FINAL DECISION
Powerlink transmission determination
2017-22

Attachment 4 – Value of imputation credits

April 2017

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's final decision on Powerlink's transmission determination for 2017–22. It should be read with all other parts of the final decision.

This final decision consists of an Overview and 11 attachments. As many issues were settled at the draft decision stage or required only minor updates we have not prepared final decision attachments for:

- Regulatory depreciation
- Operating expenditure; and
- Corporate income tax.

The AER's final decision on these matters is set out in the Overview. For ease of reference the remaining attachments have been numbered consistently with the attachment numbering in our draft decision.

The final decision includes the following documents:

Overview

Attachment 1 – Maximum allowed revenue

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Value of imputation credits

Attachment 6 – Capital expenditure

Attachment 9 – Efficiency benefit sharing scheme

Attachment 10 – Capital expenditure sharing scheme

Attachment 11 – Service target performance incentive scheme

Attachment 12 – Pricing methodology

Attachment 13 – Pass through events

Attachment 14 – Negotiated services

Contents

Shortened forms

Shortened form	Extended form
AARR	aggregate annual revenue requirement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ASRR	annual service revenue requirement
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
DMIA	demand management innovation allowance
DRP	debt risk premium
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
MAR	maximum allowed revenue
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
NTSC	negotiated transmission service criteria
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
repex	replacement expenditure
RFM	roll forward model

Shortened form	Extended form
RIN	regulatory information notice
RPP	revenue and pricing principles
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
TNSP	transmission network service provider
TUoS	transmission use of system
WACC	weighted average cost of capital

4 Value of imputation credits

Imputation credits are valuable to investors and are therefore a benefit in addition to any cash dividend or capital gains they receive from owning shares. Under the Australian imputation tax system, investors can receive an imputation credit for income tax paid at the company level.[1] For eligible investors, this credit offsets their Australian income tax liabilities. If the amount of imputation credits received exceeds an investor's tax liability, that investor can receive a cash refund for the balance.

The National Electricity Rules/National Gas Rules (NER/NGR) recognises that a service provider's allowed revenue does not need to include the value of imputation credits. Under the NER/NGR, service providers are to recover revenue that compensates them for their efficient costs in providing regulated services. This includes, among other things, a return to be provided to investors (return on equity) that is required to promote efficient levels of investment. The more that imputation credits are valuable, the less return that investors require from dividends and capital gains. However, the estimation of the return on equity does not take imputation credits into account.[2] Therefore, an adjustment for the value of imputation credits is required. This adjustment could take the form of a decrease in the estimated return on equity itself.

An alternative but equivalent form of adjustment, which is employed by the NER/NGR, is via the revenue granted to a service provider to cover its expected tax liability. Specifically, the NER/NGR require that the estimated cost of corporate income tax be determined in accordance with a formula that reduces the estimated cost of corporate tax by the 'value of imputation credits' (represented by the Greek letter, γ, 'gamma').[3] This form of adjustment recognises that it is the payment of corporate tax which is the source of the imputation credit return to investors.

In this attachment, we set out our final decision on the value of imputation credits and our key reasons for this decision. We also consider Powerlink's proposed value of imputation credits and the key reasons for its proposal. In appendix A, we include further supporting detail on our position on the value of imputation credits and also respond to Powerlink's proposal in detail.

4.1 Final decision

We accept Powerlink's proposed value of imputation credits (or gamma) of 0.4. We consider that the use of a value for imputation credits of 0.4 will result in equity investors in the

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1 *Income Tax Assessment Act 1997*, parts 3–6.

2 While the return on equity is not reduced to take into account the value of imputation credits, we note our estimate of the market risk premium (MRP) does consider the value we use for imputation credits to ensure it reflects the value to investors in the domestic Australian market inclusive of credits.

3 NER, cll. 6.4.3(a)(4), 6.4.3(b)(4), 6.5.3, 6A.5.4(a)(4), 6A.5.4(b)(4), 6A.6.4; NGR, rr. 76(c), 87A.

benchmark efficient entity receiving an ex ante total return (inclusive of the value of imputation credits) commensurate with the efficient equity financing costs of a benchmark efficient entity.

Estimating the value of imputation credits is a complex and imprecise task. There is no consensus among experts on the appropriate value or estimation techniques to use.[4] Further, with each estimation technique there are often a number of ways these may be applied resulting in different outcomes. Conceptually, the value of imputation credits must be between 0 and 1, and the range of expert views on the value of imputation credits is almost this wide.[5]

We note Powerlink's submission that proposes the AER should apply any changes to its approach to estimate the value of imputation credits resulting from a decision of the Federal Court in relation to the AER's appeal of the Ausgrid Tribunal's decision to Powerlink's 2018-22 regulatory period.[6] Since the decisions for Ausgrid and others released in April 2015 we have not departed from our 0.4 estimate for gamma and we consider a gamma value of 0.4 is appropriate for the reasons stated in this final decision. Nevertheless, when making future determinations we will take into account any merits or judicial review proceedings on the value of gamma that are available to us.

In coming to a value of imputation credits of 0.4:

- We adopt a conceptual approach consistent with the Officer framework,[7] which we consider best promotes the objectives and requirements of the NER/NGR. This approach considers the value of imputation credits is a post-tax value before the impact of personal taxes and transaction costs.[8] As such, we view the value of imputation credits as the proportion of company tax returned to investors through the utilisation of imputation credits.[9]
- We consider our conceptual approach allows for the value of imputation credits to be estimated on a consistent basis with the allowed rate of return and allowed revenues under the post-tax framework in the NER/NGR.[10]

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4 See section A.1 of appendix A.

5 The value of imputation credits must be between 0 and 1 because receiving an imputation credit cannot make an investor worse off, nor would an investor value an imputation credit more than its face value.

6 Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.

7 The Officer framework is discussed in detail in section A.6.

8 Post-tax refers to after company tax and before personal tax.

9 This means one dollar of claimed imputation credits has a post (company) tax value of one dollar to investors before personal taxes and personal transaction costs.

10 In finance, the consistency principle requires that the definition of the cash flows in the numerator of a net present value (NPV) calculation must match the definition of the discount rate (or rate of return / cost of capital) in the denominator of the calculation (see Peirson, Brown, Easton, Howard, Pinder, *Business Finance*, McGraw-Hill, Ed. 10, 2009, p. 427). By maintaining this consistency principle, we provide a benchmark efficient entity with an ex ante total return (inclusive of the value of imputation credits) commensurate with the efficient financing costs of a benchmark efficient entity.

- We use the widely accepted approach of estimating the value of imputation credits as the product of two sub-parameters: the 'distribution rate' and the 'utilisation rate'.[11] Our definition of, and estimation approach for, these sub-parameters is set out in table 4-1.

Table 4-1 Gamma sub-parameters: definition and estimation approach

Sub-parameter	Definition	Estimation approach
Distribution rate (or payout ratio)	The proportion of imputation credits generated that is distributed to investors	Primary reliance placed on the widely accepted cumulative payout ratio approach. Some regard is also given to Lally's estimate for listed equity from financial reports of the 20 largest listed firms.
Utilisation rate (or theta)	The utilisation value to investors in the market per dollar of imputation credits distributed[12]	A range of approaches, with due regard to the merit of each approach: • equity ownership approach • tax statistics • implied market value studies

Source: AER analysis, see section A.10, A.12, A.13 and A.15.

Overall, the evidence suggests a range of estimates for the value of imputation credits might be reasonable. With regard to the merits of the evidence before us, we choose a value of imputation credits of 0.4 from within a range of 0.3 to 0.5.

In considering the evidence on the distribution and utilisation rates, we have broadly maintained the approach set out in the Rate of Return Guideline (the Guideline), but have re-examined the relevant evidence and estimates. This re-examination, and new evidence and advice considered since the Guideline, led us to depart from the 0.5 value of imputation credits we proposed in the Guideline.

Recent litigation

In February 2016 the Australian Competition Tribunal (the Ausgrid Tribunal) handed down its decision for ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks.[13] The Ausgrid Tribunal ordered the remittal of our final decisions for these service providers, with directions to remake our decision by reference to an estimated cost of corporate income tax based on a value of gamma of 0.25.

We sought review of the Ausgrid Tribunal's decision in the Full Federal Court and our matter was heard in October 2016. Currently, we are awaiting the outcome of that review.

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11 These sub-parameters are discussed further in section **Error! Reference source not found.**.

12 In this decision we use the terms theta, utilisation value and utilisation rate interchangeably to mean the same thing.

13 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016.

In October 2016 the Australian Competition Tribunal (the SAPN Tribunal) handed down its decision for SA Power Networks.[14] The SAPN Tribunal upheld the AER's decision to value gamma at 0.4. The SAPN Tribunal was invited to follow the decision and reasoning of the Ausgrid Tribunal but chose not to do so. It found there was no error in the AER's approach or conclusion.

SA Power Networks has subsequently sought review of the SAPN Tribunal's decision to the Full Federal Court and the matter will be heard in May 2017.

There are therefore conflicting decisions from two differently constituted Tribunals as to both the value of gamma and the approach to valuing gamma, with each decision being subject to further applications for review.

Summary of our conclusions

We consider the use of a gamma of 0.4 is appropriate for the reasons set out in this decision. These reasons are substantively similar to the reasons we have set out in prior decisions, but we have clarified our reasoning in response to issues that have been raised by the service providers, other stakeholders and in recent litigation.

- We take the view that there is no consensus amongst experts as to the best approach to estimating the value of gamma, or to the correct value of gamma. We must therefore choose an appropriate value for gamma based on our own assessment of all the relevant evidence.
- Our conceptual approach considers the value of gamma as a post (company) tax value before the impact of personal taxes and personal costs. This is because we use a post-tax revenue model for revenue regulation for each regulated entity. The value of gamma has to be understood, and consistently estimated and applied, in that overall context.
- It follows that our estimate of the value of gamma should be consistent with each interrelated element of the regulatory scheme, such as the allowed rate of return and allowed revenues. For example, the allowed rate of return is a post-company tax pre-personal tax weighted average cost of capital (WACC). We estimate the allowed revenue, including the corporate tax allowance (and the value of imputation credits), on the same basis. Moreover, when calculating the yield to maturity on debt (for the return on debt and risk free rate) and market risk premium (MRP), the face value of coupons/dividends are used (see section A.8.2). Our interpretation of the post-tax framework in the NER/NGR is covered in section A.6.
- Our approach considers gamma to be equal to the product of the distribution rate multiplied by the utilisation value to investors in the market per dollar of imputation credits distributed (the utilisation rate). We consider the utilisation value reflects the weighted average, by wealth and risk aversion, of the utilisation rates of investors—some

[14] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016.

of whom will have a utilisation rate of 1 and others who will have utilisation rate of 0. This is covered in section A.5 and A.6.

- We use a range of relevant evidence to estimate the utilisation rate. We consider:
    - The equity ownership approach provides the best estimate of the utilisation value to investors in the market per dollar of imputation credits distributed (see section A.12). There is no data to suggest the redemption of imputation credits is materially lower than the estimate of the utilisation rate derived from the equity ownership approach. In particular, there is no credible data on the impact of the 45 day holding rule. This is covered in section A.8.3. Estimates of the gamma value from the equity ownership approach range from 0.28 to 0.47 if the ranges from both listed equity (0.28 to 0.41) and all equity (0.40 to 0.47) are considered and where estimates of gamma are based on matching cumulative distribution rate data. We use an estimate well below the top of the range for all equity.
    - Taxation statistics (tax statistics) can also provide an estimate of the utilisation value to investors in the market per dollar of imputation credits distributed, if the data upon which those statistics are based is reliable. However, there are potential issues with the quality of the underlying taxation data. For example, Lally has advised that the taxation data is unreliable.[15] Having regard to the potential data limitations and alternate estimates, the evidence from tax statistics is not inconsistent with the evidence from the equity ownership approach, but we place less reliance upon it (see section A.13). One issue that has arisen during litigation about gamma is whether tax statistics provide an upper bound estimate for gamma. The Ausgrid Tribunal found that it did provide an upper bound.[16] In contrast, the SAPN Tribunal found that it did not.[17] A report we received from Lally, after we had made our Ausgrid and SAPN decisions supports the view that tax statistics do not provide an upper bound to the value of gamma.[18] We consider tax statistics provide a point estimate of the utilisation rate of questionable reliability.
    - Implied market value studies are another source of evidence but they are affected by factors such as differential personal taxation and other personal costs. This means they do not provide an estimate of the utilisation value to investors in the market per dollar of imputation credits distributed on a post-tax (pre-personal tax and costs basis). Therefore, they are inconsistent with the Officer framework unless they are adjusted. Even when adjusted, implied market value studies are subject to many limitations and do not clearly measure the value to the aggregate investors who provide long term capital to a benchmark efficient entity. Lally stated

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15 Lally, *Gamma and the ACT Decision*, May 2016, pp. 18–20; Lally, *Issues in the estimation of gamma*, March 2017, p. 13.

16 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048, 1090 and 1095.

17 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 193.

18 Lally, *Gamma and the ACT Decision*, May 2016, p. 20; Lally, *Issues in the estimation of gamma*, March 2017, p. 13.

his views on dividend drop off studies are 'highly adverse' and considers it appropriate to place the lowest reliance on their results (see section A.15).[19]

- We have regard to a listed equity measure of the distribution rate, which we consider is reasonably reflective of a benchmark efficient entity, given the trade-offs associated with choosing an appropriate dataset (see section A.10).[20] While our consultant's advice is that there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so, we have continued to principally match datasets.[21] Our approach leads to conservative estimate (in favour of the service providers), as Lally considers only listed firms should be used to determine the distribution rate and all equity should be used to estimate the utilisation value which results in a gamma estimate of 0.5. While we primarily maintain our previous approach in this decision, we also have some regard to Lally's preferred approach. This combines a distribution rate for listed equity from financial reports of the top 20 listed firms with an all equity utilisation rate from the equity ownership approach.[22] We also have some regard to a gamma estimate based on the utilisation rate from taxation statistics of 0.48 (consistent with FAB data used to calculate the cumulative payout ratio distribution rate) and Lally's preferred estimate of the distribution rate for a benchmark efficient entity of 0.83. This additional evidence also supports a value of gamma of 0.4.
- Lally supports, among other things, our conceptual approach to estimating gamma and the relative reliance we place on different sources of evidence to estimate the utilisation rate.[23] However, he recommended an estimate of the value of gamma of at least 0.5. This is higher than the estimate of 0.4 we adopt in this decision. Other expert reports argue for a lower value. We maintain our approach in recent previous decisions to value gamma at 0.4 because we consider a value of 0.4 reflects our best judgement in the circumstances. It is based on our assessment of the available evidence having regard to the requirements of the NER/NGR.

The use of taxation statistics

In response to the Ausgrid Tribunal decisions, we have again considered the reliability of utilisation rate and gamma estimates based on tax statistics. We have also considered what can reasonably be concluded about the appropriate estimate of gamma for a benchmark efficient entity based on these statistics. This section briefly summarises our views on these matters.

In this decision, we consider there are potential underlying data issues with tax statistics and as a result, the utilisation rate cannot be estimated reliably from this data. As outlined by

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19 Lally, *Gamma and the ACT Decision*, May 2016, p. 22; Lally, *Issues in the estimation of gamma*, March 2017, p. 24.

20 See M Lally, *Gamma and the ACT Decision*, May 2016, pp. 24–26.

21 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

22 Lally, *Gamma and the ACT Decision*, May 2016, p. 4–6.

23 Lally, *Gamma and the ACT Decision*, May 2016, pp. 3–6.

Lally, the data issues with tax statistics are generally accepted by service providers, the Tribunal, Hathaway, NERA and Handley.[24] Frontier has submitted that tax statistics can estimate gamma reliably as the ratio of imputation credits redeemed to imputation credit created.[25] However, we are not convinced following our review of the Hathaway paper and our recent advice from Lally (see section A.13). For this reason, in this decision, we have placed limited weight on tax statistics.

Lally considers tax statistics do not provide a reliable estimate of the utilisation rate.[26] Lally also considers our tax statistic estimate of 0.48 is not an upper bound. As Lally explains, the fact that Hathaway also considered 0.62 a possible estimate of the utilisation rate demonstrates the utilisation rate estimate of 0.48 is not an upper bound.[27] We consider that any uncertain estimate is not an upper bound.

Putting aside the data reliability issues with tax statistics, all the evidence before us on tax statistics does not demonstrate our gamma estimate for a benchmark efficient entity of 0.4 is too high. This is evident in Table 4-2.

Table 4-2 Estimates of the value of imputation credits—evidence from taxation statistics

	Utilisation rate	Distribution rate	Value of Imputation Credits
All equity	0.48	0.7[28]	0.34
Listed equity	0.48[29]	0.75[30]	0.36
Australian Securities Exchange (ASX) top 20 firms	0.48 to 0.62[31]	0.83[32]	0.40 to 0.51[33]

Source: AER analysis; Lally, *Gamma and the ACT Decision*, May 2016, p. 6.

[24] Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

[25] Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 12-15.

[26] Lally, *Gamma and the ACT Decision*, May 2016, pp. 19, 30.

[27] Lally, *Gamma and the ACT Decision*, May 2016, p. 20. We note Lally considered the 0.45 from our previous decisions in his report. However, his analysis would hold with respect to our updated estimate from taxations statistics of 0.48.

[28] This relies on cumulative distribution rate based on FAB data being used which matches to the 0.48 tax statistic.

[29] This utilisation rate is for all equity, as tax statistics do not provide data on the listed equity utilisation. For the purpose of the calculation for the listed equity value of imputation credits, this utilisation rate has been combined with the listed equity distribution rate.

[30] This relies on cumulative distribution rate based on FAB data being used which matches to the 0.48 tax statistic.

[31] Depending on whether dividend data or FAB data is used, tax statistics provide a different utilisation rate. See: Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

[32] This relies on the distribution rate of the top 20 firms. Lally considers that financial statements are more reliable to estimate the distribution rate that ATO data.

[33] We note even if the FAB data is reliable and therefore we can use an estimate a of the utilisation rate of around 0.48 (with uncertainty around it), the 0.48 point estimate still gives an estimate of 0.4 when combined with Lally preferred estimate of the distribution rate for the efficient benchmark entity of 0.83.

Using different distribution rates, tax statistics can potentially provide a range for gamma of 0.34 to 0.51 for the benchmark efficient entity. When Lally's preferred distribution rate is used, this implies a gamma of at least 0.4.

In earlier decisions we did not rely on the 0.62 utilisation rate estimate in the Hathaway 2013 paper.[34] This is due to the two estimates in Hathaway reflecting two alternative measures of the value of credits distributed, which in turn imply two alternative estimates of the distribution rate. The 0.44 and 0.62 estimates of the utilisation rate correspond to estimates of the distribution rate of around 0.7 and 0.5 respectively.[35] Hence, since we used a distribution rate of 0.7 for all equity we considered it was appropriate to use 0.44 and not 0.62. However, this limitation does not apply to Lally's analysis, given Lally does not use ATO data to determine the distribution rate. Rather, Lally uses financial statement data for the top 20 listed firms to determine an estimate of the distribution rate for the benchmark efficient entity.[36] Lally considers the data from financial statements is of high quality given it is audited and subject to scrutiny in financial markets.[37] We agree there is no inconsistency with combining Lally's preferred estimate of the distribution rate with an estimate of the utilisation rates from tax statistics. This implies the taxation data can support a gamma estimate of at least 0.4 based on Lally's preferred distribution rate estimate of 0.83 and the lower utilisation rate in Hathaway's 2013 paper (of 0.44) updated for current tax statistics to 0.48. Given the uncertainty with the utilisation rate estimate, we also do not consider the taxation statistics would be inconsistent with a higher estimate of gamma than 0.4 for the benchmark efficient entity.

For the reasons explained above (and in section 4.4 and section A.13), we consider tax statistics do not demonstrate our gamma value of 0.4 is unreasonable.

4.2 Powerlink's revised proposal

In its revised proposal,[38] Powerlink adopted a value of 0.4 for gamma consistent with recent AER regulatory determinations. This is consistent with our Guideline based approach to estimating gamma as reflected in our decisions released in 2014 (November) and 2015 (April and June). We also adopted our Guideline based approached in decisions released in 2015 (October and November) and 2016 (May and July). Throughout this document we refer to our decisions released from Nov 2014 to July 2016 as our recent decisions.

In its revised proposal, Powerlink considers that the AER should apply any changes to its approach to estimate the value of imputation credits resulting from a decision of the Federal Court in relation to the AER's appeal of the Ausgrid Tribunal's decision to Powerlink's 2018-

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34 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?,* September 2013.

35 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?,* September 2013.

36 Lally, *Gamma and the ACT Decision*, May 2016, p. 29.

37 Lally, *Gamma and the ACT Decision*, May 2016, p. 26.

38 Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.

22 regulatory period.[39] This is consistent with Powerlink's revenue proposal submitted in 2016.[40]

4.3 Assessment approach

In this section we set out the approach we have taken to assessing proposals on the value of imputation credits. This approach includes consideration of:

- the requirements of the NEL/NGL and NER/NGR
- the Guideline
- our definition of the benchmark efficient entity
- interrelationships with other aspects of the decision
- expert reports
- our approach to determining the value of imputation credits.

