation between risk-adjusted mean excess returns and risk-adjusted credit yields. Figure 1.1 below, drawn from NERA's paper, shows that, using the Sharpe-Lintner CAPM, there is a positive, rather than a negative relation between risk-adjusted mean excess returns and

81 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 59 (pdf version). As noted in the *AER Draft decision*, Hathaway's calculations actually suggest estimates of the utilisation rate of 0.44 and 0.62 and corresponding estimates of the distribution rate of 0.69 and 0.49, respectively. However, the AER rounds these distribution rate estimates up to 0.7 and 0.5, which implies slightly higher amounts of credits distributed and therefore slightly lower utilisation rates of 0.43 and 0.61.

82 See for example, AER; *Draft Decision Jemena Gas Networks (NSW) Ltd, Access arrangement 2015 – 20 Attachment 4 – Value of imputation credits*; November 2014 page 56 (pdf version).

risk-adjusted credit yields for seven value-weighted portfolios of stocks sorted on the basis of past credit yields.

Figure 2.1: The empirical relation between risk-adjusted excess returns and risk-adjusted credit yields



Again, Associate Professor Martin Lally views results like these as 'implausible' but what Lally does not say is that while estimates of theta produced by NERA that use the Sharpe-Lintner Capital Asset Pricing Model (CAPM) – the model that the AER employs – are significantly below zero, estimates that use the Black CAPM – a model on which we suggest that the AER place more reliance – do not lie significantly below zero and so should not be deemed 'implausible'. The results that NERA provides suggest that, consistent with the idea that Australia is a small open economy, theta be set to zero.

As explained above, the SFG drop-off study was specifically designed to overcome the shortcomings of many of these previous market value studies. In particular, the methodology used in the SFG study:

- Was designed, at the request of the Tribunal, to overcome shortcomings in previous drop-off studies (particularly the Beggs and Skeels (2006) study);
- Represented the product of a consultative process involving the AER; and
- Relies on more recent data than previous studies.

In effect, the SFG study was designed to supersede previous drop-off studies, both in terms of its methodology and the currency of the underlying data.

As noted above, the SFG study was found by the Tribunal (at the time of its May 2011 decision in *Energex*) to be "*the best dividend drop-off study currently available*".[83] The Tribunal also did not accept the submission of the AER that either minor issues in the construction of the database or econometric issues justified giving

[83] *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [29].

the SFG study less weight and earlier studies (particularly the previous Beggs and Skeels (2006) study) some weight. The Tribunal observed that "*the Beggs and Skeels study, despite not being subjected to anything like the same level scrutiny [sic], is known to suffer by comparison with the SFG study on those and other grounds*".[84]

The AER has recently referred to the adjustment to dividend drop-off estimates of theta proposed by Associate Professor Lally and referred to by Associate Professor John Handley. This adjustment is said to account for factors such as personal taxes and risk which mean that cash (and by implication credits) will be valued at less than its face value.

This adjustment to dividend drop-off estimates of theta is unnecessary and inappropriate. As explained above, in valuing imputation credits, personal costs which may affect the value that investors place on imputation credits cannot be ignored or assumed away. Accordingly, any adjustment to exclude the impact of these factors would be inappropriate and would lead to overestimation of the true value of imputation credits to investors.

United Energy is not aware of any more recent drop-off study (apart from Professor Gray's updated study, using the same methodology) which is more robust or is more likely to provide a better estimate of theta.[85]

Unlike the Tribunal in *Energex*, the AER in its Draft Decision gives no consideration to the relative strengths and weaknesses of the available market value studies. Rather, the AER has simply grouped all market value studies together and referred to a range of estimates emerging from this broad group.

It would be unreasonable for the AER to simply adopt a wide range of estimates from market value studies and to criticise such studies as a group, without having regard to the relative strengths and weaknesses of each study. In considering the appropriate estimate for theta from market value studies, the AER must consider which of these studies are most appropriate having regard to factors such as the robustness of their methodology and currency of data.

United Energy maintains its view that an estimate of theta drawn from market value studies be set no higher than 0.35. This reflects the evidence that NERA provides and the output of the best dividend drop-off study currently available.

2.4 Conclusions

The AER's recent draft decisions (depicted in the table below) have concluded that a reasonable estimate of the value of imputation credits is in the range 0.30 to 0.50, and that a reasonable point estimate for gamma is 0.40.