4.3.1 Requirements of the NEL/NGL and NER/NGR

The NER/NGR require that the estimated cost of corporate income tax of a service provider for each regulatory year (ETC_t) must be estimated in accordance with the following formula:[41]

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

- ETI_t 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 regulated services if such an entity, rather than the service provider, operated the business of the service provider, such estimate being determined in accordance with the post-tax revenue model.
- r_t is the expected statutory income tax rate for that regulatory year as determined by the AER.
- γ is the value of imputation credits.

Unlike many other aspects of the NER/NGR, there is no specific objective we must achieve for the value of imputation credits and no specific factors we must take into account in estimating it. The allowed rate of return objective does not specifically apply to the value of imputation credits. However, the rate of return must be determined on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.[42]

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39 Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.
40 Powerlink, *Revised Revenue Proposal,* 1 December 2016, p. 11.
41 NER, cll. 6.5.3, 6A.6.4; NGR, r. 87A.
42 NER, cll. 6.5.2(d)(2), 6A.6.2(d)(2); NGR, r. 87(4)(b).

In this context, the conceptual rate of return framework developed by Officer in a 1994 paper informs our approach to interpreting and estimating the value of imputation credits.[43] This is because:

- The NER/NGR's cost of corporate income tax formula (shown above) mirrors Officer's framework for the treatment of imputation credits, including through the use of the parameter denoted by the Greek letter 'gamma'.[44]
- We have received expert advice that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the NER/NGR.[45] Previous statements by the consultant for the majority of the service providers', Gray, and their industry association appear to support this consideration:
    - During the AEMC's 2012 rule change process, Gray advised the AEMC that '…there are a number of different WACC formulas that can all be identified as post-tax nominal definitions of WACC. Officer (1994), in the paper that forms the basis for the regulatory rate of return framework, sets out four such definitions…'.[46]
    - During the development of the Guideline, the Energy Networks Association (ENA) submitted '[t]he fundamental economic framework in relation to dividend imputation was set out by Officer (1994)…'.[47]

The NER/NGR require that we determine the rate of return on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.[48] The Officer framework provides a means for doing this. It provides a consistent framework for determining the rate of return for a business, which takes into account the value that investors receive from imputation credits.[49] An important implication of this is that gamma is not a standalone concept or parameter. It is part of a broader framework, and should be interpreted and estimated accordingly.

Consistent with the expert advice we have received, we consider that the Officer framework provides the basis for the rate of return framework in the NER/NGR. We therefore also consider that estimating the value of imputation credits consistent with the Officer framework

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43 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

44 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.

45 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.

46 SFG, *Response to submissions on rule change proposals, Report for the AEMC*, 5 November 2012, para. 2.

47 ENA, *Response to the Draft Rate of Return Guideline of the Australian Energy Regulator*, 11 October 2013, p. 49.

48 NER, cll. 6.5.2, 6A.6.2; NGR, r. 87.

49 For a detailed discussion of the Officer framework, see: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–12.

will best promote the National Electricity Objective/National Gas Objective (NEO/NGO) [50] and other requirements of the NER/NGR.

To this end, we have had regard to the differing expert opinions on the proper interpretation of the gamma parameter in the Officer framework. As discussed in section A.7.3, we accept Handley's expert advice on the Officer framework. An important aspect of this advice is that the framework is on a 'before-personal-tax and before-personal-costs' basis.[51] That is, 'the per dollar value of an imputation credit γ gamma should be measured prior to any personal tax on the credit and prior to any personal costs associated with the receipt of the credit'.[52]

By determining a value of imputation credits in a manner consistent with the Officer framework, we consider that we are making our decision in a manner that will or is likely to contribute to the achievement of the NEO/NGO.[53] Further, when exercising our discretion in making the relevant parts of a decision, we must take into account the revenue and pricing principles (RPP).[54] The RPP provide, amongst other things, that:[55]

- a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs providing regulated services and complying with regulatory obligations
- a service provider should be provided with effective incentives in order to promote economic efficiency with respect to the regulated services it provides, and
- a price, charge or tariff for the provision of a regulated service should allow for a return commensurate with the regulatory and commercial risks involved in providing the regulated service.

Therefore, the value of imputation credits we adopt must ultimately promote the achievement of the NEO/NGO (via its application in the estimated cost of corporate income tax building block) and must take into account the RPP.

With reference to the language of the RPP, this requires the exercise of our discretion in determining a tax building block (including the exercise of our discretion in determining the adjustment for the value of imputation credits) that is:

- not too low, in that it contributes to providing a reasonable opportunity to recover at least efficient corporate tax costs

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50 NEL, s. 16(1)(a); NGL, s. 28(1)(a).

51 Although the term 'personal' is used, we note that classes of investors other than individual persons can value imputation credits (for example, superannuation funds and charities). Therefore, an alternative characterisation might be 'before-investor-tax' and 'before-investor-costs'.

52 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

53 NEL, s. 16(1)(a); NGL, s. 28(1)(a).

54 NEL, s. 16(2)(a)(i); NGL, s. 28(2)(a)(i).

55 NEL, ss. 7A(2)–(7); NGL, ss. 24(2)–(7).

- not too high, in that it contributes to a return that is not excessive and is commensurate with the relevant risks.

We consider that finding the right balance is best served by having regard to the merits of the full range of relevant evidence. We explain our consideration of, and reliance upon, the range of relevant evidence in this attachment. We have determined a value of imputation credits that we are satisfied achieves a balance between the opportunity for service providers to recover at least efficient costs but that is commensurate with relevant risks.

4.3.2 Rate of return Guideline

In December 2013, we published the Guideline which is available on our website.[56] Within it we specified:[57]

- the methodologies we propose to use to estimate the allowed rate of return (derived from the expected return on equity and the return on debt) for electricity and gas network service providers
- the method we propose to use to estimate the value of imputation credits
- how these methods will result in an allowed return on equity and return on debt which we are satisfied achieve the allowed rate of return objective.

In the Guideline we also set out the estimation methods, financial models, market data and other evidence that we propose to take into account in estimating the expected return on equity, return on debt and the value of imputation credits.[58] We discuss our development of the Guideline in detail in attachment 3 of this decision.

The Guideline is not binding in determining the value of imputation credits. However, should we decide to depart from the Guideline we must provide reasons for doing so.[59] Equally, it is open to service providers to propose departures from the Guideline, so long as they provide reasons.[60]

4.3.3 Definition of a benchmark efficient entity

As shown in section 4.3.1, the NER/NGR refer to a 'benchmark efficient entity'. We have adopted:

- a single benchmark across gas, electricity, transmission and distribution

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[56] The requirements to make and publish the Guideline are set out in: NER, cls. 6.5.2(m) and 6A.6.2(m); NGR, r. 87(13). The Guideline is available at: http://www.aer.gov.au/node/18859.

[57] NER, cll. 6.5.2(n), 6A.6.2(n); NGR, r. 87(14).

[58] NER, cll. 6.5.2(n)(2), 6.A.6.2(n)(2); NGR, r. 87(14)(b).

[59] NER, cll. 6.2.8(c), 6A.2.3(c); NGR, r. 87(18).

[60] NER, ss. S6.1.3(9)–(9B), S6A.1.3(4)(vi),(4A)–(4C); NGR, r. 72(1)(g).

- a conceptual definition of the benchmark efficient entity as 'a 'pure play', regulated energy network business operating within Australia'.[61]

We provide a detailed discussion of our definition of a benchmark efficient entity in attachment 3 of this decision. This includes a response to service providers' submissions that a benchmark efficient entity should not be a regulated entity. The definition of a benchmark efficient entity we use for determining the rate of return is identical to the definition we use for determining the value of imputation credits in this decision.

However, we discuss one element of the definition in this attachment: 'operating within Australia'. We consider the rate of return should be estimated on a basis that is consistent with our estimate of gamma. The rate of return should also be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk to the relevant service provider in the provision of its regulated services. The degree of risk a service provider faces in the provision of its services is significantly affected by location. This is because the location of a business determines the conditions under which the business operates. This includes the regulatory regime, tax laws, industry structure and broader economic environment that impact the risks faced by the service provider in its provision of regulated services. An additional consideration that is particularly relevant to the value of imputation credits is that we recognise that both domestic and foreign investors participate in the Australian market. That is, we consider that the defined market is an Australian domestic market that recognises the presence of foreign investors to the extent that they invest in the Australian market. This is important for determining a value of imputation credits because typically domestic investors are eligible to utilise imputation credits while foreign investors are not.

4.3.4 Interrelationships

The NER/NGR recognise that a service provider's allowed revenue does not need to include the value of imputation credits. The NER/NGR adjust for the value of imputation credits via the revenue granted to a service provider to cover its expected tax liability. This form of adjustment recognises that it is the payment of corporate tax which is the source of the imputation credit return to investors.

The CCP for the NSW electricity distribution network's view suggests that we should take into account the interrelationship with the corporate tax allowance when determining the value of imputation credits. The CCP for the NSW electricity network submitted evidence that our benchmark tax allowance was substantially higher than the corporate tax actually paid by service providers.[62] The CCP for the NSW electricity network then concluded:[63]

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61 AER, *Better Regulation: Rate of Return Guideline*, December 2013, p. 8.

62 CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, pp. 48–49.

63 CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, p. 49.

> Regarding gamma, it is difficult for the CCP to support a gamma of 0.5 as being better or worse than 1 or 0 or any number in between, we simply do not know enough about the vagaries of such calculations. Though the lack of tax paid would suggest a gamma nearer 1 than 0.

We agree with the CCP for the NSW electricity network's suggestion that it would be reasonable to consider the tax building block as a whole when determining the value of imputation credits. Under this approach, a tendency toward a higher value of imputation credits (and therefore greater reduction in the tax building block) might be reasonable if the benchmark tax allowance is above the efficient cost of tax. However, in the Guideline and this final decision our determination of the value of imputation credits is guided by the relevant theoretical framework and associated evidence.

The value of imputation credits is also interrelated with the market risk premium (MRP). As discussed in attachment 3, the definition of the MRP in the Sharpe-Lintner capital asset pricing model (CAPM) should account for the capitalised value of imputation credits. Accordingly, in our determination of the return on equity in attachment 3 we adjust estimates of the MRP in a manner consistent with our determination of the value of imputation credits in this attachment. This is also required by the NER/NGR.[64]

4.3.5 Expert reports

During the development of the Guideline, we commissioned expert advice on the value of imputation credits from Dr Martin Lally of the Victoria University of Wellington.[65]

Since the Guideline, we commissioned further expert advice from Associate Professor John Handley of the University of Melbourne and Dr Martin Lally.[66] We have also had regard to, among other things:

- the May 2014, February 2015, June 2015, January 2016 and September 2016 reports by Professor Stephen Gray that were commissioned by service providers.[67]
- the March 2015, April 2015 and June 2015 reports by NERA Economic Consulting (NERA) that were commissioned by service providers.[68]

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64 NER, cll. 6.5.2(d)(2), 6A.6.2(d)(2); NGR, r. 87(4)(b).

65 M. Lally, *The estimation of gamma*, 23 November 2013.

66 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015. J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015; Lally, *Gamma and the ACT decision*, May 2016; M. Lally, *Issues in the estimation of gamma*, April 2017.

67 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015; Frontier, *The appropriate use of tax statistics when estimating gamma,* January 2016; Frontier, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016; Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016; Frontier Economics, *Issues in the estimation of gamma*, September 2016.

- the November 2013 and March 2014 reports by Associate Professor Lally that were commissioned by the Queensland Competition Authority.[69]
- an October 2013 review of a network rail access undertaking by Professor Michael McKenzie of the University of Liverpool and Associate Professor Graham Partington of the University of Sydney.[70] This review was commissioned by the Queensland Resources Council and submitted to the Queensland Competition Authority.
- a September 2013 report on tax statistics by Dr. Neville Hathaway that was commissioned by the Energy Networks Association.[71]
- a June 2013 report on the distribution rate by NERA that was commissioned by the Energy Networks Association.[72]

4.3.6 Approach to determining the value of imputation credits

There is no consensus among experts or regulators on the value of imputation credits or the techniques to use to estimate it.[73] Our approach to determining the value of imputation credits is guided by:

- The requirements of the NER/NGR—see section 4.3.1.
- The role of the value of the imputation credits in the revenue building block framework—this suggests that the value of imputation credits is intended to reflect the value of imputation credits to investors in the benchmark efficient entity.[74]
- Relevant academic literature (Officer)—the framework developed in a 1994 paper by Officer is widely recognised as providing the basis for the value of imputation credits in the building block framework.[75] A key implication of Officer's framework is that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis. This is consistent with a rate of return determined on a nominal vanilla (that is, a post-company tax pre-personal tax and costs) basis. Therefore, we view the value of imputation credits as the proportion of company tax returned to investors through the utilisation of imputation credits.

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68 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015. NERA, *Do imputation credits lower the cost of equity? Cross-sectional tests*, April 2015; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015.

69 M. Lally, *Estimating gamma*, 25 November 2013. M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

70 M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013.

71 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

72 NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

73 See sections A.1 and A.2 of appendix A.

74 See section A.5 of appendix A.

75 See sections 4.3.1 and A.6 of appendix A.

- Relevant academic literature (Monkhouse)—the work of Monkhouse (and others) extends the Officer framework, and shows that the value of imputation credits can be estimated as the product of two parameters:
    - the proportion of imputation credits generated that is distributed to investors (the distribution rate)
    - the utilisation value to investors in the market per dollar of imputation credits distributed (the utilisation rate).[76]

  Consistent with this literature, we determine the value of imputation credits as the product of these two parameters.
- A wide range of relevant evidence—we use this range of evidence to estimate the distribution rate and utilisation rate. In particular:
    - Distribution rate—we place primary reliance on the widely accepted approach to estimating the distribution rate (that is, the 'cumulative payout ratio approach'). We also have some regard to Lally's estimate for listed equity from financial reports of the 20 largest listed firms.[77]
    - Utilisation rate—unlike the distribution rate, there is no single accepted approach to estimating the utilisation rate, and there is a range of evidence relevant to the utilisation rate. This includes:
        - the proportion of Australian equity held by domestic investors (the 'equity ownership approach')[78]
        - the reported value of credits utilised by investors in Australian Taxation Office (ATO) statistics ('tax statistics')[79]
        - studies that seek to infer from market prices the value to investors of distributed imputation credits ('implied market value studies').[80]

      We place varying levels of reliance on these sources of evidence (which is supported by Lally).[81] That is:
        - we place most reliance on the equity ownership approach because we consider it generates the best estimate of the utilisation value to investors in the market per dollar of imputation credits distributed
        - we place less reliance on tax statistics because the underlying taxation data are unreliable

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[76] Assuming retained imputation credits have no value. See section A.6 of appendix A.

[77] Lally, *Gamma and the ACT Decision*, May 2016, p. 29.

[78] See section **Error! Reference source not found.**.

[79] See section **Error! Reference source not found.**.

[80] See section **Error! Reference source not found.**.

[81] Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–5.

- we place even less reliance on implied market value studies because we consider they have many limitations, including they do not measure the pre-personal tax and pre-personal cost value of distributed imputation credits.[82]

Also, when estimating the distribution rate and the utilisation rate there is no consensus regarding whether evidence and data should be used on all companies and their investors (all equity) or just listed companies and their investors (only listed equity).[83] In determining the value of imputation credits, we rely on the results from both approaches.

- the views of experts—experts differ in their interpretations of the:
  - role of the value of imputation credits in the regulatory framework
  - underlying theory and academic literature
  - relevance of different estimation techniques, particularly for the utilisation rate.

4.4 Reasons for final decision

In determining the value of imputation credits, we have considered the full range of evidence before us with regard to its merits (see section 4.3.6 for our approach). We consider that a value of imputation credits of 0.4, selected from within a range of 0.3 to 0.5, is reasonable because:

- It is within the range of values indicated by the evidence, and the relevance of the evidence is supported by the expert opinion of Handley, Lally, and McKenzie and Partington.
- It primarily reflects an estimate of the utilisation rate from the equity ownership approach. Handley considered this the most important approach to estimating the utilisation rate, relative to the alternatives of tax statistics and implied market value studies.[84] The equity ownership approach was Lally's second preference after his recommendation for a utilisation rate of 1.[85]

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[82] Rather, they measure the dividend drop off ratio which is influenced by personal tax factors. This is not appropriate given our post (corporate) tax regulatory framework based on Officer's 1994 paper (see R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994).

[83] For instance, some experts advocate use of evidence on just listed companies and their investors because this is considered to be more reflective of the benchmark efficient entity and its investors, and/or this is consistent with the use of evidence from just listed companies when estimating the market risk premium. We note that Lally, in his latest report, recommends that the distribution rate should be set with reference to the financial reports of the top 20 listed companies (as he considers this is most representative of the firm specific distribution rate for a benchmark efficient entity) and the utilisation rate should be set with reference to all equity (as he considers this likely the best estimate of the economy wide theta value) (see Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–6). See section A.9.1 of appendix A for more discussion.

[84] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

[85] M. Lally, *The estimation of gamma*, 23 November 2013, p. 4 and M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 27,29; Lally's recommendation of a utilisation rate of 1 is based on his consideration that, because we use a domestic

- It is within the 'preferred' range for the value of imputation credits (0.4 to 0.5) in Handley's September 2014 advice.[86]
- It is slightly below the Lally's recommended application of the equity ownership approach.[87] This suggests a gamma of at least 0.50 based on Lally's preferred estimate of the distribution rate and using the equity ownership data based on all equity (which Lally prefers).
- It is consistent with providing regulatory certainty given it is consistent with the value we used for all regulatory decisions released in 2015 and 2016.
- Based on the evidence before us at this time, adopting a value of imputation credits that is rounded to one decimal place appropriately reflects the uncertainty and imprecision associated with this parameter. This uncertainty is evident in the range of views and values that have been espoused by experts, and was recognised by Handley and McKenzie and Partington.[88] The imprecision of determining the value of imputation credits was emphasised by Handley.[89]

In considering the evidence on the distribution and utilisation rates, we have broadly maintained the approach set out in the Guideline, but have re-examined the relevant evidence and estimates. This re-examination, and new evidence and advice considered since the Guideline, led us to depart from the Guideline value of imputation credits of 0.5. Departures from specific aspects of the Guideline are noted in the discussion of the distribution rate and utilisation rate below.

Further to the Guideline approach, in this final decision we consider we may have regard to evidence from all equity and/or only listed equity. Some experts advocate use of evidence on only listed companies and their investors because they consider it to be more reflective of the benchmark efficient entity and its investors, or because they consider this is consistent with the use of evidence from only listed companies when estimating the MRP. However, there is no consensus on this point. We discuss the issue further in sections A.8 and A.8.5. We did not consider this issue in the Guideline.

Lally considered that there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so.[90] However, we note given Lally's advice our approach appears to lead to a conservative gamma estimate

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rate of return framework, we should assume that all investors in the market are domestic (and therefore eligible to make full use of imputation credits).

86 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 3.

87 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 3–6.

88 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 32. M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 31–35. See also section A.1 of appendix A.

89 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 32.

90 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

(in favour of the service provider), as Lally considered that only listed firms should be used to determine the distribution rate and all equity firms should be used to estimate the utilisation value which results in a gamma estimate of 0.5. Following Lally's most recent advice we remain of the view it is not necessary to 'match' estimates of distribution rates and utilisation rates based on the dataset used; although we still consider the choice is open to us. We discuss this further in section 4.4.1 and A.9.2.

We also note that, following his advice, Lally recommended pairing an estimate of the utilisation rate for all equity from the equity ownership approach, with a distribution rate for listed equity estimated from the financial statements of the top 20 listed firms (which he considered likely to best reflect the distribution rate of a benchmark efficient entity).[91]

Recognising these considerations, table 4-3 and table 4-4 show estimates of the value of imputation credits that arise from internally consistent evidence from all equity and only listed equity.[92] It also shows the estimated value of imputation credits from Lally's recommended approach (see above). These individual sources of evidence allow us to present estimates to two decimal places. However, we consider it reasonable to determine a value of imputation credits to only one decimal place when determining a single value from across this evidence.

Table 4-3 Estimates of the value of imputation credits—evidence from all equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.56 to 0.68	0.7	0.40 to 0.47
Equity ownership approach (Lally recommended distribution rate)	0.56 to 0.68[93]	0.83	0.46 to 0.56[94]
Tax statistics	0.48	0.7	0.34
Tax statistics (Lally recommended distribution rate)	0.48	0.83	0.40

Source: AER analysis; Lally, *Gamma and the ACT Decision*, May 2016, p. 6.

[91] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–6, 18, 25. In making this choice, Lally considered there is a trade-off between statistical reliability (which is greater if a market-wide estimate is used) versus potential bias (worse from a sector-wide estimate). Lally discussed various issues with using firm-specific data, industry averages and market-wide data to estimate the distribution rate.

[92] Note that our estimates of the distribution rate for listed equity come from ATO data on public companies. Handley advised that it is not strictly correct to refer to ATO data on public companies as data on listed companies. This is because the ATO definition of a public company includes but is not limited to listed companies. However, Handley also advised that referring to the public company data as relating to listed companies is suitable for our purpose. J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 26.

[93] Lally does no use a range for the utilisation rate, rather Lally recommends a utilisation rate of at least 0.6 (all equity). See Lally, *Gamma and the ACT Decision*, May 2016, pp. 5, 6, 21, 23, 31, 32.

[94] Lally recommends a gamma estimate of at least 0.5 which is based on a distribution rate of at least 0.83 and a utilisation rate of 0.6. See: M. Lally, *Gamma and the ACT Decision*, May 2016, p. 6.

Table 4-4 Estimates of the value of imputation credits—evidence from listed equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.38 to 0.55	0.75	0.28 to 0.41 [(a)]
Implied market value studies	0 to 1	0.75	0 to 0.75
SFG dividend drop off study	*0.35 (0.4)*[(a)]		*0.26 (0.30)*[(b)]

Source: AER analysis.

(a) We note Lally recommends the utilisation rate from all equity over the utilisation rate from listed equity. However, if his preferred distribution rate was paired with the utilisation rate for listed equity it would give a range for the value of imputation credits of 0.31 to 0.46.

(b): Following the adjustment proposed by Handley and Lally. This adjustment is discussed further in section A.15.4.

Overall, the evidence suggests that a reasonable estimate of the value of imputation credits is within the range 0.3 to 0.5.[95] From within these possible ranges, we choose a value for gamma of 0.4 based on the following considerations:

- The equity ownership approach, on which we place the most reliance, suggests a value between 0.28 to 0.47 using 'matched' distribution and utilisation rates for all equity and for all listed equity, respectively. This is based on a range of 0.40 and 0.47 when applied to all equity and 0.28 and 0.41 when applied to only all listed equity. The overlap of the different evidence from the equity ownership approach using these 'matched' distribution and utilisation rates suggests a value between 0.40 and 0.41. We also have regard to Lally's recommended approach, which combines the use of an all equity utilisation rate from the equity ownership approach with a distribution rate for listed equity from financial reports of the top 20 listed firms.
- The evidence from tax statistics, on which we place less reliance, suggests a value around 0.34 based on a utilisation rate of 0.48 and an economy wide distribution rate of 0.70. This is within the equity ownership approach range of 0.28 to 0.47 using 'matched' data and below the overlap of estimates from listed and all equity of 0.40 to 0.41. The taxation data also suggests a value around 0.40 based on a utilisation rate of 0.48 and Lally's preferred distribution rate for a benchmark efficient entity of 0.83.
- The evidence from implied market value studies, on which we place even less reliance, suggests a value between 0 and 0.75. In particular, SFG's dividend drop off study suggests a value of 0.26 or 0.30. This is around the bottom end of the 'matched' equity ownership approach range of 0.28 to 0.47, below the overlap of 0.40 to 0.41, and well below Lally's recommended gamma estimate of at least 0.5. Evidence from implied

[95] Although implied market value studies produce estimates below 0.3 and above 0.5, we place less reliance on these studies.

market value studies more generally suggests the value could be higher than 0.5 or lower than 0.28.

On balance, we have considered it appropriate to continue to apply a value of imputation credits of 0.4 in this final decision. We note this is within the range of the overlap if 'matched' utilisation rates and distribution rates for all equity and all listed equity are used (0.40 to 0.41). This is also at the bottom of the range for the paired values from all equity using a distribution rate of 0.7 (range of 0.40 to 0.47). We consider this estimate satisfies the requirements in the NER/NGR.

We consider a gamma value of 0.4 remains appropriate despite Lally's recent advice indicating this might be too low and recommending a value of at least 0.5.[96] In maintaining the use of a gamma value of 0.4 we have given particular consideration to the desirability of regulatory certainty and predictability. We also note we have used a value of 0.4 for all decisions released in 2015 and 2016. Given these considerations, we would be reluctant to depart from the value of 0.4 used in our recent decisions without broad stakeholder consultation. We also remain of the view Lally's advice does not indicate 0.4 is not open to us to choose when exercising our regulatory discretion.

Therefore, we remain of the view that our choice of 0.4 gives appropriate regard to the relative merits of the equity ownership approach, tax statistics and implied market value studies (in particular, SFG's evidence).

In section 4.3.6 (and in appendix A), we describe the sources of the estimates in table 4-3 and table 4-4, and present our assessment of the underlying evidence. This includes reasons for the relative levels of reliance we place on the underlying sources of evidence.

We accept Powerlink's proposed value of imputation credits of 0.4. We acknowledge Powerlink's submission that the AER should apply any changes to its approach to estimate the value of imputation credits resulting from a decision of the Federal Court in relation to the AER's appeal of the Ausgrid Tribunal's decision to Powerlink's 2018-22 regulatory period.[97] However, we have not changed our approach to gamma in light of the recent Tribunal decisions and remain of the view it is appropriate. The AER will have regard to any merit or judicial review proceeding in relation to gamma that is released after Powerlink's final determination when deciding the value for gamma to apply in future determinations.

We do not accept the recent Ausgrid Tribunals decision that the estimated utilisation rate of 0.35 from the SFG dividend drop off study should be used to estimate gamma. This is because we do not consider it appropriate to rely exclusively on implied market value studies (or SFG's single dividend drop off study). This position is supported by a number of

[96] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 29.

[97] Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.

experts.[98] The South Australian Centre for Economic Studies suggested that dividend drop off studies be disregarded entirely.[99]

Even if we were to rely solely on the estimate of the utilisation rate of 0.35 from SFG's study, we consider that a value of imputation credits of 0.25 is unreasonable. This is because:

- Handley and Lally advised that the proper use of this estimate of the utilisation rate requires its adjustment to 0.4. We agree with this adjustment which is required to correct for the incorrect post-company pre-personal tax valuation of cash dividends from SFG's study, which will also be expected to be reflected in the estimated utilisation rate. In the post-tax Officer framework underlying the NER/NGR, one dollar of dividends distributed to the investor is worth one dollar to investors post (company) tax (pre-personal tax). This is clear from Officer's definition of after tax net cash flows consistent with the post-tax vanilla WACC in formula (12) of his 1994 paper.[100] The incorrect post (company) tax (pre-personal tax) valuation of dividends (that will also be reflected in the estimated utilisation rate) is most likely due to differential personal taxes on dividends and capital gains which impact dividend drop off studies.
- This is an estimate of the utilisation rate of investors in only listed equity, and therefore we remain of the view it should be paired with either an estimate of the distribution rate from only listed equity using the cumulative payout approach (that is, 0.75); or Lally's estimate for only listed equity estimated using the top 20 listed firms (that is, 0.83).

Therefore, even if dividend drop off studies can be used to determine the utilisation rate, it yields a value of imputation credits of at least 0.30 (0.4 x 0.75) rather than 0.25. However, with regard to the discussion above, our estimated value of imputation credits is higher than 0.30. We also note we do not consider even the adjusted value from SFG's dividend drop off study is a reliable estimate of the utilisation rate for the reasons discussed in this decision (see section 4.4.1).

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98 For example, Handley and Lally advised that other classes of evidence are more valuable. Handley considers that the equity ownership approach and tax statistics are more important to estimating the utilisation rate than implied market value studies: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31. Lally prefers an estimate of the utilisation rate from the equity ownership approach to one from implied market value studies: M. Lally, *The estimation of gamma*, 23 November 2013, p. 4. We discuss the different approaches to estimating the utilisation rate in more detail in section 4.4.1. Also, McKenzie and Partington's report for the Queensland Resources Council also suggested that it is reasonable to have regard to other classes of evidence. McKenzie and Partington describe the approach to estimating the utilisation rate in our draft rate of return Guideline, which relied on evidence other than implied market value studies, as making a 'reasonable case' for the estimate adopted in that document; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 32.

99 SA Centre for Economic Studies suggested this in a report for the South Australian Council of Social Service. See SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, p. 17.

100 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pg. 8.

We remain of the view that limited reliance should be placed on market based studies. These studies are influenced by differential personal taxes and are determined by the marginal investor that is trading around the ex-dividend date. We consider market based studies are unlikely to provide an appropriate estimate for the utilisation rate. Therefore, given the data reliability issues with tax statistics, we consider the equity ownership approach provides the best estimate for the proportion of distributed imputation credits that are expected to be used to offset investor personal tax (that is, the utilisation rate). This is due to local investors effectively fully valuing distributed imputation credit at their face value on a post-company pre-personal tax and pre-personal costs basis.[101] We remain of the view the 45 day holding rule does not be have a material impact on the utilisation of imputation credits by otherwise eligible (that is, domestic) investors.

In section 4.4.2 (and appendix A) we address Powerlink's proposal in more detail. We also address other service providers' proposals submitted prior to Powerlink's proposal and at the same time Powerlink submitted its proposal.

4.4.1 Evidence underlying our estimate of the value of imputation credits

This section discusses the distribution rate and utilisation rate (or value) in more detail. More specifically, it describes our approach to estimating these sub-parameters of the value of imputation credits. This includes reasons for the relative levels of reliance we place on the underlying sources of evidence (for the utilisation rate in particular).

The distribution rate

The distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.[102] We consider:

- an estimate of 0.75 for the distribution rate is reasonable when considering estimates of the utilisation rate that relate to only listed equity.
- an estimate of 0.7 for the distribution rate is reasonable when considering estimates of the utilisation rate that relate to all equity.

Whether an estimate of the distribution rate will result in a reasonable estimate of the gamma value for a benchmark efficient entity depends on what is considered the best estimate of the utilisation rate (and if this should be based on all equity or a subset) and what is considered the best estimate of the distribution rate for a benchmark efficient entity. We

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[101] We note that there may be a very small diminution in value from face value due to the time value of money. However, we consider this immaterial for the reasons discussed in section A.8.3.

[102] In the Guideline we referred to the distribution rate as the 'payout ratio'. We have in this decision adopted 'distribution rate' as we consider this to be the more commonly used terminology. In the Guideline and this decision we attach the same meaning to these two different ways of describing the parameter. Note also that the distribution rate is referred to as the 'access fraction' in the Monkhouse framework.

note Lally effectively considers both 'matched' estimates will be too low given what he considers to be the best estimate of the market wide utilisation rate (of around 0.6) and the appropriate (firm specific) estimate of the distribution rate for a benchmark efficient entity (of 0.83).[103]

Consistent with the Guideline, we estimate the distribution rate using the 'cumulative payout ratio approach', which uses data from the ATO on the accounts used by companies to track their stocks of imputation credits ('franking account balances').[104] We use the cumulative payout ratio approach because it:

- uses long-term, published data
- is supported by the service providers, Gray (for SFG), Handley, and McKenzie and Partington[105]
- is simple and intuitive.

Using this approach, NERA estimated a distribution rate across all equity of 0.7 for the period 1987 to 2011.[106] Hathaway found a similar estimate for the period 2004 to 2011.[107] We relied on these estimates in the Guideline and the decisions released in 2014. We consider that updated analysis of the ATO data to the 2012 tax year by NERA and Handley indicates that 0.7 remains a reasonable estimate of the distribution rate over all equity.[108]

Gray (for Frontier) updated the ATO data up to 2012-13 and found that the payout ratio for all equity latest year is 0.64 and the cumulative ratio is 0.67.[109] However, recognising the volatility in the data Frontier considered that 0.7 distribution rate still remained appropriate for all equity.[110] We have updated this data to 2014 and find the cumulative payout ratio for listed equity is 0.75 and for all equity is 0.68. However, we remain of the view that a distribution rate of 0.7 is appropriate for all equity.

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103 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 6.

104 We discuss the cumulative payout approach and alternative approaches to estimating the distribution rate in section A.10 of appendix A.

105 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 84–92; J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 25–30; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 31.

106 NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

107 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

108 We discuss this updated analysis in section A.10 of appendix A. NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015. J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015.

109 Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016, pp. 7, 18-19.

110 Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 7.

Also using this approach, Handley estimated a distribution rate across only listed equity of 0.8 for the period 1987 to 2011.[111] We found a similar estimate for the period 2004 to 2011.[112] We relied on these estimates in the decisions we released in November 2014 and April 2015. Updated analysis of the ATO data to the 2012 tax year by NERA and Handley indicates that the distribution rate over only listed equity has fallen slightly.[113] In this final decision following a further update incorporating 2013 and 2014 data we consider an appropriate estimate of the distribution rate over only listed equity is 0.75. This is slightly lower than the value of 0.77 we used in our October and November 2015 decisions.

A distribution rate across only listed equity was not presented in the Guideline. However, as set out above, we now consider it is open to us to have regard to evidence from all equity and/or only listed equity (see section A.9.2). We consider estimates of the distribution rate from listed equity and all equity are reasonably consistent with a benchmark efficient entity given the difficulties associated with choosing a representative dataset (see section A.10).[114]

Lally agrees that when estimating the distribution rate for a benchmark efficient entity, practical considerations indicate the use of sector-wide data. He recommends a listed equity distribution rate estimated from financial statements of the top 20 listed firms, stating that:[115]

> Furthermore, since privately-owned regulated businesses in Australia are typically listed firms or subsidiaries of listed firms, the appropriate set of firms to use to estimate the distribution rate of regulated businesses would seem to be listed firms.

Lally also considered that there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so.[116] This is because, even though the distribution rate may be estimated using market-wide data, it is, in principle, a firm-specific parameter. On the other hand, the utilisation rate is a market-wide parameter.[117] Following this, Lally's most recent advice we remain of the view it is not necessary to 'match' estimates of distribution rates and utilisation rates based on the dataset used; although we still consider the choice is open to us. While we principally maintain our previous approach (as is open to us), we also have some regard to Lally's preferred approach (which combines an all equity utilisation rate from the equity ownership approach with a distribution rate for listed equity from financial reports of the top 20 listed firms).[118] We note that using Lally's preferred approach results in a significantly higher gamma estimate than 0.4.[119] While we have given this limited weight, Lally's advice does provide further

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111 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 28–29.

112 See section A.10 for more detail.

113 We discuss this updated analysis in section A.10 of appendix A.

114 See M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 24–25.

115 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 26, 28–29.

116 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

117 Lally's view on this issue appears consistent with the views of Gray. See Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 12–13.

118 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5–6, 24–26, 29.

119 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 27.

support for our view that our use of gamma value of 0.4 should result in an overall return (inclusive of the value of imputation credits) that is (at least) sufficient to compensate Powerlink's investors.

We discuss our approach to estimating the distribution rate further in sections A.8 and A.8.5.

The utilisation rate

We understand the utilisation rate to be the utilisation value to investors in the market per dollar of imputation credits distributed.[120] In the Monkhouse framework, the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors. For an 'eligible' investor, each dollar of imputation credit received can be fully returned to the investor in the form of a reduction in tax payable or a refund.[121] Therefore, we consider that eligible investors have a utilisation rate of 1. Conversely, 'ineligible' investors cannot utilise imputation credits and have a utilisation rate of 0. It follows that the utilisation rate reflects the extent to which investors can utilise the imputation credits they receive to reduce their tax or obtain a refund.

This means imputation credits expected to be utilised should be valued at full face value on a post-company pre-personal tax basis. Valuing imputation credits at face value is consistent with how all inputs into the allowed rate of return are estimated. For example, the yield on debt is calculated where the face value of coupon payments and face value of the principal is used to determine the yield to maturity. Similarly, the face value of dividends are used to calculate the MRP under the historical average approach and in the dividend growth model.

The implied market value studies that value dividends and imputation credits around the ex-dividend date are influenced by different personal tax treatment of capital gains and dividend income. These estimates are neither pre- nor post- personal tax estimates due to differential taxes. Our consultant supports that market value studies need to be adjusted to correct for the biases in the estimates (likely to be principally driven by differential taxation).[122] As a result, we do not consider this is appropriate to use implied market value studies to estimate the utilisation value given our post (corporate) tax regulatory framework based on Officer 1994.[123] What is relevant is the cost that is imposed on a benchmark efficient entity. This is the cost before personal taxes and personal transaction costs are incurred. The face value of the imputation credit is the pre-personal tax value and personal tax is levied on this estimate.[124]

Consistent with the Guideline, when estimating the utilisation rate we place:

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120 In this decision we use the terms theta, utilisation value and utilisation rate interchangeably to mean the same thing.

121 This is the return to eligible investors before administrative costs, personal taxes and diversification costs. Handley advises that this is the desired basis for the utilisation rate. We discuss this further in section A.8.1 of appendix A.

122 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 21-22.

123 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994.

124 Personal tax is levied on the gross dividend which is the sum of the face value of the franked dividend and the face value of the imputation credit.

- significant reliance upon the equity ownership approach
- some reliance upon tax statistics
- less reliance upon implied market value studies.

This weighting is supported by Lally.[125] The SAPN Tribunal also considered the AER did not err, nor was it unreasonable, in giving most weight to the "utilisation" approach.[126]

The results from these classes of evidence are summarised in table 4-3 and table 4-4. The relative importance that we assign to each approach is supported by Handley and Lally, while McKenzie and Partington's report for the Queensland Resources Council suggested that having regard to all of these approaches is reasonable.[127] We discuss each approach in the sections below.[128] We depart from the Guideline by not relying upon the 'conceptual goalposts approach'.

We discuss our interpretation and definition of the utilisation rate further in sections A.6 and A.8.

The equity ownership approach

We consider that the value-weighted proportion of domestic investors in the Australian equity market is a reasonable estimate of the utilisation rate. This is because, in general, domestic investors are eligible to utilise imputation credits and foreign investors are not. Moreover, as discussed above, we consider that eligible investors have a utilisation rate of 1 because each dollar of imputation credit received by these investors can be fully returned to them in the form of a reduction in tax payable or a refund. On a pre-personal tax basis, one dollar of imputation credits reduces an eligible investor's tax bill by one dollar. We refer to this approach as the 'equity ownership approach', and we use data from the National Accounts of the Australian Bureau of Statistics (ABS) to estimate the domestic ownership share.[129]

We place significant reliance upon the equity ownership approach when considering estimates of the utilisation rate. This is because:

- it is well aligned with the definition of the utilisation rate in the Monkhouse framework
- it employs a relatively simple and intuitive methodology
- it uses a reliable and transparent source of data

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125 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 22.

126 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 159.

127 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31; M. Lally, *The estimation of gamma*, 23 November 2013, p. 4; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 32.

128 We have also considered these approaches and the evidence they employ against the criteria used to assess evidence on the allowed rate of return. See section A.11 of appendix A.

129 Specifically, we use data from Australian National Accounts: Finance and Wealth (ABS cat. 5232.0).

- it provides estimates of the utilisation rate for investors in both all equity and only listed equity.

We recognise the equity ownership approach does not take into account the existence of some domestic investors that do not hold their shares for 45 days at risk over the ex-dividend date (the 45 day rule).[130] However, we consider it is unlikely to have a material impact on the utilisation of imputation credits by domestic investors. Importantly, no data has been presented that demonstrates a material impact.

We also recognise the equity ownership approach produces a range of estimates of the utilisation rate, and the upper end of this range is higher than the estimate produced from tax statistics (see discussion under 'Tax statistics' below). However, we do not consider this means the equity ownership approach is incorrect. This is because tax statistics, like the equity ownership approach, produce an estimate of the utilisation rate. These estimates are uncertain and dependent on the quality of the underlying data (this is a particular issue for tax statistics). As such, the true (unknown) value could be higher or lower. Following this, we do not consider the 45 day rule explains the difference in utilisation rate estimates between tax statistics and the equity ownership approach. We consider the difference is likely driven by estimation error in the taxation data. This view is supported by Lally.[131] We also note Lally's statement that:[132]

> Thus, if foreign investors are recognized and absent any information on the terms other than the value weights on the RHS of equation (8), the equity ownership approach is not an upper bound on theta but an unbiased estimate.

We consider that a reasonable estimate for the utilisation rate from the equity ownership approach is between:

- 0.56 and 0.68, if all equity is considered
- 0.38 and 0.55, if only listed equity is considered.

This differs from the Guideline. In the Guideline, we considered that the equity ownership approach supported a utilisation rate between 0.7 and 0.8. Since the Guideline's publication, we have examined more closely the relevant data from the National Accounts. This has allowed us to update and refine our estimates.

We describe our application of the equity ownership approach and our re-examination of this source of evidence since the Guideline in detail in section A.12.

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130 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048.

131 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 23.

132 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 17.

Tax statistics

The ATO publishes aggregate statistics on the tax returns submitted by individuals, superannuation funds and companies, as well as on the imputation credits refunded to certain income tax exempt entities (for example, charities).[133] In theory, these statistics can be used to derive a measure of the total amount of imputation credits utilised by eligible investors to offset tax or to be refunded. As discussed in relation to the distribution rate, ATO statistics also provide estimates of the amount of imputation credits distributed. We consider the reported value of credits utilised divided by the reported value of credits distributed is an estimate of the utilisation rate.