Given the values adopted by the AER for the distribution rate this implies:

- For listed equity, a theta estimate of 0.50 (i.e. 0.40 divided by 0.80);
- For all equity, a theta estimate of 0.57 (i.e. 0.40 divided by 0.70).

84 *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9, [29].

85 There is one other more recent study by Vo et al; *Estimating the market value of franking credits: Empirical evidence Australia;* April 2013. This study adopts a methodology similar to SFG (2011) and SFG (2013), except that additional methodological permutations are run, resulting in the exclusion of the standard market adjustment (as explained by SFG, the standard market adjustment is a simple adjustment made in most dividend drop-off studies to remove the effect of movements in the broader market). The results of the Vo et al (2013) study with the standard market adjustment are consistent with those reported by SFG, while the result without the standard adjustment is higher. However, as previously explained, the results without the adjustment will be biased due to exogenous factors which may be driving the broader market over the ex-dividend day.

Table 2.2: Draft decision estimates of gamma based on redemption rate re-definition of theta

Estimation approach	Theta	Distribution Rate	Gamma
Equity ownership (all equity)	0.55-0.70	0.70	0.39-0.49
Tax statistics (all equity)	0.43	0.70	0.30
Equity ownership (listed equity)	0.40 – 0.60	0.80	0.32 – 0.48

This conclusion is clearly inconsistent with the evidence presented recently to the AER, including the AER's own analysis of the empirical data.

The evidence submitted to the AER by United Energy demonstrates that:

- The current domestic equity ownership rate is 0.44 for listed equity and 0.58 for all equity. This means that the maximum set of investors who ***may*** be eligible to redeem imputation credits and who may therefore place ***some*** value on imputation credits is 44% of listed equity investors and 58% of all equity investors. This implies that a theta value of 0.50 for listed equity cannot be correct – theta cannot be higher than 0.44 for listed equity and will in fact be lower than this for the reasons explained above;
- The redemption rate estimate using tax statistics is 0.45 for all equity consistent with a distribution rate of 0.70.[86] While tax statistics do not show the redemption rate for listed equity only, it is likely that this will be lower than 0.45, due to higher foreign ownership of listed equity. This means that the upper bound for theta is 0.45 (corresponding to a distribution rate of 0.70), and will likely be lower for listed equity. This implies that a theta value of 0.50 for listed equity and 0.57 for all equity cannot be correct;

The value of imputation credits distributed to investors – as indicated by market value studies – is in fact no higher than 0.35.

The AER's recent approach produces a value for gamma of 0.4 which is not consistent with evidence. This value is well above even the upper bound values indicated by the equity ownership approach and tax statistics.

The evidence indicates:

- Gamma can be no higher than 0.31 (combining a distribution rate of 0.7 with the upper bound for theta of 0.45);
- Even if the AER's new conceptual definition of theta were to be accepted, which is clearly inappropriate, this would imply a gamma point estimate of no more than 0.28 (applying the Lally adjustment to Professor Gray's estimates to exclude the effect of factors such as differential personal taxes and risk);[87]
- If the correct definition of theta were to be accepted, consistent with the requirements of the NER, this would imply a gamma point estimate of no more than 0.25.

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86 NERA; *Estimating Distribution and Redemption Rates from Taxation Statistics,* A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks and United Energy; March 2015, page 27.

87 The Lally adjustment implies that the estimate of the utilisation rate from a given study can be divided by investors' estimated valuation of dividends from the study. Handley and Lally advised that the theta estimate of 0.35 from SFG's dividend drop off study should in fact be interpreted as a theta estimate of around 0.4. The implied value of gamma would then be 0.28. The adjustment is disputed by SFG. See:

SFG; *An appropriate regulatory estimate of gamma*, Report for Jemena Gas Networks, ActewAGL, APA, Networks NSW (Ausgrid, Endeavour Energy and Essential Energy), ENERGEX, Ergon, Transend, TransGrid and SA Power Networks; May 2014, paragraphs 150-153, page 39.

As demonstrated above, the AER's recent approach for ascertaining a value for gamma is based on several errors of fact and reasoning. These include errors in the use of certain measures as direct evidence of the value of imputation credits, and errors in the interpretation of empirical data.

On a proper interpretation of the empirical evidence a value of no higher than 0.25 for gamma is clearly correct. The AER's approach in recent draft decisions overestimates gamma and consequently underestimates the overall return required by investors. Accordingly, the AER's recent approach will not contribute to the achievement of the NEO whereas a value of no more than 0.25 for gamma is more fundamentally correct.