We have had regard to tax statistics when considering estimates of the utilisation rate. We place a degree of reliance upon tax statistics that is less than that placed upon the equity ownership approach, but which is more than that placed on implied market value studies. Our position on tax statistics is consistent with the advice from Handley and Lally. Handley considered tax statistics to be the second most important approach to estimating the utilisation rate after the equity ownership approach.[134] Lally considered that the tax statistics approach lacks precision, and he did not prefer it to the equity ownership approach.[135] However, Lally still preferred tax statistics to implied market value studies.[136]

We have placed less reliance upon tax statistics compared with the equity ownership approach because we consider that tax statistics have a number of limitations:

- There are residual concerns regarding the data. While Hathaway considered that the amounts of tax paid and credits utilised can be concluded ‘with some confidence’ and that they are ‘unlikely to be in major error’. Hathaway also identified a significant discrepancy associated with the tracking of imputation credits in the data that led him to 'urge all caution in using ATO statistics for any estimates of parameters concerned with [imputation] credits'.[137]
- They do not reflect the amount of credits refunded to individuals that do not have to fill out a tax return.
- They might not reflect the amount of credits refunded to certain types of entities.[138]

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133 These statistics are available at: https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/. Accessed 9 April 2015.

134 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

135 M. Lally, *The estimation of gamma*, 23 November 2013, p. 4. Also see M. Lally, *Gamma and the ACT Decision*, May 2016, p. 4–5.

136 M. Lally, *The estimation of gamma*, 25 November 2013, p. 4. Also see M. Lally, *Gamma and the ACT Decision*, May 2016, p. 4–5.

137 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, paras. 9 and 99–100.

138 That is, statistics are published on the refunds to 'endorsed income tax-exempt entities and deductible gift recipients', but it is not clear whether this covers refunds to other entities entitled to a refund of imputation credits. Such entities include

- They do not provide estimates of the utilisation rate for investors in only listed equity. Handley suggested that evidence from listed equity is more relevant to the benchmark efficient entity.[139]
- Lally considered tax statistics based estimates of the utilisation rate are unreliable and potentially biased.[140]

With regard to Hathaway's analysis, in the draft decisions released in 2014 we considered that tax statistics supported an estimate of the utilisation rate between 0.4 and 0.6.[141] However, we also recognised in the draft decisions released in 2014 that our estimate of the distribution rate (0.7) implied that we should adopt a utilisation rate of around 0.43 from within this range for consistency. This differs from the Guideline, in which we considered that tax statistics supported an estimate of the utilisation rate between 0.4 and 0.8.

Since the Guideline, we have continued to examine this evidence. We now consider that greater reliance should be placed upon estimates that are:

- derived from post-2004 data, consistent with Hathaway's findings that the ATO statistics are subject to a number of issues prior to 2004[142]
- consistent with our estimates of the distribution rate using cumulative distribution rate data. However, we note this consistency principle does not preclude the combination of a utilisation rate estimated based on this principle with a higher estimate of the distribution rate for the benchmark efficient entity based on Lally's latest advice.[143]

In this final decision, we have regard to NERA's updated analysis of the ATO data to the 2012 tax year.[144] This analysis supports a distribution rate of 0.7 and a utilisation rate of 0.45. Using updated ATO data to the 2012-13 year, Gray (for Frontier) has estimated a slightly higher utilisation rate of 0.46 for the period 2004 to 2013. Our analysis uses updated ATO data up to 2013-14 and estimates a slightly higher utilisation rate of 0.48 for the period 2004 to 2014.

We consider tax statistics are a valid method for estimating a point estimate of the utilisation rate. However, we consider it provides a less reliable estimate of the utilisation rate than the equity ownership approach (see discussion under 'Equity ownership approach' above). This is because there are issues with the underlying taxation data. As explained above, we

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public funds declared by the Treasurer to be a developing country relief fund and exempt institutions that are eligible for a refund under the regulations. See: https://www.ato.gov.au/Non-profit/Franking-credits/In-detail/FAQs/Refund-of-franking-credits--endorsed-entities---FAQs/?page=3. Accessed 9 April 2015.

139 We discuss this issue further in section A.9.1 of appendix A.

140 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 19-20, 26, 30.

141 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

142 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

143 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5, 25.

144 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

consider there are issues with the underlying taxation data and experts consider it to be unreliable. We note that Frontier has submitted that gamma can be estimate reliably from tax statistics as the ratio of credits redeemed to credit credits created.[145] However, after reviewing the Hathaway paper and Lally's advice, we are not convinced. This is further discussed in section A.13.

Nevertheless, having regard to the potential data limitations and alternate estimates, the evidence from tax statistics is not inconsistent with the evidence from the equity ownership approach. We also note that an estimate of gamma of approximately 0.4 is obtained when combining a utilisation rate of 0.48 (consistent with FAB data) with Lally's preferred estimate of the distribution rate for a benchmark efficient entity of 0.83.

We discuss our revised (post-Guideline) consideration of tax statistics in more detail in section A.13.

Implied market value studies

Implied market value studies seek to infer from market prices the value of distributed imputation credits. A wide range of such studies have been conducted over time, employing a variety of techniques. A common type of implied market value study are dividend drop off studies. These studies compare the price of a security with and without the entitlement to a dividend. Econometric techniques are then used to infer the value of the imputation credits attached to these dividends. We discuss the different types of implied market value study in section A.15.1.

We consider that the equity ownership approach and tax statistics provide more direct and simpler evidence on the utilisation rate than implied market value studies. Handley supported this view; he noted that dividend drop off studies are the most relevant class of implied market value study, but considered them less important to estimating the utilisation rate than the equity ownership approach and tax statistics.[146] Lally identified a number of issues with using market prices to estimate the utilisation rate and, therefore, preferred the equity ownership approach.[147] Lally preferred both the equity ownership approach and tax statistics to dividend drop off studies.[148]

We also consider that these studies can be subject to a number of limitations. The limitations of implied market value studies can include:

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

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[145] Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 34, 12-15.

[146] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

[147] M. Lally, *The estimation of gamma*, 23 November 2013, p. 4; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 4-6.

[148] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–5.

- The results of these studies can be influenced by factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate. The utilisation rate should be estimated on a post-company pre-personal tax basis consistent with the allowed rate of return parameters and the post (corporate) tax framework in the NER/NGR.
- The results of these studies might not be reflective of the value of imputation credits to investors in the market as a whole. For instance, in dividend drop off studies the value of imputation credits is determined by the marginal investor that trade around the ex-dividend date.[149] There is no reason to assume this reflects the value that long term investors who provide capital to a benchmark efficient entity place on imputation credits in aggregate. There is also no reason to assume this value will show what proportion of company tax is a prepayment of personal tax.[150]
- These studies can be data intensive and employ complex and sometimes problematic estimation methodologies.
- 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. However, 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').

Lally, in his most recent report, has outlined eleven concerns with the SFG dividend drop off study and many of these concerns generally apply to all dividend-drop off studies.[151]

The limitations of dividend drop off studies are discussed in more detail in section A.15. However, we note here the following statement from Lally:[152]

> In respect of dividend drop-off studies, my views on the merits of this approach appear in Lally (2013, section 3.5) and they are highly adverse. In particular, the results from such studies are subject to considerable statistical uncertainty, to the tax positions and transactions costs incurred by arbitrageurs who may be quite unrepresentative of investors in general, the contentious question of which model to use, data filtering rules, deletion of outliers, the choice of the "tuning constant" in robust regression models, the wide divergence in results from other types of studies using market evidence, the wide range of evidence on anomalous behaviour around ex-days, and the need to correct the estimated coefficient on imputation credits for the difference in the tax rate on capital gains and dividends.

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149 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44; A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 18.

150 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44; A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 18.

151 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 4-6.

152 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 22.

In section A.15.2, we summarise the available implied market value studies and their results. Opinion on the merits of the various studies differs:

- Gray (for SFG) considered that implied market value studies should be relied upon exclusively when estimating the (after-personal-tax and after-personal-costs) utilisation rate. Moreover, he considered that dividend drop off studies should be preferred to alternative market studies. In Gray's view, there is no reasonable basis for adopting an estimate from dividend drop off analysis above the 0.35 estimate from SFG's study.[153]
- The Economic Regulation Authority of Western Australia (ERA) conducted its own dividend drop off study and concluded that a reasonable estimate is between 0.35 and 0.55.[154]
- Lally concurred with the view that implied market value studies 'warrant low weight', but suggested that some studies are more useful than others based on their characteristics.[155] Lally also raised a number of issues in relation to SFG's dividend drop off study.[156] Lally considers that 'minimal weight' should be placed on dividend drop off studies.[157]
- McKenzie and Partington considered that there is no obvious manner in which to weigh the results from various studies based on their characteristics. They observed that a simple average of the results from a reasonably comprehensive sample of studies suggests an estimate of the utilisation rate of 0.53. They also noted that their own studies suggest a significantly higher estimate of 0.83.[158]
- Gray (for Frontier) expressed concerns that the reintroduction of pre-2000 and low quality studies is an error, and that it is also an error to assume all market value studies are of uniform relevance and quality.[159]

A further issue regarding implied market value studies is the appropriate interpretation of their results. Handley and Lally both advised that in the rate of return framework investors are assumed to value one dollar of dividends at one dollar (on a post-company pre-personal-tax basis). This is certainly true of how the MRP is estimated, where the face value of historically distributed dividends and historical capital gains are used. However, the results of implied market value studies can reflect certain factors that suggest that investors value one dollar of dividends at less than one dollar (such as differential personal taxes on dividends and capital gains). Moreover, any such factors will affect these studies' results for investors'

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153 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 17 and 20.

154 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 13 December 2013, para. 921.

155 M. Lally, *The estimation of gamma*, 23 November 2013, pp. 20–30.

156 M. Lally, *The estimation of gamma*, 23 November 2013, pp. 24–26 and 28–29; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, pp. 35–38; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 4-6.

157 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–5, 23, 31.

158 M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 34.

159 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 35.

valuation of imputation credits. Handley and Lally advised that the desired estimate of the utilisation rate should exclude the effect of these factors.[160] To remove the effect, they advised that the estimate of the utilisation rate from a given study can be divided by investors' estimated valuation of dividends from the same study.[161] Therefore, Handley and Lally advised that the 0.35 estimate from SFG's dividend drop off study should in fact be interpreted as an estimate of around 0.4.

In light of this, we consider implied market value studies, if they are to be used at all, need to be adjusted for the incorrect estimates of the post-company pre-personal tax value of cash dividends which would expect to also result in an incorrect estimate of the value of imputation credits. This is likely correcting for the effect on the observed drop off ratio of differential personal taxes between income and capital gains (see section A.15.3). This limitation does not apply to other market parameters in the allowed rate of return framework. We also consider that, even when adjusted, we should place limited reliance on estimates of the utilisation rate from implied market value studies because of residual concerns about these studies and what they are measuring.

In light of the differing views on these studies and the range of estimates they produce, we consider that implied market value studies provide limited guidance. In the Guideline, we considered that implied market value studies supported an estimate of the utilisation rate between 0 and 0.5. This range was determined with regard to a range of studies, with higher regard given to those studies that:

- used longer data periods
- used data since 2000, when the change in tax law entitled eligible investors to a refund of credits that exceeded their tax liability
- encompassed the breadth of the market instead of just selected firms, and
- appeared to use more reasonable and robust econometric treatments.

However, in this final decision we recognise that experts advocate both broader and narrower assessments of the evidence from implied market value studies. McKenzie and Partington considered it reasonable to have regard to a range of studies, including those that produced estimates above 0.5.[162] In Gray's view (for SFG), there is no reasonable basis for

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[160] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 43–44; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 16; M. Lally, *The estimation of gamma*, 23 November 2013, p. 21.

[161] In the appendix to the Guideline we noted that this adjustment was contentious and required further examination. In his recent advice, Handley also advised that this adjustment should be applied. Having given this issue further consideration, we agree with the advice from Lally and Handley that estimates from dividend drop off studies should he adjusted in this manner for the reasons that Lally and Handley explain.

[162] M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 33–35.

adopting an estimate from dividend drop off analysis above the 0.35 estimate from SFG's study.[163] It appears that Gray (for Frontier) continues to hold this view.[164]

Ultimately, as discussed in section A.15.5, estimates from implied market value studies and the level of reliance we place on them (including SFG's dividend drop off study) do not give us cause to move from the estimate of the value of imputation credits that we determine with regard to evidence from the equity ownership approach and tax statistics. In response to Gray's comments (for Frontier) on our consideration of "pre-2000 and low-quality studies"[165] we note that our having regard to more studies since the Guideline, including those that use pre 2000 data and those that estimate a value for theta between 0.5 and 1, was not material to our decision to set gamma at 0.4, and that we have had particular regard to SFG's dividend drop off study in making our decision.

We discuss our consideration of implied market value studies in detail in section A.15.

4.4.2 Response to submissions by stakeholders

In section A.4, we set out the key issues raised by Powerlink, as well as the key issues raised by other service providers we have assessed recently (post-Guideline). The key issues raised are broadly consistent across the service providers.

Table 4-5 sets out the key issues raised by Powerlink and other service providers in their recent proposals. We also provide a summary of our response and a reference to our more detailed response.

Table 4-5 Key issues raised by service providers

Issue	Summary of response	Section
Conceptual framework		
Our conceptual approach to gamma, redefining it as the value of imputation credits that are available for redemption, is inconsistent with the concept of gamma in the Officer framework for the WACC and inconsistent with the requirements of the NGR/NER and the NGO/NEO. It is also inconsistent with the objective of ensuring a market rate of return on equity.[166] Frontier considers that theta should be	We have not redefined gamma as the value of imputation credits available for redemption. Rather, our conceptual approach considers imputation credits should be valued on a post-company tax basis, before the impact of personal taxes and transaction costs. This corresponds to valuing imputation credits utilised by eligible investors at their face value and is consistent with the Officer framework. Based on this, we consider gamma to be equal to the product of the distribution rate and the utilisation rate to investors in	**Error! eference source not found.** 4.3.1 A.5

[163] SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 17 and 20.

[164] Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 33; Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, p. 10; Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016.

[165] Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 35.

[166] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 288 and 289; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 2, 4, 6: ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 40; AusNet Electricity Services, *Revised Regulatory*

Issue	Summary of response	Section
measured as value and not the utilisation of imputation credits.[167] Frontier considers that if gamma is set anything other than value of imputation credits to investors, investors will be either over or under compensated.[168] The Ausgrid Tribunal considered the equity ownership and tax statistics approaches to estimating the utilisation rate ignore factors which reduce the value of imputation credits to shareholders below the face value. As a result, it considered these approaches are inconsistent with a proper interpretation of the Officer framework.[169]	the market per dollar of credits distributed (the 'utilisation rate'). The equity ownership approach and tax statistics are consistent with our conceptual approach. They value imputation credits expected to be utilised (the utilisation rate) at full face value on a pre-personal tax and costs basis. Conversely, estimates of the utilisation rate from implied market value studies are influenced by different personal tax treatment of capital gains and dividend income. Also, valuing imputation credits at face value is consistent with how all inputs into the allowed rate of return are estimated. In regards to the 'factors', we have received advice from Handley on these factors. We consider such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate.	A.6 A.7 A.8
Distribution rate		
It is appropriate to use an all equity based estimate of the distribution rate.[170] The distribution rate for listed equity is likely to be a poor proxy for a benchmark efficient entity.[171]	We consider the use of a distribution rate for listed equity is open to us and reasonably reflective of a benchmark efficient entity given the difficulties associated with choosing a representative dataset. Lally also recommends	4.4.1 A.10

Proposal, January 2016, p. 7-79; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 80; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 358; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 86; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 352.

167 Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 6; Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, pp. 7-10.

168 Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 6.

169 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1095.

170 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 286; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 7-9; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 109-110; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-80, 7-81; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87-88; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 359-360; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 87-88; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 353-354; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206; Frontier Economics, *Issues in the estimation of gamma*, September 2016, p. 3.

171 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 292; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 7-9; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 109-110; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-80, 7-81; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87-88; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 359-360; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 87-88; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 353-354.

Issue	Summary of response	Section
The Ausgrid Tribunal considered we provided insufficient reasoning for introducing listed equity distribution rate.[172]	distribution rate based on listed equity for a benchmark efficient entity, although he estimates this using financial statements of the top 20 listed firms. Further, we consider it is inappropriate to focus on individual elements of a benchmark efficient entity, such as foreign income and foreign ownership. Instead, we consider a benchmark efficient entity should be assessed holistically. When determining gamma for a benchmark efficient entity, what is relevant is how it generates and distributes imputation credits. We also note that if we estimated a distribution rate strictly in accordance with our benchmark definition we would use only the firms we regulate, or an observable set of similar firms. Finally, it is not clear that foreign income results in a higher imputation payout ratio. In fact, Lally's analysis suggests the opposite.	
Estimates of the utilisation rate from listed equity (all equity) do not have to be paired with estimates of the distribution rate from listed equity (all equity).[173]	We consider it is not essential to 'match' estimates of distribution rates and utilisation rates based on the dataset used; although we note the choice is open to us. While we primarily rely on 'matched' estimates, we also have regard to Lally's preferred estimate based on an all equity utilisation rate from the equity ownership approach and a distribution rate for listed equity from financial reports of the top 20 listed firms. Lally considered there is good reason not to match datasets.[174] However, we note given Lally's advice our approach appears to lead to a conservative gamma estimate (in favour of the service provider), as Lally's preferred gamma estimate is 0.5.[175]	4.4.1 A.9
Utilisation rate		

Also see HoustonKemp, *A response to the Australian Energy Regulator Draft Decision on Australian Gas Networks AA2016 Revenue Reset*, February 2016, p. 30; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206.

172 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1106.

173 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 111, 128; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-81, 7-95; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 82, 96; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360-374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp.88, 103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 354, 368; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205.

174 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

175 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 27.

Issue	Summary of response	Section
Equity ownership approach		
The equity ownership approach overstates the utilisation rate (relative to an upper bound based on tax statistics).[176] The Ausgrid Tribunal considered this shows there are investors who we assume are eligible to redeem imputation credits but, for whatever reasons, either cannot redeem them or attribute so little value to the credits that they do not utilise them. In particular, there are investors who hold shares for less than 45 days.[177]	We do not consider the estimate of the utilisation rate from tax statistics is an upper bound (see response under 'Tax statistics'). We consider the 45 day rule is unlikely to have a material impact on the utilisation of imputation credits by domestic investors, and no data has been presented that demonstrates a material impact. As such, we do not consider the 45 day rule explains the difference in utilisation rate estimates between tax statistics and the equity ownership approach. We consider the difference is likely driven by estimation error in the taxation data. Lally considers the most obvious explanation for the difference is the estimate of the redemption rate from tax statistics used by the AER is too low.[178] We use an estimate of the utilisation rate below the top of the range from the equity ownership approach.	4.4.1 A.12 A.14 A.8.3
The equity ownership approach is inconsistent with the proper interpretation of the Officer framework.[179] The equity ownership approach does not reflect factors which affect investors' valuation of imputation credits (below their full face value).[180]	See response under 'Conceptual framework'.	A.8.3 A.12
The equity ownership approach can only be used informatively as an upper bound or as a	The equity ownership approach (and tax statistics) can used to generate a point estimate of the utilisation rate.	**Error! eference**

[176] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 286 and 288; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 10-11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 112-114; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-83, 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 84-85; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 362-363; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 90-91; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 356-357.

[177] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048, 1090, 1092.

[178] M. Lally, *Gamma and the ACT Decision*, May 2016, p. 21.

[179] United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1095.

[180] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 286, 294, 296, 298; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 112-114; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-83; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 84; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 362; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 90-91; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 356; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 207.

Issue	Summary of response	Section
check on other estimates (like tax statistics).[181]		**source not found.** A.12
The equity ownership approach estimate of the utilisation rate should be based on listed equity.[182]	We consider utilisation rates from the equity ownership approach based on listed equity and all equity.	A.9.1 A.12
Only the most recent point estimates of the equity ownership share are relevant.[183]	We disagree. Given that the series exhibits considerable volatility, we consider it is reasonable to not rely solely on the most recent point estimate. Similarly, we estimate an MRP (for the return on equity) that reflects prevailing market conditions using a historical series of excess returns.	A.12
Tax statistics		
Tax statistics are inconsistent with the proper interpretation of the Officer framework[184] Tax statistics do not reflect factors which affect investors' valuation of imputation credits (below their full face value).[185]	See response under 'Conceptual framework'.	**Error! eference source not found.**

[181] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 288; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 10-11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 114; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-83, 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 85; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 362-363; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 91; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 356-357; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1095; Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, p. 10; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 208.

[182] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 17-18; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 121-122; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-90–7-91; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 91–92; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 369-370; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 98-99; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 363-364.

[183] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 18-19; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 123-124; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-91–7-92; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 92–93; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 370-371; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 99-100; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 364-365; Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, pp. 13-15.

[184] United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016.

Issue	Summary of response	Section
		A.8.3 A.13
Tax statistics can only provide an upper bound for the estimate of the utilisation rate.[186]	We do not consider tax statistics provide an upper bound estimate. An upper bound is a value above which the true value cannot exceed.[187] Rather, tax statistics provide one point estimate for the utilisation rate. This estimate is, by definition, uncertain and dependant on the quality of the underlying data. As such, the true (unknown) value could be higher or lower. Importantly, the quality of the underlying taxation data is poor and experts consider it to be unreliable. Lally considers the tax statistic used by us is not an upper bound.[188]	4.4.1 A.13
Tax statistics can estimate gamma reliably as the ratio of credits redeemed to credits created.[189]	We do not agree and consistent with Hathaway's paper, we consider that caution should be exercised when using ATO statistics to estimate any parameter associated with franking credits.	A.13
Implied market value studies		

185 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 294; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 11-12: ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 114-115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 85-86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 363-364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 357-358; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 210.

186 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 286, 288, 305; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 4, 20, 23; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 115, 125; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-84, 7-93, 7-107; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 86, 94, 97; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 364, 372, 375; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 92, 101, 104; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 358, 366, 369; Australian Competition Tribunal, Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, 26 February 2016, paras. 1048, 1090 and 1095; Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 6; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 208, 210; Frontier Economics, *Issues in the estimation of gamma*, September 2016, p. 4.

187 For an example of the correct use of the term "upper bound" see John. C. Hull, Options Futures and other Derivatives, Fourth Edition, 2000, p. 171.

188 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 23.

189 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 3-4, 12-15*;* AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 210.

Issue	Summary of response	Section
We should rely more on estimates of the utilisation rate from implied market value studies as they are direct evidence on the value of imputation credits to investors.[190] If the value interpretation is adopted, gamma must be estimated with a market based approach.[191] The Ausgrid Tribunal considered implied market value studies are best placed to capture the considerations investors make in determining the utilisation rate (or the worth of imputation credits to them).[192]	See response under 'Conceptual framework'. Even when adjusted for the impacts of differential personal taxation, we consider limited reliance should be placed on the results of these studies. This is because these studies have a range of limitations, including that they do not clearly measure the utilisation value to long term investors. We consider market value studies do not provide a post-company pre-personal tax estimate of the utilisation rate unless they are corrected for the impact of differential personal taxation on capital gains and dividend income. Without this adjustment they are inconsistent with the Officer framework.	4.4.1 A.15
We should exclusively rely on SFG's study, which suggests a best estimate of 0.35 for the utilisation rate.[193]	See response to 'We should rely more on estimates of the utilisation rate from implied market value studies'. We do not consider it appropriate to rely exclusively on implied market value studies (or SFG's single dividend drop off study). Even if we were to rely solely on SFG's study, we consider it does not support a gamma of 0.25. This is because the estimate of the utilisation rate requires an adjustment for factors that suggest investors value a dollar of dividends at less than one dollar.	4.4 4.4.1
The use of implied market value studies to estimate the utilisation rate (and thus gamma) is consistent with the approach to estimating other rate of return parameters.[194]	We disagree. See response under 'Conceptual framework'.	A.8.2 A.15

[190] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 286; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 13; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 46; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-85; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 364-365; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 92-93; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 358-359; APNT, *Access Arrangement Revised Proposal to Draft Decision*, January 2016, p. 93; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 211.

[191] Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 7.

[192] United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1096.

[193] SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 17 and 20; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 33; Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, p. 10; Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 7; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 209, 211-212.

[194] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 300; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 13; ActewAGL, *Appendix 5.01 Detailed*

Issue	Summary of response	Section
Under our conceptual approach to gamma, the appropriate adjustment to the results of SFG's study results in a gamma of 0.3. However, this adjustment is not necessary because our conceptual approach is incorrect.[195]	See response under 'Conceptual framework'. We disagree and consider the Handley/Lally adjustment is necessary.	4.4.1 A.15
Several of the limitations that we have identified as applying to implied market value studies do not apply to SFG's study, which has not been assessed individually on its merits.[196]	We consider the key limitations that apply to implied market value studies also apply to SFG's study.	A.15
Instead of adjusting the estimate of the utilisation rate (theta) to correct for the apparent incorrect valuation of cash dividends, the appropriate response is not to adjust the theta estimate. Rather it is to adjust the allowed return on equity.[197]	We consider that such an adjustment to the allowed return on equity would not be appropriate. The post-company tax and pre-personal tax required return on the equities market is reflective of the face value of dividends paid in the market, not a higher amount. We also note the equities market sets equilibrium prices based on the expected post-company pre-personal tax returns to shareholders (post-tax dividends, post-tax capital gains and post-tax imputation credits). Lally considers that if dividend drop-off studies produce an estimate of cash dividends of less than one, this implies that shareholders do not value dividends as highly as capital gain and this does not suggest that revenue should be increased.[198]	A.15.3

response to rate of return, gamma and inflation, January 2016, p. 117; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-85; United Energy, Re*sponse to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 87; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 365; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 93; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 359; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 204.

195 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 4, 13, 22; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41,117,127; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-94; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87, 95; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365, 373; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94, 103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359, 367.

196 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 301, 303, 306; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 13-14, 20; ActewAGL, Appendix 5.01 Detailed response to rate of return, gamma and inflation, January 2016, pp. 117-120, 125-12: AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-87, 7-93; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87, 88, 94; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365-366, 372; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94-95, 102; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360, 366.

197 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 37–38; Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 23-24.

198 M. Lally, *Issues in the estimation of gamma,* April 2017, pp. 21-22, 26.

Issue	Summary of response	Section
Other		
There is an inconsistency between the corporate income tax and the allowed rate of return.[199]	We disagree. We discuss this in detail in section C.6 of Attachment 3.	

Source: AER analysis; service providers' initial and revised proposals; Tribunal decisions.

We have also received a number of submissions on gamma from consumer representatives. These are summarised below:

- The CCP for the NSW electricity networks expressed a view that suggests we should take into account the interrelationship with the corporate tax allowance when determining the value of imputation credits.[200] We address this in section 4.3.4.
- The Public Interest Advocacy Centre (PIAC) submitted that the Australian Competition Tribunal's decision in 2011 to rely on an estimate of the utilisation rate from the 2011 version of SFG's dividend drop off study should not be viewed as permanently determinative.[201] We agree with these comments in light of the Tribunal's finding that:[202]

  > Further, the Tribunal notes that estimation of a parameter such as gamma [the value of imputation credits] is necessarily, and desirably, an ongoing intellectual and empirical endeavour. Its decision in these proceedings is based on the material before it.

- PIAC also submitted that our draft decisions adequately set out the reasons for departing from the value of imputation credits in the Guideline.[203]
- The Energy Markets Reform Forum (EMRF) submitted that our estimates of the utilisation and distribution rates are lower (and, therefore more favourable to service providers) than those relevant to a pure play energy network (which is the benchmark efficient entity for setting the rate of return).[204] The EMRF also submitted that we should consider actual industry practices when determining the value of imputation credits—for

199 HoustonKemp, *A response to the Australian Energy Regulator Draft Decision on Australian Gas Networks AA2016 Revenue Reset*, February 2016, p. 28.

200 CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, p. 49.

201 PIAC, *Moving to a new paradigm: submission to the Australian Energy Regulator's NSW electricity distribution network price determination*, 8 August 2014, pp. 90–92; PIAC, *A missed opportunity? Submission to the Australian Energy Regulator's draft determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, p. 46.

202 Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, 12 May 2011, para. 45.

203 PIAC, *A missed opportunity? Submission to the Australian Energy Regulator's draft determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, pp. 19–20.

204 EMRF, *NSW Electricity Distribution Revenue Reset, AER Draft Decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, A response*, February 2015, pp. 31–32.

example, the EMRF submitted that none of APA Group, Envestra Limited (pre-sale) or JGN's parent company had balances in their franking accounts.[205] To clarify, we have interpreted and estimated the value of imputation credits consistently with Officer's 1994 paper and related literature, such as Monkhouse. Under this literature, the utilisation rate is a market-wide parameter and the distribution rate is a firm specific parameter. We estimate the utilisation rate on a market-wide basis. Although the distribution rate is a firm specific parameter, we estimate it on a market-wide basis also and our reasons for doing so are set out in the Guideline.[206]

- The South Australian Council of Social Service (SACOSS) submitted, based on advice received from the South Australian Centre for Economic Studies that evidence was emerging for a value of imputation credits lower than the 0.5 in the Guideline.[207] SACOSS supported a value of imputation credits of at least 0.4. In a subsequent submission on the AER's preliminary decision for SA Power Networks, SACOSS supported the AER's decision to use the lower estimate of gamma than in the rate of return guideline, although noting its preferred estimate was for a gamma of 0.36. However, given the AER is reporting gamma to one decimal place SACOSS acknowledged that its preferred estimate of 0.36 concurs with the AER's estimate of 0.4 to one decimal place.[208]
- The Energy Consumers Coalition of South Australia (ECCSA) considered that the service providers (who had submitted regulatory proposals to us in 2014) submitted no new evidence to change our conclusions in the Guideline regarding the value of imputation credits.[209] We set out in this decision how and why we have departed from the Guideline. In a subsequent submission on the AER's preliminary decision the ECCSA submitted that 'the AER has moved to a conservative position on the issue of gamma to the detriment of consumers' and it appeared 'the AER has based its assessment on lower utilisation and distribution rates than would otherwise be the case for a pure play energy network which is the benchmark entity for setting the WACC.[210]
- In a submission on our draft decision for Australian Gas Networks, the ECCSA consider that imposing an assumption that the benchmark entity would frank its dividend to the market average is a conservative assumption.[211] The AER considers that the benchmark selected to estimate gamma is appropriate. In section A.9.2 and section A.10.1, the AER

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205 EMRF, *NSW gas distribution revenue reset, Draft decision by the Australian Energy Regulator on Jemena's Gas Networks Access Arrangement, A response*, March 2015, p. 71.

206 AER, *Better regulation: Explanatory Statement Rate of Return Guideline,* December 2013, pp. 163–164.

207 SACOSS, *Submission to Australian Energy Regulator on SA Power Networks' 2015 – 2020 Regulatory Proposal*, January 2015, p. 21.

208 SACOSS, *Submission to Australian Energy Regulator on SA Power Networks' 2015 – 2020 AER Preliminary Decision* June 2015, p. 5.

209 ECCSA, *SA Electricity Distribution Revenue Reset, SA Power Networks' Application, A response*, December 2014, pp. 80–81.

210 ECCSA, *SA Electricity Distribution Revenue Reset, The AER preliminary decision, A response*, June 2015, p. 42.

211 ECCSA, *A response to the Australian Energy Regulator Draft Decision on Australian Gas Networks AA2016 Revenue Reset*, February 2016, p. 35.

considers that benchmark should be assessed holistically. Further, the ECCSA stated that it is inappropriate to reward offshore investors in energy networks by providing extra revenue when they have made a conscious decision to invest even though they gain no benefit from imputation.[212] In response, the AER considers that gamma and the return on equity are estimated on a consistent basis.

- The Queensland Council of Social Service (QCOSS) submitted a 'more even-handed and consistent approach' would be a value of imputation credits of 0.5 as per the Guideline.[213] QCOSS had regard to a recent decision by the Queensland Competition Authority for a value of 0.47. We set out in this decision why we consider 0.4 to be the best estimate from within the range 0.3 to 0.5.
- The Alliance of Electricity Consumers (the Alliance) employed a value of imputation credits of 0.25 in its estimation of an efficient rate of return.[214] However, the Alliance provided no discussion or justification for the use of this estimate. Regardless, the Alliance submitted that the appropriate rate of return was 3.76 per cent, which is less than half the rate of return typically proposed by the service providers.
- UnitingCare Australia supported our value for gamma, if a value for gamma is necessary.[215]
- The CCP for AusNet Service Transmission sees no clear reason for a further downward departure from the guideline gamma estimate of 0.5.[216] Their view is that gamma should be at least 0.5 because a higher gamma better meets the NEO and given the imprecision around estimating this input in the revenue calculation.[217] We agree that estimating gamma is an imprecise exercise. However, we consider that a gamma estimate of 0.4 meets the requirement of the NEO.
- Tasmanian Counsel of Social Service (TasCOSS) believes that gamma should be set consistently with the AER's rate of return guideline which was developed by the independent regulator after broad consultation and consideration.[218] Further, the Tasmanian Small Business Council has strong reservations about the AER's decision to depart from its own guideline in moving its gamma estimate down to 0.4 from the 0.5 value it originally set.[219] However, the AER considers there is persuasive evidence to

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212 ECCSA, A response to the Australian Energy Regulator Draft Decision on Australian Gas Networks AA2016 Revenue Reset, February 2016, p. 35.

213 QCOSS, *Understanding the long term interests of electricity customers, Submission to the AER's Queensland electricity distribution determination 2015-2020*, 30 January 2015, p. 81.

214 Alliance of Electricity Consumers, *Submission on Ergon Energy's Regulatory Proposal 2015--2020*, 30 January 2015, p. 24.

215 Uniting Care Australia, *Submission to the Australian Energy Regulator -Response to Electricity Distribution Business Revised Regulatory Proposal from 2015–20 from SA Power Networks, and AER Preliminary Determination*, July 2015, p. 29.

216 CCP, *Transmission for the Generators*, February 2016, pp. 6, 43.

217 CCP, *Transmission for the Generators*, February 2016, p. 43.

218 TasCOSS, Submission on the AER issues paper regarding TasNetworks regulatory proposal, April 2016, p. 2.

219 Tasmanian Small Business Council, *Submission on TasNetwork's regulatory proposal*, May 2016, p. 36.

move away from the 0.5 gamma estimate in the rate of return guideline, as set out in this chapter. The AER considers that a gamma of 0.4 is currently appropriate.

- The CCP4 for TasNetworks considered the AER guideline should be applied in respect to gamma, especially as gamma only has value where there are shareholders subject to the Commonwealth tax on business profits. For regulated businesses that are government owned and not subject to this tax, setting gamma at a level lower than unity merely increases the revenue to these businesses with little legitimate basis and therefore this is an unnecessary cost that is being transferred to consumers.[220] In its submission on the AER draft decision and TasNetworks revised proposal, the CCP4 for TasNetworks continues to hold this view.[221] The AER does not agree and considers there should a single benchmark for the rate of return for the reasons set out in Attachment 3 to this decision. The requirement to estimate gamma consistently with the rate of return means gamma should be determined based on the same single benchmark.
- The CCP for AusNet Services' Transmission considers there is no correct value for gamma and there is considerable imprecision around estimating it. The CCP for AusNet Services' Transmission considers the AER's approach is more robust than the methodology sought by the regulated businesses and that the AER should not buy into technical arguments from the regulated businesses that contain many debateable assumptions.[222] We agree that gamma is a parameter that is imprecise to measure. We have assessed the regulated businesses submissions and overall consider a gamma estimate of 0.4 still remains appropriate.
- The CCP4 (Headberry) for TasNetworks considers that the AER's gamma estimate is conservative and it should be reassessed in the next guideline review in the next 2 years. Given this, the current guideline estimate should apply to TasNetworks.[223] We do not agree as we have moved away from the guidelines gamma estimate of 0.5. Reassessing the evidence before us since the guideline review, we consider a gamma estimate of 0.4 is appropriate.
- The Tasmanian Small Business Council supports the AER's gamma estimate of 0.4, and notes that this value has been set with extensive and wide ranging consultation. It believes the 0.4 gamma value should stand unless it is overturned by the eventual outcome of the appeals process.[224] The CCP4 (Headberry) for Powerlink notes that despite the SAPN Tribunal upholding the 0.4 gamma estimate, Powerlink expresses a

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220 CCP sub panel 4, *Submission on TasNetworks' regulatory proposal,* May 2016, pp. 44-45.

221 CCP sub panel 4, *Submission on TasNetworks' revised proposal and AER's draft decision*, December 2016, pp. 30-31.

222 CCP, *Transmission for the Generators II*, September 2016, pp. 6, 43; CCP, *Transmission for the Generators III*, October 2016, p. 13.

223 Consumer Challenge Panel Sub Panel 4 (David Headberry), *Response to the AER's Draft Decision and Revised Proposal to Tasmania's electricity distribution network service provider for a revenue reset for the 2017-19 regulatory period*, 25 November 2016, p. 28.

224 Tasmanian Small Business Council, *Submission: TasNetworks Distribution - Draft Regulatory and Tariff Structure Statement Determination,* November 2016, p. 9.

desire to benefit from a lower gamma estimate if this is the result of the Full Federal Court.[225] At the time we released this final decision, the outcome of both Full Federal Court decisions was unknown. As a result, we have been unable to incorporate the Full Federal Court's decision in this final decision. Further, we consider it is inappropriate to adjust the total revenue for the service providers within the access arrangement (either via cost pass through or x-factor mechanism) for the outcome of the Full Federal Court decision on gamma.

[225] Consumer Challenge Panel sub Panel 4 (CCP4), *Response to the AER Draft decision and Revised Proposal to Powerlink's electricity transmission network for a revenue reset for the 2017-2019 regulatory period*, 19 December 2016, p. 3.

A Value of imputation credits: Detailed analysis

In attachment 4, we set out our decision on the value of imputation credits (gamma)—which is to adopt a value of 0.4—and our key reasons for that view. We also indicated the position submitted to us by the service providers and briefly set out our consideration of that position. In this appendix, we set out further supporting material for our decision on the value of imputation credits. We also respond in more detail to the position submitted to us by the service providers.

In its revised proposal,[226] Powerlink adopted a value of 0.4 for gamma consistent with recent AER regulatory determinations. This is consistent with our Guideline based approach to estimating gamma as reflected in our decisions released in 2014 (November) and 2015 (April and June). We also adopted our Guideline based approached in decisions released in 2015 (October and November) and 2016 (May and July). Throughout this document we refer to our decisions released from Nov 2014 to July 2016 as our recent decisions.

In its revised proposal, Powerlink considers that the AER should apply any changes to its approach to estimate the value of imputation credits resulting from a decision of the Federal Court to Powerlink's 2018-22 regulatory period.[227] This is consistent with Powerlink's revenue proposal submitted in 2016.[228]

Consistent with our recent 2016 decisions, in this final decision we have adopted a value of 0.4 for gamma. We remain of the view 0.4 is appropriate having given careful consideration to all the material before us.

This appendix is structured under the following headings:

- expert views on the value of imputation credits
- the value of imputation credits used by other regulators
- previous Australian Competition Tribunal (Tribunal) considerations
- key concerns of the service providers
- the role of the value of imputation credits in the regulatory framework
- the conceptual framework for the value of imputation credits
- Professor Stephen Gray's (Gray's) comments on the conceptual framework
- further issues relating to the utilisation rate
- estimation approach considerations

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226 Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.
227 Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.
228 Powerlink, *Revised Revenue Proposal,* 1 December 2016, p. 11.

- estimating the distribution rate
- application of rate of return criteria to evidence on the utilisation rate
- the equity ownership approach
- tax statistics
- the difference between equity ownership approach and tax statistics
- implied market value studies
- revised consideration of the conceptual goalposts approach.

A.1 Expert views on the value of imputation credits

We, other regulators, service providers and consumer representatives have commissioned expert advice on the value of imputation credits from a range of experts in the context of a number of regulatory processes. These expert reports demonstrate that there is no consensus among experts on either the value of imputation credits (particularly for the utilisation rate parameter), nor on the techniques to estimate it. Table 4-6 summarises recent expert advice of which we are aware. We have considered the advice from each of these experts in forming our position on the value of imputation credits. For this decision we have considered the new expert report submitted by several service providers in January 2016 and September 2016.[229] We have also commissioned expert advice from Lally.[230] We consider the new expert reports do not provide new evidence to justify a departure from the position we adopted in the decisions we released in 2016.

Table 4-6 Summary of expert views on the value of imputation credits

Expert	Distribution rate	Utilisation rate	Value of imputation credits
Lally (2016a, 2017)[231]	**At least 0.83** using the financial statements of 20 largest ASX-listed companies	**At least 0.6**, using the all equity estimate of local equity ownership	**At least 0.5**
Lally (2013a, 2013b, 2014)[232]	**0.84** using the financial statements of 20 largest ASX-listed companies	**1.0**, based on assumption that all investors in the Officer CAPM are domestic investors 0.54 to 0.7, using equity ownership as second preference	**0.84** 0.45 to 0.59 using second preference utilisation rate

[229] Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016; Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016; Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016 and Frontier Economics, *Issues in the estimation of gamma*, September 2016.

[230] M. Lally, *Gamma and the ACT Decision*, May 2016.

[231] M. Lally, *Gamma and the ACT Decision*, May 2016, p. 6; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 27, 29.

[232] M. Lally, *The estimation of gamma*, 23 November 2013; M. Lally, *Estimating gamma*, 25 November 2013; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

Expert	Distribution rate	Utilisation rate	Value of imputation credits
McKenzie and Partington (2013)[233]	**0.7**, using cumulative payout ratio approach over all equity	**None recommended**, although estimates considered included 0.7 from AER draft rate of return Guideline approach, 0.53 from average of implied market value studies and 0.83 from average of McKenzie and Partington's implied market value studies	Evidence not compelling enough to depart from **0.5**
Handley (2014)[234]	**0.8**, using cumulative payout ratio approach over only listed equity	**0.5 to 0.6**, with regard to (in order of importance) equity ownership approach, tax statistics and dividend drop off studies	**0.4 to 0.5**
SACES (2015)[235]	**0.8**, using cumulative payout ratio approach over only listed equity	**0.45**, using the average of the estimate from tax statistics (0.43) and the refined domestic ownership share of only listed equity (0.46)	**0.36**
CEG (2014)[236]	**0.7**, using cumulative payout ratio approach over all equity	**0.35**, based on SFG's dividend drop off study	**0.25**
Gray (for SFG) (2015)[237]	**0.7**, using cumulative payout ratio approach over all equity	**0.35**, based on SFG's dividend drop off study	**0.25**
Gray (for Frontier) (2015, 2016)[238]	**0.7**, using cumulative payout ratio approach over all equity, or alternatively using an estimate of the payout ratio for listed equity excluding the 20 largest firms.	**0.35**, based on SFG's dividend drop off study	**0.25**

Source: As specified in table.

In summary:

- A distribution rate of 0.7 estimated using the cumulative payout ratio approach is most commonly accepted. We describe this approach in section A.10.2. However, Handley considers that this approach should be applied to only listed equity, and this produces a

[233] M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013.

[234] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014.

[235] SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015.

[236] CEG, *WACC estimates: A report for NSW DNSPs*, May 2014.

[237] SFG, *Estimating gamma for regulatory purposes*, February 2015 and Frontier Economics, *Regulatory estimation of gamma report prepared for Powerlink*, January 2016, p. 10.

[238] Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015 and Frontier, The appropriate use of tax statistics when estimating gamma, January 2016; Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016 and Frontier Economics, *Issues in the estimation of gamma*, September 2016.

higher estimate of the distribution rate. The South Australian Centre for Economic Studies (SACES) accepts Handley's approach. Lally considers there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so.[239] However, we note given Lally's advice our approach appears to lead to a conservative gamma estimate (in favour of the service provider), as Lally considered that only listed firms should be used to determine the distribution rate and all equity firms should be used to estimate the utilisation value which results in a gamma estimate of 0.5. Lally considers the best estimate of the distribution rate for a benchmark efficient entity is 0.83, calculated using the financial statements of the 20 largest ASX-listed companies.

- There is no widely accepted utilisation rate or method for estimating it. The recommended values for the utilisation rate range from 0.35 to 1.0.
- Only CEG, SFG, and Gray (for SFG and Frontier), rely exclusively on the SFG dividend drop off study when estimating the utilisation rate. Handley and McKenzie and Partington rely on a range of evidence. SACES gives equal weight to the equity ownership approach and tax statistics. Lally prefers a conceptual approach, but his second preference is the equity ownership approach.
- As a result of the differing approaches, particularly to the utilisation rate, the range of estimates of the value of imputation credits is 0.25 to 0.83.

Conceptually, the value of imputation credits must be between 0 and 1. Accordingly, the range of recommended estimates from 0.25 to 0.83, which spans most of the possible range for the value of imputation credits, highlights the lack of consensus among experts. Our final decision value of imputation credits of 0.4 sits in the lower half of the range recommended by experts, which is more favourable to service providers.

A.2 The value of imputation credits used by other regulators

Australian regulators have applied a wide range of approaches to estimate the value of imputation credits, resulting in varied outcomes. Table 4-7 summarises some recent regulatory decisions on the value of imputation credits. While these decisions have not directly informed our position on the value of imputation credits, they indicate that there is no conceptual or practical consensus amongst Australian regulators.

[239] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

Table 4-7 Australian regulators' approaches to the value of imputation credits

Regulator	Form of adoption	Year	Distribution rate	Utilisation rate	Value of imputation credits
IPART[240]	Sydney Desalination Plant Review of Prices	2017	**0.7**, using cumulative payout ratio approach	**0.35**, using 2011 version of SFG dividend drop off study	**0.25**
ESC[241]	Melbourne Water 2016-17	2016	N/A	N/A	**0.5**
QCA[242]	Dalrymple Bay Coal Terminal access undertaking	2016	**0.84**, using Lally's approach of using data sourced directly from companies' financial statements in their annual reports	**0.56**, based primarily on the domestic ownership share of listed equity	**0.47**
ERA[243]	Proposed Revisions to the Access Arrangement for the Dampier to Bunbury National Gas Pipeline 2016-30, final decision	2016	**0.7 to 0.8**	**0.35 to 0.69**, most weight placed on the equity ownership approach which supports a utilisation rate of 0.47 to 0.59 and gamma estimate of 0.38 to 0.41	**0.4**
ACCC[244]	Australian Postal Corporation 2015 Price Notification	2015	N/A	N/A	**0.4**, set for consistency with previous ACCC and AER decisions

Source: As specified in table.

Conceptually, the value of imputation credits must be between 0 and 1. The range of values adopted by Australian regulators is from 0.25 to 0.5. This range is narrower than the range of estimates recommended by experts (from 0.25 to 0.84), but it is still quite wide. This highlights the lack of consensus among regulators on the value of imputation credits. Given the lack of consensus among experts, this is perhaps not surprising. Our final decision value of imputation credits of 0.4 sits within the range adopted by regulators.

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240 Independent Pricing and Regulatory Tribunal, *Sydney Desalination Plant Review of prices from 1 July 2017 to June 2022—Draft Report decision*, March 2017, p. 94. Note IPART completed a major review of WACC in 2013 (see: Independent Pricing and Regulatory Tribunal, *Review of WACC methodology-Final Report*, December 2013, p. 17).

241 Essential Services Commission, *Melbourne Water price Review 2016-Final decision*, June 2016, p. 53.

242 Queensland Competition Authority, *DBCT Management's 2015 draft access undertaking - Final decision*, November 2016, pp. 107-121, 123, 155.

243 Economic Regulation Authority, *Appendix 5 - Gamma: Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas pipeline 2016-2020, Final decision*, 30 June 2016, p. 48.

A.3 Previous Australian Competition Tribunal considerations

The Australian Competition Tribunal has considered in detail the value of imputation credits (gamma) in five proceedings since 2010, relating to applications by:

- SA Power Networks
- ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks
- Energex Limited
- DBNGP (WA) Transmission Pty Ltd, and
- WA Gas Networks Pty Ltd.

The Tribunal's comments in each case referred to the lack of expert consensus regarding the value of imputation credits and the scope that existed for future assessments of the evidence. We discuss these comments further in the sections below.

A.3.1 SA Power Networks

In October 2015 we released our final decisions for SA Power Networks, where we adopted a gamma estimate of 0.4. The SAPN Tribunal upheld the AER's decision. In reaching its position, the SAPN Tribunal expressed views on the important factors in its decision. The SAPN Tribunal's views are summarised in table 4-9 below.

Table 4-8 Australian Competition Tribunal's observations on imputation credits in SA Power Networks matter

Issue	Tribunal comments
Transaction costs	Time value of money: the Tribunal considered that it might hold for some investors, but would appear to imply logically that such investors will also discount the tax costs associated with any taxes yet to be paid on dividends.[245] In any case, the Tribunal considered that the relatively short time lags and the current low discount rates would suggest the time value of money effect is likely to be small.[246] 45 day rule: the Tribunal considered that the evidence presented to it about the reliability of tax statistics suggested the materiality of this point is hard to judge.[247] Portfolio effects: the Tribunal considered that there is a well-documented "home-bias" in investor portfolios (found internationally generally regardless of tax systems), implying incomplete diversification benefits, the extent to which this is an additional factor of significant materiality is unclear.[248] Personal costs: the Tribunal is of the view that while some investors do experience investor level (personal) costs in dealing in equities, these can vary substantially across investor groups. It is thus not clear what effect such costs will have on equity market prices or on the need to adjust estimates for implied values of franking credits drawn from shareholder distribution or tax statistics.[249]
Equity ownership approach	The equity ownership approach does not produce an upper bound if it is believed that stock prices are determined by some marginal investor.[250] Even if the average investor perspective is taken, there may be other relevant factors, not adequately captured in theoretical models, which preclude an interpretation as an upper bound.[251] While the Tribunal recognises the need for analysis of historical data to reduce uncertainty surrounding current figures, it would expect that sound reasons would be provided for using figures significantly different from the current value given that current value is close to the historical average.[252] The Tribunal does not find that the AER erred or that its decision was unreasonable in considering historical data on domestic equity ownership shares for both listed

[245] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 175.
[246] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 175.
[247] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 176.
[248] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 177.
[249] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 177.
[250] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 186.
[251] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 186.
[252] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 188.

Issue	Tribunal comments
	and all companies.[253]
Tax statistic estimates	The Tribunal considered that if a marginal price-setting investor perspective is taken, the average utilisation rate implies nothing about valuation by a marginal investor. However, if an average investor perspective is taken, the redemption rate figure from tax statistics is not an upper bound for the utilisation rate, but rather a noisy estimate.[254] In regards to whether redemption rates reflect the value of imputation credits to investors, the Tribunal has noted that experts are dividend on the issue and had found no reason to accept that the interpretation by the AER is incorrect.[255]
The conceptual basis for dividend drop off studies	The Tribunal is of the view that while dividend drop-off studies may convey some information about tax parameters and valuation of their consequences for the set(s) of investors determining stock prices around the ex-div date, there are too many other confounding factors to place sole, or even, major weight on such studies for the estimation of the value of franking credits in the context of the PTRM.[256] However, the fundamental issue is whether valid tax related valuation parameters can be reliably inferred from such statistical results. Because of the weight of expert evidence questioning that such inferences can be reliably drawn, and the AER reliance on that evidence in forming a judgement, the Tribunal does not believe it needs to address those other criticisms. The uncertainty associated with drawing conclusions about the value of imputation credits from any existing drop-off study (no matter how well specified and conducted) was sufficient for the AER to make a judgement to accord limited weight to this type of evidence. Consequently, the Tribunal does not agree that the AER erred or was unreasonable in placing less weight on dividend drop-off studies in the estimation of the value of gamma.[257] The Tribunal also questions whether the existence of the 45-day rule (which voids imputation credits from short-term trading around the ex-div date) impedes the ability of dividend drop-off studies to inform on the value of imputation credits.[258]
Weighting different approaches	The Tribunal considers that different theoretical models, all of which are simplifications of reality, with different strengths and weaknesses, and with different degrees of support among experts, may suggest differing approaches. Judgement about the weight to be given to alternative approaches would then be required, with resulting consequences for judgements about the subsequent issues.[259]

253 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 190.
254 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 193.
255 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 195.
256 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 170.
257 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 171.
258 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 176.
259 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 138.

Issue	Tribunal comments
	The Tribunal is of the view that the AER did not err, nor was unreasonable, in giving most weight to the "utilisation" approach. It considered the range of alternative approaches, recognised the diversity of views of experts on their merits (both theoretical and empirical), and made a judgement call. In doing so, it demonstrated responsiveness to the empirical evidence in lowering its estimate of gamma from 0.5 as proposed in its ROR Guidelines to a value of 0.4.[260] In the face of significant uncertainty, the approach by the AER of considering a range of approaches to estimating gamma and applying different weights to those approaches is, the Tribunal believes, appropriate. It is clear that some experts would apply different weights to the alternative types of evidence, and that some support the AER's relative ranking while others disagree. In particular, some would accord much higher weight to results of dividend drop-off studies. The Tribunal has noted the arguments about the problems of deriving reliable tax-related parameters such as investor valuation of imputation credits from drop-off parameters, and is of the view that the AER did not err in forming the judgement it did regarding weight to give to different forms of evidence.[261]
Listed equity vs. all equity measures	There is no compelling reason which has been advanced to believe that the "average" unlisted company is any better or worse than the "average" listed company as a proxy for the BEE. Consequently the Tribunal does not believe that the AER made an error or was unreasonable or incorrectly exercised its discretion in considering estimates of distribution rates for listed entities.[262] The Tribunal is willing to accept that there might be different proxies better suited to estimation of different characteristics of the hypothetical BEE. Nevertheless, the Tribunal has not been presented with convincing evidence that the listed equity data should not have been considered by the AER.[263]
Marginal investor vs. average investor	The marginal investor is not the same as the average investor. The proportion of tax credits used in aggregate (i.e. the average utilisation) provides no information about the value of tax credits to the marginal investor. Hence, contrary to the arguments advanced, the usage of tax credits is not an upper bound on the market value of tax credits – if that is set by some "marginal investor".[264] Alternatively, if the market value is set by some "average" investor, an estimate for the average investor of the tax payment consequences of imputation credits distributed has relevance. As argued by SAPN, the value estimated in this way may be an upper bound due to a number of value-reducing factors.[265]
The need to re-evaluate gamma	This Tribunal determined that despite the AER seeking a review of the Ausgrid Tribunal decision to the Full Federal Court, it was appropriate for it to hear the SAPN review rather than leave the matter to be determined conditional on the outcome of the hearing of the Full Court of the Federal Court. The Tribunal has a legislative

[260] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 159.
[261] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 196.
[262] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 184.
[263] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 184.
[264] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 146.
[265] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 146.

Issue	Tribunal comments
	responsibility to hear and determine the review (within a statutorily delineated period of time), and should proceed accordingly.[266] The function of the Tribunal is a reviewer of decisions, and is not a primary decision-maker. The Tribunal has a responsibility to determine individual cases based upon the evidence and arguments put before it. [267] The Tribunal recognises that this decision is the converse of that made by a differently constituted Tribunal in the Ausgrid case. The reason for this difference is twofold. First, submissions in this hearing gave greater attention to the theoretical underpinnings of the PTRM and "vanilla WACC" framework. Secondly, this Tribunal is of the view that the dividend drop-off evidence should be viewed in the context of the theoretical model underpinning it, and that there are significant uncertainties associated with extracting reliable evidence about tax-related parameters (such as gamma) from such studies.[268]

Source: As specified in table.

[266] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 110.
[267] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 112.
[268] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 159.

We note that SA Power Networks has appealed the SAPN Tribunal's decision to the Full Federal Court. SA Power Networks appealed the decision on a range of grounds including that it considers the SAPN Tribunal acted on an incorrect construction of the words "the value of imputation credits" in cl 6.5.3 of the NER. The AER will participate in this hearing as the second respondent and will consider any decision by the Full Federal Court in due course. The SAPN Full Federal Court appeal hearing is currently scheduled to commence on 1 May 2017.

The SAPN Tribunal's key finding was the AER was not in error. This applied to all key areas of the gamma decision as noted in the table above.

A.3.2 ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks

In April and June 2015 we released our final decisions for ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks. In these decisions, we adopted a gamma estimate of 0.4.

ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks successfully sought review of these final decisions by the Australian Competition Tribunal.[269] The Ausgrid Tribunal set aside our decisions and has remitted the matter back to us to remake the decision using a gamma value of 0.25. The Ausgrid Tribunal considered the appropriate distribution rate to use is 0.7 based on a value from all equity. It also considered it was appropriate to use market based studies to solely estimate the value of distributed imputation credits (also known as the utilisation rate, or theta).

In reaching its position, the Ausgrid Tribunal expressed views on the important factors in its decisions. The Ausgrid Tribunals views and our initial response is summarised in table 4-9 below. However, we note that at this time, we have not completed the remittal of our final decisions for the above-mentioned service providers and have appealed the decision to the Full Federal Court. The appeal was heard in October 2016 and the decision is reserved.

[269] See for example, Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016. The Tribunal gave similar reasoning in its decisions for applications by the other service providers.

Table 4-9 Australian Competition Tribunal's observations on imputation credits in ActewAGL Distribution, Ausgrid, Endeavour Energy, Essential Energy and Jemena Gas Networks matter

Issue	Tribunal comments	AER initial comments
The conceptual framework for gamma	By placing most reliance on the equity ownership approach and effectively defining the utilisation value as the proportion of distributed imputation credits available for redemption, the AER has adopted a conceptual approach to gamma that redefines it as the value of imputation credits that are available for redemption.[270] This is inconsistent with the concept of gamma in the Officer Framework for the WACC which underlines the Rules, and with the objective of ensuring a market rate of return on equity by making an adjustment to the revenue allowance for taxation to account for imputation credits.[271] It did not accept the AER's approach that imputation credits are values at their claimable amount or face value. The value is not what can be claimed or utilised, but what is claimed or utilised as demonstrated by the behaviour of the shareholder recipients of the imputation credits.[272] Handley's extension of the Officer Framework does not appear to present an empirically robust and internally consistent explanation for the link between the existence of imputation credits and the applicability of the vanilla WACC.[273]	In developing the Guideline, we re-evaluated the conceptual framework for the value of imputation credits in consultation with stakeholders. In making this final decision, we have built on this re-evaluation. We discuss the role of the value of imputation credits and the underlying conceptual framework in sections A.5 and A.6. We consider the face value of imputation credits is the most appropriate measure and is consistent with the Officer framework. We consider market values only where it is appropriate to do so and some other parameters used by us are also based on face values. For instance, when estimating the MRP we use the face value of dividends. Similarly, when estimating the yield to maturity for the return on debt and the risk free rate, the face value of the coupon payment and the face value of the principal is used. The Officer framework is based on a post-company tax and pre-personal tax framework. In order to be consistent with the Officer framework, all parameters need to be estimated on a pre-personal tax basis. The face value of imputation credits, dividends and debt coupon payments are the pre-personal tax values as personal tax rates are levied on these values. Similarly, the returns calculated from the market values of equity prices and debt prices are pre-personal tax values as the personal capital gains tax is levied on these returns. However, the dividend drop off imputation credit estimate is neither a pre-

[270] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1100.
[271] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1100.
[272] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1081.
[273] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1076.

Issue	Tribunal comments	AER initial comments
		personal tax nor a post-personal tax estimate. As a result, this estimate (absent adjustment) cannot be used at all in our regulatory context as it is inconsistent with the post-tax Officer framework. This is further discussed in section A.15.3.
The distribution rate (payout ratio)	There is insufficient explanation for introducing the distribution rate for only listed equity.[274]	As discussed in section **Error! Reference source not found.** of ttachment 4 and section A.10 of this appendix, we consider the use of a distribution rate for listed equity is open to us and reasonably reflective of a benchmark efficient entity given the difficulties associated with choosing a representative dataset.[275] Lally also recommends distribution rate based on listed equity for a benchmark efficient entity, although he estimates this using financial statements of the top 20 listed firms.[276] As discussed in section **Error! Reference source not found.** of ttachment 4 and section A.9.2 of this appendix, Lally considers there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so.[277] However, we note given Lally's advice our approach appears to lead to a conservative gamma estimate (in favour of the service provider), as Lally considers only listed firms should be used to determine the distribution rate and all equity should be used to estimate the utilisation value which results in a gamma estimate of 0.5. While we primarily rely on 'matched' estimates, we also have regard to Lally's preferred estimate based on an all equity utilisation rate from the equity ownership approach and a distribution rate for listed equity from financial reports of the top 20 listed firms.[278]

[274] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1106.

[275] See M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 24–25.

[276] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 26, 28–29.

[277] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

[278] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5–6, 24–26, 29.

Issue	Tribunal comments	AER initial comments
Equity ownership approach	To the extent that the equity ownership approach indicates that theta is above the amount specified through tax statistics, it is apparent that there are investors who the AER assume are eligible to redeem imputation credits but, for whatever reasons, either cannot redeem them or attribute so little value to the credits that they do not utilise them.[279] There are investors who hold shares for less than 45 days. The issue is not whether such a class exists, but the size of that class and the extent to which the value of imputation credits is lower as a result of domestic shareholders being unable to use them.[280] The equity ownership approach overstates the redemption rates and would only be useful a further check on other estimates.[281] The AER's equity ownership and tax statistics approaches makes no attempt to assess the value of imputation credits to shareholders and ignores the likely existent of factors, such as the 45 day rule, which, across all eligible shareholders, reduce the value of imputation credits to those shareholders below the "face" value assumed by the AER. As a result, these approaches are inconsistent with a proper interpretation of the Officer Framework underlying 2 .5.3 of the NEL.[282]	We consider the equity ownership approach remains the best method to estimate the utilisation rate. We do not consider the difference between the equity ownership approach and tax statistics is due to the 45 day holding rule and Lally agrees with this.[283] Instead, we consider the difference in the utilisation rate is likely driven by the unreliability in the taxation data underlying the tax statistics estimate. Lally considers the most obvious explanation for the difference is the estimate of the redemption rate from tax statistics used by the AER is too low.[284] However we note that, regardless of any issues of taxation data reliability, an estimate of gamma of approximately 0.4 is obtained when combining a utilisation rate of 0.48 (consistent with FAB data) with Lally's preferred estimate of the distribution rate for a benchmark efficient entity of 0.83.[285] We remain of the view that the 45 day rule does not have a material impact on the utilisation rate. This is supported by Lally.[286] We have not been presented with any data that would suggest the 45 day rule is having any impact on the utilisation of imputation credits. We consider that on a post-company pre-personal tax basis, investors that are eligible to receive imputation credits value them at their full face value. A dollar face value of imputation credits reduces eligible investor's tax liabilities by one dollar. The face value of the imputation credit is the post-

279 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1090.
280 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048 and 1090.
281 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1093.
282 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1095.
283 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 19-20.
284 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 4.
285 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 5.
286 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 20-21.

Issue	Tribunal comments	AER initial comments
		company pre-personal tax value of the imputation credit.
Tax statistic estimates	Tax statistics can only provide an upper bound on the estimate of theta.[287] The value of theta produced by taxation statistics is evidence that Australian investors do not value imputation credits at their face value, because they may be unable to use them.[288] The ATO data relied by Hathaway has since been acknowledged by Hathaway to be of some concern.[289]	Handley advised that his previous comments regarding the use of tax statistics being an 'upper bound' were misinterpreted in these proceedings. Handley confirmed that tax statistics can be used to produce a point estimate of the utilisation rate. We discussed Handley's views in section A.6.1 of the draft/preliminary decisions. We discuss the use of tax statistics more broadly in section A.13 of this appendix. Lally advised that the correct tax statistic is upward biased as it is expected local investors would tilt their shareholding towards stock with high imputation credit yields. However, he considers that given the taxation data reliability issues and the fact that we select the lower of the two possible tax statistic estimates (0.45 vs. 0.62), the tax statistic estimate we use (updated to 0.48 in this decision) is not an upper bound.[290] Ultimately, we consider any uncertain estimate is not an upper bound. Moreover, even if we do use an estimate of the utilisation rate of 0.48 from tax statistics (consistent with FAB data), this results in an estimate for gamma of approximately 0.4 when combined with Lally's preferred distribution rate of 0.83 for a benchmark efficient entity. Having regard to the potential data limitations and alternate estimates, the evidence from tax statistics is not inconsistent with the evidence from the equity ownership approach, but we place less reliance upon it. We do not consider the utilisation rate produced by taxation statistics is evidence that Australian investors do not value imputation credits at their face value. Rather we consider the evidence demonstrates there are

[287] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048, 1090 and 1095.
[288] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.
[289] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.
[290] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 19-20.

Issue	Tribunal comments	AER initial comments
		potential data reliability issues with tax statistics. The Tribunal itself has acknowledged concerns with the ATO data.[291]
The conceptual basis for dividend drop off studies	Of the various methodologies for estimating gamma employed by the AER, market value studies are best placed to capture the considerations that investors make in determining the worth of imputation credits to them.[292] The AER could have excluded earlier market based studies that were not relevant, such as the studies that were conducted on pre 2000 data.[293] That the econometric issues identified in market based studies is at odds with the AER's reliance on economic modelling in other aspects of its determinations.[294] The best estimate derived by the updated SFG study is 0.35 and it is incorrect for the AER to adjust the SFG study for factors, such as differential personal taxes and risk.[295] The SFG 2013 Study represents one point of view. As in a number of instances in these matters, there are conflicting expert views. Without the benefit of learning further from the experts, the Tribunal (like the AER) is faced with the selection between competing views.[296]	The limitations of dividend drop off studies have been widely identified—we provide a selection of comments from academics and regulators in section A.15 and 4.4.1. Moreover, both Handley and Lally advised that other approaches to estimating the utilisation rate should be preferred. Handley and Lally also advised that, without adjustment, dividend drop off studies produce downwards-biased estimates of the utilisation rate. The issue with dividend drop off estimates of the utilisation rate (or value) is that they do not produce a post (company) tax (pre-personal tax) estimate and therefore do not produce estimates consistent with the Officer post-tax framework. The dividend drop off estimate is influenced by differential personal taxes, given that investor value capital gains more than dividend income due preferential tax treatment of capital gains. Further, dividend drop off studies reflect the value of the marginal investor and not the value of aggregate long term investors in regulated utilities. This is further discussed in section A.15.3. The utilisation value estimate from dividend drop off studies is neither a pre- nor post-personal tax estimate. The pre-personal tax estimate of the utilisation value is the face value of imputation credits. The personal tax is levied on the face value of imputation credits (levied on gross dividend).
Consistency of allowed rate	The AER's reasoning ignores the fact that other parameters in the WACC calculation	The market value of imputation credits is inferred from dividend drop off

[291] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.
[292] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1096.
[293] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.
[294] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1052.
[295] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1101-1103.
[296] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1118.

Issue	Tribunal comments	AER initial comments
of return parameters	are market values that already incorporate the effects of the difference in investors' tax position and transaction costs'.[297] There is no inconsistency between the use of market studies to estimate the value of imputation credits and the method used to calculate other parameters of the cost of debt and equity from market data.[298] The Tribunal consider that return on equity is derived from market prices of government bonds (the risk free rate) and from the market prices of shares (beta and MRP).[299] The cost of debt is calculated by reference to bond yields which are derived directly from traded market prices.[300] These market prices reflect every consideration that investors make in determining the worth of shares to them and that the bond prices, and the yields that are derived from them, reflect every consideration that investors make in determining the worth of the asset to them, including "personal costs".[301]	studies which measure the dividend drop off ratio. The value of imputation credits from dividend drop off studies is influenced by differential personal taxation of dividend income and capital gains. It reflects investor's preference for capital gains over dividend income given the preferential tax treatment of capital gains in Australia. As such, it does not reflect a post-company pre-personal tax value consistent with the framework in the NER/NGR based on Officer's work. We consider all parameters in the WACC are calculated on a consistent basis. In the WACC we use both market values (equity and debt prices) and face values (dividends, imputation credits, debt coupons, debt principal). We use the face value for imputation credits because this value is a post (company) tax (pre-personal tax) value and is internally consistent with all other allowed rate of return parameters. We note personal tax is levied on the face value of imputation credits (levied on gross dividends).
The need to re-evaluate gamma	Changes to the NER and the NEL allow the AER greater flexibility to adopt a more sophisticated approach to the cost of capital than previously envisaged by the NER and the NEL.[302] It is appropriate that the AER should use that additional flexibility to seek advice on alternatives to the Officer Framework that better define the impact of imputation credits on the cost of capital.[303] Suggested that given the New Zealand High Court decision financial modelling may not yet have produced a workable version of a CAPM that incorporates a generalised	We remain of the view that Officer Framework remains appropriate for the current final decision. We consider our application of the Officer Framework will lead to an overall rate of return (inclusive of the value of imputation credits) that is commensurate with the efficient financing costs of a benchmark efficient entity in the provision of regulated services.

297 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1073.
298 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1074 and 1097.
299 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1098.
300 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1098.
301 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1098.
302 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1083.
303 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1084.

Issue	Tribunal comments	AER initial comments
	treatment of imputation credits, in which case the AER would necessarily have to make judgements about whether and how to modify the methodology in the RoR Guidelines for factors subsequently raise in advice it received from experts.[304] Experts present no consistently coherent CAPM framework for the assessment of the components of the cost of capital. There are models with disputed applicability which may or may not be consistent with the application of a vanilla WACC.[305]	

Source: As specified in table.

[304] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1088.

[305] Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1084.

A.3.3 Energex

In our 2009 industry wide review of rate of return parameters (the 2009 WACC review), we adopted a gamma of 0.65.[306] In 2009, we applied this value in the Queensland and South Australian electricity distribution determinations. Energex and Ergon successfully sought review of this decision by the Australian Competition Tribunal. The Energex Tribunal set the distribution rate to 0.7 and initiated a dividend drop off study from SFG to estimate the utilisation rate. The Energex Tribunal adopted SFG's recommendation that the utilisation rate be set at 0.35. This resulted in a gamma of 0.25.

In reaching its position, the Energex Tribunal expressed views on the important factors in its decisions. This included areas where the Energex Tribunal felt its understanding was incomplete, as summarised in table 4-10 below. We have carefully considered these views.

[306] AER, *Final decision: Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters*, 1 May 2009.

Table 4-10 Australian Competition Tribunal's observations on imputation credits in Energex matter

Issue	Tribunal comments	AER comments
The conceptual framework for gamma	"The Tribunal has found some deficiencies in its understanding of the foundations of the task facing it, and the AER, in determining the appropriate value of gamma. These issues have not been explored so far because they have not arisen between the parties, who appear to be in agreement about how the Rules should be interpreted regarding the treatment of corporate income tax. They may be matters that the Tribunal will take up in its further decision in these matters; or they may best be left until the next WACC review. Indeed, they may go to the basis for the Rules themselves. The Tribunal would be assisted in its consideration of the issues before it if the AER were to provide relevant extrinsic material explaining: (a) the rationale for including the gamma component in the formula for calculating the estimated cost of corporate income tax; and (b) how it relates to the rest of the building blocks, especially the rate of return (cl 6.4.3(a) and cl 6.5.2(b) of the Rules)."[307]	In developing the Guideline, we re-evaluated the conceptual framework for the value of imputation credits. In making this final decision, we have built on this re-evaluation. We discuss the role of the value of imputation credits and the underlying conceptual framework in sections A.5 and A.6. Also see our response above in section A.3.2 under ' The conceptual framework for gamma'.
The distribution rate (payout ratio)	"…there is [was] no empirical evidence currently available supporting a distribution ratio higher than 0.70."[308]	As discussed in section A.10 of this appendix, we consider that a distribution rate of 0.7 across all equity and a distribution rate of 0.75 for listed equity is appropriate for a benchmark efficient entity. Lally also finds a distribution rate of 0.83 for listed equity estimated from financial reports of the largest 20 listed companies. Also see our response above in section A.3.2 under 'The distribution rate (payout ratio)'.

[307] Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] ACompT 7*, October 2010, paras. 149–150.

[308] Australian Competition Tribunal, *Application by Energex Limited (Distribution Ratio (Gamma)) (No 3) [2010] ACompT 9*, December 2010, para. 2.

Issue	Tribunal comments	AER comments
Tax statistic estimates	"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."[309] "SIRCA's March 2011 report provided responses to a number of specific questions asked by the AER. Some of these responses raise serious issues regarding the use of dividend drop-off studies and the Tribunal's earlier reasons. For example, SIRCA's March 2011 report suggests that: - estimates from dividend drop-off studies are very imprecise and of questionable reliability; - such studies are likely to produce downwardly-biased estimates of theta; and - taxation studies do not give an upper bound to theta. By way of background, the Tribunal in earlier reasons noted that the AER accepted that tax statistics studies provide an upper bound on possible values of theta. The AER in its report, while being less unequivocal than SIRCA, adopts SIRCA's suggestion that the results of tax statistics studies (now called the redemption rate) could be discounted for factors such as the time between the distribution and the redemption of imputation credits. These adjustments "would need to be made on an economically justifiable basis". The AER referred to a 2004 study by Hathaway and Officer as being an example of such a use of an estimate of the utilisation rate. Beyond these observations, the AER does not seek to adduce material from SIRCA's March 2011 report to advance its submissions. On the material before it, the Tribunal is unable to reach any conclusions about the further use of tax statistics studies in estimating the utilisation ratio, theta. No doubt the AER will in the future have	Handley advised that his previous comments regarding the use of tax statistics being an 'upper bound' were misinterpreted in these proceedings. Handley confirmed that tax statistics can be used to produce a point estimate of the utilisation rate. We discussed Handley's views in section A.6.1 of our draft/preliminary decisions. We discuss the use of tax statistics more broadly in section A.13 of this appendix. Also see our response above in section A.3.2 under 'Tax statistic estimates'.

[309] Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] ACompT 7*, October 2010, para. 91.

Issue	Tribunal comments	AER comments
	opportunity, and perhaps cause, to investigate further. It has not sought to do so in these proceedings."[310]	
The conceptual basis for dividend drop off studies	"The AER has tendered, largely without comment, material that casts some doubt on the use of dividend drop-off studies in estimating gamma for regulatory purposes. In responding to questions from the AER, SIRCA's March 2011 report raises questions about the theoretical basis for dividend drop-off studies. In doing so, it touches on issues raised in the Tribunal's earlier reasons regarding the arbitrage model underlying dividend drop-off studies. However, SIRCA's March 2011 report does not resolve these issues and the AER has provided no conclusions of its own."[311]	The limitations of dividend drop off studies have been widely identified since these proceedings—we provide a selection of comments from academics and regulators in section A.15. Moreover, both Handley and Lally advised that other approaches to estimating the utilisation rate should be preferred. Handley and Lally also advised that, without adjustment, dividend drop off studies produce downwards-biased estimates of the utilisation rate. Also see our response above in section A.3.2 under 'The conceptual basis for dividend drop off studies '.
The need to re-evaluate gamma	"Further, the Tribunal notes that estimation of a parameter such as gamma is necessarily, and desirably, an ongoing intellectual and empirical endeavour. Its decision in these proceedings is based on the material before it."[312]	Consistent with this comment, we have not sought to apply the Tribunal's previous considerations in this final decision. Instead, we adopt a value of imputation credits that is based on our assessment of the merits of the evidence before us, which includes a large amount of material that was not before the Tribunal in these proceedings. Also see our response above in section A.3.2 under 'The need to re-evaluate gamma '.

Source: As specified in table.

310 Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, paras. 32–34.
311 Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, paras. 40–41.
312 Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, para. 45.

During the Guideline process, service providers frequently proposed a value of imputation credits of 0.25 and referenced the Tribunal decision for Energex in support of this.[313] However, the last quote from the Energex Tribunal demonstrates that it did not intend for its decision to be determinative of the appropriate estimation technique for gamma, and certainly not on a permanent basis. In the Guideline, we also made this point. Service providers with current proposals no longer refer to the Energex Tribunal's decision as if it were precedent. Rather, they propose a value of imputation credits, and reasons for that value, which are consistent with the Energex Tribunal decision. However, the service providers consider that the problematic estimation methodologies and the currency of the underlying data that apply to other dividend drop off studies does not apply to the SFG study.[314] We do not agree for the reasons outlined in section A.15.

Both during the Guideline development process and this determination process, we have considered the previous Tribunal decision for Energex carefully in forming our view on the value of imputation credits. For the reasons expressed in this appendix and attachment 4 we have come to a different position. This is consistent with the Energex Tribunal's expectation that the value of imputation credits is 'necessarily, and desirably, an ongoing intellectual and empirical endeavour'.

A.3.4 DBNGP and WA Gas Networks

In 2012, Dampier to Bunbury Natural Gas Pipeline (DBNGP) sought Tribunal review of the ERA's decision to adopt a value of imputation credits of 0.25. In upholding the ERA's value, the Tribunal again emphasised the lack of consensus on an appropriate value and the fact that determining a value for gamma is continually being refined:[315]

> 171 Determining the appropriate values of F [the distribution rate] and theta has been a fiercely contested issue in Australia's regulatory history. There is no unique pair of values of F and theta that are regarded as universally correct. Therefore there is no value of gamma that is regarded as universally correct. The academic models, empirical research methods, data and relevant time periods all need to be carefully investigated. Debate is inevitable, and ultimately, which value is most relevant for the matter at hand must be decided on a case-by-case basis.

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313 For example, see: ENA, *Response to the Draft Rate of Return Guideline of the Australian Energy Regulator*, 11 October 2013.

314 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 301, 303, 306; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 14-16, 21; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 117-118; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-86; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 87; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365-366; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 94; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360.

315 Australian Competition Tribunal, *Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14*, July 2012.

…

210 The material (and conclusions drawn from it) that were relied on by the ERA were objectively produced by respected academic researchers. Professor Gray advanced alternative interpretations. This whole area of discourse about inputs into the CAPM and the correct approach to estimating the relevant parameters of the CAPM, including gamma, is a continuing area of sophisticated debate involving competing opinions. An agreed position appears to be a distant outcome. In reaching its decision the ERA relied on expert opinions that were contrary to those of Professor Gray, who had been engaged by DBP. Such a difference of opinion is common amongst academics in this as in other similar areas. Thus, so long as the ERA acted reasonably in preferring one expert to another, it will not have committed error.

211 The Tribunal reiterates that there is no single agreed-upon correct value of gamma. While the value of F is relatively settled in Australia, great controversy has surrounded the relevant value of theta. Many papers on the measurement of theta, and thus gamma, were produced for the ERA's consideration, from its own and from DBP's experts. The gap between their estimating models, and their ensuing calculations, was wide.

214 The Tribunal observes that this is not to say, however, that a gamma value of 0.25 is the only possible value for this parameter. It is simply the best estimate currently available for use in this matter now before it. As with the estimation of many economic and financial parameters, finding the "right" value is a process of continual refinement as new models and paradigms emerge and as better data and estimating techniques become available.

The Tribunal made similar comments in the earlier WA Gas Networks matter.[316]

A.4 Key concerns of the service providers

Since the rate of return guideline we have effectively reviewed four tranches of submissions from the regulated businesses and other related stakeholder submissions. These tranches related to common gamma decision in AER decisions released in May and June 2015[317], October and November 2015[318], May 2016[319] and the current decisions[320]. Below we

316 Australian Competition Tribunal, *Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12*, June 2012, paras. 119 and 125.

317 ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015; Directlink, *Directlink submission on gamma (updated)*, January 2015; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015; and JGN, *Gamma - response to the draft decision*, February 2015; TransGrid, *TransGrid's approach to gamma*, May 2014.

318 SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015; Ergon, *Submission on value of imputation credits (gamma)*, July 2015; Energex, *Submission on Energex's regulatory proposal 2015-20 and AER issues paper - attachment 2*, January 2015.

319 AusNet Services, *2016-20 Regulatory Proposal*, April 2015; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015; CitiPower, *Appendix J - Gamma*, April 2015; Powercor, *Appendix J -*

highlight the key concerns raised by regulated businesses in each tranche of submissions. Overall most businesses submit that gamma should be set to 0.25 based on a 0.35 utilisation value from the SFG dividend drop off study and a 0.7 all equity distribution rate based on franking account balance data from the Australian Taxation Office.

Two businesses, TasNetworks, and Powerlink in these proposals submitted a gamma estimate of 0.4, consistent with the AER's earlier decisions.[321]

A.4.1 Ausgrid, Endeavour Energy, Essential Energy, ActewAGL, TransGrid, Directlink, Jemena Gas Networks

In their revised proposals, Ausgrid, Endeavour Energy, Essential Energy, ActewAGL, TransGrid, Directlink, and Jemena Gas Networks directly raised eight key concerns with our draft decisions released in 2014, which they characterised as errors.[322] Below we set out each of these and identify where we have responded to each of these eight key concerns in this final decision.

- *Our definition of the utilisation rate is conceptually incorrect and inconsistent with the requirements of the NER/NGR*—our understanding of the utilisation rate (and the value of imputation credits more broadly) is discussed in sections 4.3.1, 4.3.6,A.5, A.6, and A.7. As shown there, our understanding is consistent with the theoretical framework that underpins the NER/NGR and is supported by expert advice from Handley and Lally.
- We incorrectly use equity ownership rates as direct evidence of the value of distributed imputation credits—given our understanding of the utilisation rate, we set out in section A.12 why the equity ownership approach provides a reasonable estimate.
- The ranges we used for the equity ownership rate were not supported by the evidence in the draft decisions—as discussed in section A.12, the service providers who raised this did not recognise that our ranges were based on the evidence from two alternative applications of the equity ownership approach. In this final decision, our ranges are primarily based on the application that was deemed more relevant by Handley, although we also have regard to the range for all equity implied by Lally's recommended estimate

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Gamma, April 2015; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, July 2015.

320 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016; TasNetworks, *Tasmanian Distribution Revised Regulatory Proposal,* 2 December 2016; Powerlink, *Revised Revenue Proposal,* 1 December 2016.

321 TasNetworks, *Tasmanian Distribution Revised Regulatory Proposal,* 2 December 2016, p. 17*;* Powerlink, *Revised Revenue Proposal,* 1 December 2016, pp. 10-11.

322 ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015, pp. 485–486; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 1; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 1–2; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 1; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 1; and JGN, *Gamma - response to the draft decision*, February 2015, p. 1.

for the distribution rate and particularly his preferred point estimate for gamma of at least 0.5.

- We incorrectly use tax statistics as direct evidence of the value of distributed imputation credits—given our understanding of the utilisation rate, we set out in section A.13 why tax statistics provide a valid, albeit uncertain, estimate.
- We incorrectly conclude that implied market value studies reflect factors that are not relevant to estimating the utilisation rate—given our understanding of the utilisation rate, we set out in sections A.15.4 and A.15.5 why the results of implied market value studies can reflect factors that are not relevant to the utilisation rate.
- We erred by considering implied market value studies in a general manner rather than considering the merits of SFG's dividend drop off study—in sections 4.4.1 and A.15 we set out a list of limitations that can apply to implied market value studies, and in section A.15.5 we conclude that that there is reasonable evidence to suggest that several of these limitations apply to SFG's dividend drop off study. In sections 4.4.1and A.15 we also refer to the issues raised by Lally in relation to SFG's dividend drop off study, and McKenzie and Partington's view that there is no obvious manner in which to weigh the results from various implied market value studies based on their characteristics. In section A.15 we set out statements from experts and other regulators on the limitations of dividend drop off studies. All but one of these statements occurred after the development of SFG's dividend drop off study.
- It was neither necessary nor appropriate for us to identify a distribution rate for only listed equity—in sections A.9 and A.10.1 this is further discussed.
- Our ultimate conclusion as to the value of imputation credits was inconsistent with the evidence presented in our recent decisions—as set out in section **Error! Reference ource not found.**, the evidence presented in this final decision suggests that a reasonable estimate for the value of imputation credits is within the range 0.3 to 0.5. Our estimate of 0.4 is within this range.

A.4.2 SA Power Networks, Ergon Energy, Energex

In the revised regulatory proposals of SA Power Networks, Ergon Energy, and Energex submitted in July 2015, two issues were raised as the key issues in dispute.[323] These issues were also raised in Gray's June 2015 report (for Frontier). These issues are:

- The first key point of difference is conceptually whether theta should be interpreted as the value of distributed credits, or the redemption proportion. The service providers consider that if their value interpretation is adopted then you must use estimates that

[323] We note that these issues have been raised by other service providers. However SA Power Networks, Ergon Energy and Energex have clarified that they consider these to be the key issues in dispute with the AER. We also note Gray did not explicitly identify these as the key issues in dispute, although they featured prominently in his report.

measure the value of distributed credits (such as dividend drop-off studies).[324] In sections A.5 and A.8.1 we explain why we consider the proportion of imputation credits distributed to shareholders eligible to utilise them is an appropriate measure of the value of imputation credits before personal taxes and transaction costs.

- The second key point of difference concerns the set of comparator businesses that should be used when estimating a benchmark distribution rate.[325] The service providers consider: firstly, we are incorrect to consider the same set of firms need to be used to estimate the distribution rate and to estimate the value of imputation credits; and secondly, we are incorrect to use a distribution rate from all listed equity of around 0.8[326] given our benchmark efficient network operator is a pure play wholly domestic business that is not necessarily stock market listed. We respond to these views in sections A.9 and A.10.

We note that both of these points of difference were considered in our decisions released in April and June 2015 and also considered by Handley who supported our approach. We also note Lally's advice recommends a distribution rate for listed equity estimated from the financial reports of the top 20 listed firms. It also implies matching distribution and utilisation rates based on the dataset used is likely to result in an underestimate of gamma (given his recommended values for the distribution rate and utilisation rate).[327]

A.4.3 Australian Gas Networks, ActewAGL, AusNet Services, CitiPower, Jemena Electricity, United Energy, Powercor

In the revised regulatory proposals of Australian Gas Network, ActewAGL, AusNet Services, CitiPower, Jemena Electricity, United Energy and Powercor, a number of key 'second order' differences of view have been identified:

- A redemption rate study can only provide an upper bound for estimating theta.[328] In section A.8.3 we consider this further.

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[324] SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370–371; Ergon, *Submission on value of imputation credits (gamma),* July 2015, p. 7; Frontier Economics, *An appropriate regulatory estimate of gamma*, p. 8, June 2015.

[325] SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370–371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 7; Frontier Economics, *An appropriate regulatory estimate of gamma, pp. 26–30, June 2015*.

[326] We note we have used an estimate of the distribution rate of 0.77 in this decision. This was updated to 0.77 in our JGN decision released in June 2015 from 0.8 used in our final decisions released in April 2015.

[327] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5–6, 25–26, 28–29.

[328] AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 354; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 2; CitiPower, *Appendix J - Gamma*, April 2015, p. 4; Powercor, *Appendix J - Gamma*, April 2015, p. 4; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 5; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, p. 2; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, pp. 9–10, July 2015; Amadeus Gas Pipeline, *Access Arrangement revision submission*, August 2015, p. 151.

- The criticisms of Gray and Hall's dividend drop-off work is not reasonable.[329] We discuss the limitations of dividend drop off studies and which of these apply to the SFG dividend drop off study in section A.15.5.

We note the primary and second order differences of view identified above did not appear to be new issues and largely overlapped with the eight key concerns that service providers had raised previously. Having considered these revised proposals and the new experts' reports since our 2015 JGN decision, we remained of the view that a gamma value of 0.4 was appropriate.

In their revised proposals, these service providers had broadly not submitted anything new. Besides a new report by Frontier Economics, which presented no substantive new arguments, these service providers submitted essentially the same arguments that were considered in our decisions released in October and November 2015. Overall these service providers propose a gamma estimate of 0.25 which is based on a 0.35 utilisation rate from the SFG dividend drop off study and an all equity distribution rate of 0.7.[330]

As a high level summary of the revised proposals, these service providers submitted:

- our approach to estimating gamma is premised on an incorrect interpretation of the NGR[331]
- both the equity ownership value and taxation statistics can be no more than an upper bound for the utilisation rate[332]

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329 AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 367; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 18; CitiPower, *Appendix J - Gamma*, April 2015, p. 16; Powercor, *Appendix J - Gamma*, April 2015, p. 16; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 7; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, p. 15; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, p. 3, July 2015.

330 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 40; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-96; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 97; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 375; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 104-105; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 369.

331 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 2; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 40; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-79; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 80; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 358; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 86; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 352.

332 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 125; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-84, 7-83; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 85, 86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 362, 364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 91, 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 356, 358.

- market value studies are direct evidence of the value of imputation credits to investors—we have erred in concluding that market value studies reflect factors such as differential personal taxes and risk which are not relevant to the task of measuring the utilisation rate[333]
- we incorrectly assume that estimates of the utilisation rate from listed equity (all equity) can only be combined with estimates distribution rate from listed equity (all equity)[334]
- under our interpretation of the NGR, our gamma estimate cannot be supported as the pre-personal cost estimate of the utilisation rate is approximately 0.3.[335]
- These points largely reflect the same issues that were submitted by regulated businesses in earlier regulatory proposals.

A.4.4 AusNet Transmission, TasNetworks, Powerlink

In the revised regulatory proposals of AusNet Transmission, TasNetworks and Powerlink we are considering currently, three issues were raised as the key issues in dispute. These issues were also raised in the two Frontier reports submitted in September 2016.[336] These issues are:

- That using the most recent available data, dividend drop off studies still suggests a theta estimate of 0.35 remains appropriate.[337] Lally has reviewed the updated SFG dividend drop off estimate and considers there are eleven issues that apply to the study.[338] This is further discussed in section A.15.2.

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[333] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 41.

[334] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 111, 128; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-81, 7-95; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 82, 96; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360, 374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 88, 103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 354, 368.

[335] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 127; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-94; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 95; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 368.

[336] Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016; Frontier Economics, *Issues in the estimation of gamma*, September 2016.

[337] AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 209, 212; Frontier Economics, *Regulatory An updated dividend drop-off estimate of theta*, September 2016.

[338] M. Lally, *Issues in the estimation of gamma,* April 2017, pp. 6-9.

- Gamma can be directly estimated reliably from tax statistics as the ratio of credits redeemed to credits created.[339] The AER does not agree and considers caution should be exercised with using tax statistics to estimate any parameters associated with the value of imputation credits. This is further discussed in section A.13.
- Dr Lally's analysis on the seven largest firms listed on the Australian Stock Exchange which demonstrated that firms with more foreign income have a smaller imputation credit distribution rate is flawed as:

    1. The relevant question is whether large multinationals have higher imputation credit distribution rates than other firms.[340]
    2. The analysis does not control for the difference in dividend payout ratios.[341]

    Dr Lally has reviewed this criticism and does not agree. Dr Lally has provided further explanation on why his analysis shows that foreign income can be associated with a lower imputation credit distribution rate.[342] Further, Lally considers that there is no need to control for the dividend payout ratios and what is important is the overall amount of imputation credits that are distributed by businesses.[343] This is further discussed in section A.10.1.

A.5 The role of the value of imputation credits in the regulatory framework

To explain the role of the value of imputation credits in the NER/NGR, we must consider:

- the 'building block' revenue framework in the NER/NGR, and
- the construction of the tax building block.

A.5.1 The building block framework

Under the NER/NGR, we employ a building block framework to estimate revenue for service providers. The building block framework sets out how to estimate the various components (that is, 'building blocks') that make up a total revenue allowance.[344] The function of this building block revenue estimate is to determine the revenue that a service provider requires to:

- fund its operating expenses.

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339 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 210; Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 3-4, 12-15.

340 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205; Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 6-11.

341 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205; Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 6-11.

342 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 9-12.

343 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 9-12.

344 NER, cll. 6.4.3, 6A.5.4; NGR, r. 76.

- achieve adequate returns to raise debt and equity in order to finance its capital investments. This is made up of a rate of return on capital to compensate investors for the risks of investment. It also includes a return of capital (depreciation), which gradually returns the initial principal of the investment, and subsequent investments, back to investors.
- pay its tax liability.
- reflect any revenue increments or decrements from incentive mechanisms in the design of the regulatory regime.

Importantly, the building block framework is intended to compensate the service provider (and its investors) only for costs incurred by the service provider and not by its investors; that is, the framework is on a post-company before-personal-tax and before-personal-costs basis. Handley described this consideration as follows:[345]

> The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.
>
> …
>
> The regulatory WACC framework is an after-company-before-personal-tax framework which requires explicit modelling of cash flows and returns after allowing for company tax but avoids most of the complications associated with having to model personal taxes - one complication which remains of course, is gamma. If one wanted to explicitly model personal taxes then an after-company-after-personal-tax WACC framework could be used instead.

In particular, Handley advised that the Officer framework provides the basis for the building block framework in the NER/NGR, and that the before-personal-tax and before-personal-costs interpretation is consistent with Officer. Handley's advice on these matters is discussed in more detail in sections A.6, A.7.3 and A.8.1.

In response to a number of service providers' view that we prefers our conceptual valuation relative to a market mechanism derived value, and their concerns around our definition of gamma, we note:

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[345] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5 and footnote 2.

- There is no market for imputation credits and therefore there is no directly observable market price.[346] This is also discussed below in section A.15.3.
- The value of imputation credits as estimated through a dividend drop off study:
    - is not a post company tax value before personal taxes and personal transaction costs (particularly demonstrated where the study estimates a value for cash dividends materially below their face value as the SFG study does)
    - is not necessarily consistent with the estimate of the return on equity and return on debt which are estimated required returns after company taxes before personal taxes and personal transaction costs (particularly demonstrated where the study estimates a value for cash dividends materially below their face value as the SFG study does)
    - is not clearly measuring a value to long term investors supplying capital to the benchmark efficient entity (even where adjusted for adjusted for differential tax impacts)
    - is subject to significant uncertainty.
- A number of limitations of these studies are discussed further in sections A.15.4 and A.15.5.
- Our definition of the utilisation value is consistent with Officer Framework underpinning the rules that uses a post-tax Vanilla WACC, is consistent with the way we estimate the required return on equity, and is supported by Handley. Lally also considers our approach to imputation credits is consistent with the post-tax framework in the NER/NGR.[347]
- The explicit recognition that this is a pre personal taxes and pre personal transaction costs value is simply explicit recognition of something implicit in the Officer Vanilla WACC framework. This framework determines the required return to the company (i.e. before personal taxes and personal transaction costs are incurred) consistent with the definition of the after-tax net cash flows set out in Officer.[348]
- Our definition is consistent with the 'value' concept in the rules given the rules are requiring the AER to estimate a post-tax nominal Vanilla WACC consistent with Officer formula (12) in his 1994 paper, which as stated by Officer is one particular definition of "a company's after-tax cost of capital (WACC)" and "is determined by the definition used of after-tax operating income or really after-tax net cash flows".[349] As these after-tax net

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[346] We note that if there was a post-tax market for imputation credits they should trade for approximately their face value as this is the amount of post-tax cash flow from the government they entitle the claimant to receive from the government.

[347] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 11-12.

[348] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 7.

[349] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 6.

cash flows are at the company level they are before personal taxes and personal transaction costs. This is supported by the advice of Handley and Lally.[350]

A.5.2 The tax building block

One expense that a service provider faces is taxation. An allowance for taxation can be estimated as a separate building block allowance, or through the rate of return. Either way, the service provider and its investors are compensated for its tax liability. The difference is only how this return is presented. The NER/NGR specify that we must estimate a nominal vanilla rate of return.[351] A nominal vanilla rate of return combines a post-tax return on equity with a pre-tax return on debt. More specifically, as described by Handley above, the return on equity is a post-company-tax-pre-personal-tax return on equity.

Amongst other things, this means the return on capital does not include an allowance for the cost of taxation. As a result, the building block framework includes an estimate of the cost of corporate income tax as a separate revenue item.

The cost of corporate income tax building block takes the following form:

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

- $(ETI_t \times r_t)$ is an estimate of the benchmark efficient entity's tax liability.
- γ is the value of imputation credits.

Therefore, the effect of the value of imputation credits is to reduce a service provider's allowed revenue by γ (gamma) dollars for each dollar of expected company tax payable by the benchmark efficient entity. Given it is the tax paid by the benchmark efficient entity that gives rise to the imputation credits, we consider that it is the (pre-personal tax) value of imputation credits to investors in the benchmark efficient entity that is relevant.[352]

A.6 The conceptual framework for the value of imputation credits

With regard to the discussion of the tax building block in section A.5.2, we consider the 'value of imputation credits' to be the value of imputation credits to investors in the benchmark efficient entity. Moreover, as noted above, it is the post-company pre-personal tax value of imputation credits to those investors that we seek to estimate. The issue is then how to interpret and estimate the value of imputation credits. Our approach to interpreting

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350 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5 and footnote 2; M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 7, 11, 12.

351 NER, cll. 6.5.2, 6A.6.2; NGR, r. 87.

352 Although we consider that it is implied that the 'value of imputation credits' refers to the value of imputation credits to investors in the benchmark efficient entity, we note that the NER/NGR are not explicit on this point.

and estimating the value of imputation credits is guided in the first instance by the conceptual framework developed by Officer.[353] This is because:

- The construction of the tax building block mirrors the treatment of imputation credits in the framework developed by Officer, including through use of the parameter denoted by the Greek letter 'gamma'.[354]
- Handley advised that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the NER/NGR.[355]
- The NER/NGR require that we determine the rate of return on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.[356]

We do not contend that the Officer Paper is a “statute or a code”. However, as the Officer Paper underpins the inclusion of gamma in the corporate income tax formula in NER 6.5.3 and NGR 87A, it is fundamental to a coherent understanding of the role of gamma in the regulatory scheme.

The Officer Paper specifically identified gamma in its WACC formulae to be the “proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend”: It directly supports an interpretation of gamma which is focused on the utilisation or redemption of imputation credits, and an approach to theta which seeks to identify the proportion of investors that are eligible to utilise distributed imputation credits. So much is confirmed by Handley, who states:[357]

> 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. 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.

The Officer Paper makes clear that gamma is:

(a) the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend; *which is*

(b) the value of a dollar of tax credit to the shareholder; *with the result that*

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353 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

354 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.

355 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.

356 NER, cll. 6.5.2, 6A.6.2; NGR, r. 87.

357 Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 9, 17.

(c) if the shareholder can fully utilise the imputation tax credits then the value of gamma =1.[358]

Our approach to gamma, as drawing upon the Officer Paper, advances the NEO and the NGO and does not detract from those objectives. The purpose of including the gamma parameter in the corporate income tax formula is to ensure that investors are appropriately compensated having regard to the combined value of dividends, capital gains and imputation credits they receive.

The Officer Paper included the following explanation of gamma at pp 2-4 (emphasis added):

> Under an imputation system, credit is given to shareholders for the company tax implicitly levied on their dividend receipts, i.e. dividends paid after company tax has been levied which implies that the dividends have been taxed at the company level. Under a full imputation tax system, tax that is implicitly being levied on the dividends can be credited against any further tax liabilities of the shareholder (the recipient of the dividend).
>
> The proportion of company tax that can be fully rebated against personal tax liabilities is best viewed as personal income tax collected at the company level. In effect, the tax collected at the company level is a mixture of personal tax and company tax, the company tax being that proportion of the tax collected which is not credited (rebated) against personal tax. If all the collection of tax from a company is rebateable (in the Australian terminology if all the franking credits can be used against personal tax liabilities), then for that company's shareholders company tax is effectively eliminated. The tax the company pays is simply the shareholders' personal income tax being collected at the company level.
>
> The amount of tax collected from the company by the government is found by applying the effective tax rate (T) to the operating income less interest, i.e. $X_O - X_D$.
>
> This amount, i.e. $T(X_O - X_D)$ represents the amount of tax collected from the company but not all of this is company tax. A proportion (γ) of the tax collected from the company will be rebated against personal tax and, therefore, is not really company tax but rather is a collection of personal tax at the company level. Therefore, if we wish to define the effective company tax collection, we need to reduce T by the proportion γ.
>
> In these circumstances, the effective level of company tax paid is defined by:
>
> $XG = T(X_O - X_D) - \gamma \, . \, T(X_O - X_D)$
>
> $= T (X_O - X_D) (1-\gamma)$ (2)
>
> where

[358] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 4.

> T is the tax rate effective for the definition of assessable income as defined in (2), it is the effective rate which is levied at the company level and it is a mixture of company tax T(1-γ) and personal tax, T. γ, i.e. T= T(1-γ) + Tγ. Thus γ is the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend. This franking credit can be utilized as tax credit against the personal tax liabilities of the shareholder. γ can be interpreted as the value of a dollar of tax credit to the shareholder.

The Officer Paper set out the following example of its interpretation of gamma:[359]

> For example, if the shareholder can fully utilize the imputation tax credits then ("value") γ = 1, e.g. a superfund or an Australian resident personal taxpayer. On the other hand a tax exempt or an offshore taxpayer who cannot utilize or otherwise access the value in the tax credit will set γ = 0.

While the above passages of the Officer Paper describe gamma using slightly different permutations of language, it is clear that, at its core, gamma is conceptualised by Officer as being concerned with investors' utilisation of tax credits.

Officer describes gamma in different ways, and this is a potential source of ambiguity regarding what the parameter represents and therefore how one might estimate it in practice. Whilst Handley acknowledged that Officer describes gamma in seemingly different ways, he advised that, when examined closely, there is no ambiguity in the meaning of Officer. Handley advised:[360]

> Similarly, Officer has described gamma in seemingly different ways. For example he refers to:
>
> *"A proportion (γ) of the tax collected from the company will be rebated against personal tax."*
>
> and shortly thereafter:
>
> *"γ can be interpreted as the value of a dollar of tax credit to the shareholder."*
>
> But again, there is no ambiguity. These terms can and have been used interchangeably because the underlying source of value of an imputation credit to shareholders is the consequent reduction in personal taxes in recognition of taxes that were previously paid at the corporate level. In other words, within the Officer framework, it is clear that gamma represents the utilisation or redemption value of imputation credits and this value corresponds to the proportion of company tax which is in effect a prepayment of personal tax by the company on behalf of its

[359] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 4.

[360] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 9.

> shareholders. It is this identification of the personal tax component of the company tax paid which is the central idea of the paper.

In other words, gamma in the Officer framework represents the proportion of company tax that is returned to investors through the utilisation of imputation credits and this is the value of imputation credits to investors. This is the interpretation of the value of imputation credits we adopted in the Guideline and continue to adopt in this decision. This interpretation is consistent with the Officer framework and is supported by advice from Handley.

The Ausgrid Tribunal considered we had erred in adopting a conceptual approach to gamma that redefines it as the value of imputation credits that are available for redemption.[361] The Ausgrid Tribunal found this due to us placing most reliance on the equity ownership approach and effectively defining the utilisation value as the proportion of distributed imputation credits that are available for redemption.[362] The Ausgrid Tribunal considered that such an approach:[363]

> Is inconsistent with the concept of gamma in the Officer Framework for the WACC which underlies the rules and the objective of ensuring a market rate of return on equity by making an adjustment to the revenue allowance for taxation to take account for imputation credits.

We consider our approach is consistent with the Officer framework and our estimation of the required return on equity. We consider what matters from a value to investor's perspective is the face value of imputation credits expected to be utilised as this reflects both the cost of these imputation credits to the regulated businesses and the benefit that investors receive from these credits when utilised to reduce their tax payable (or to receive a refund from the government). The post company (pre-personal) tax value of an imputation credit when utilised is approximately[364] its face value. This is further discussed in section A.15.3.

The Officer framework assumes all free cash flows (including imputation credits) are fully paid out each period. That is, the Officer framework is a 'perpetuity' framework. However, in reality not all imputation credits are necessarily paid out each period, nor are all other free

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361 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1100; United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; CitiPower/Powercor, *Submission on implications of recent Australian Competition Tribunal Decision*, 18 April 2016; ActewAGL, *Implication of recent Tribunal decisions for final decision and updates to the allowed rate of return and forecast inflation estimate*, 12 May 2016.

362 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, January 2016, para. 1100.

363 United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; CitiPower/Powercor, *Submission on implications of recent Australian Competition Tribunal Decision*, 18 April 2016; ActewAGL, *Implication of recent Tribunal decisions for final decision and updates to the allowed rate of return and forecast inflation estimate*, 12 May 2016; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1100.

364 It is approximately equal due to the time value of money that impacts the present valuation of distributed imputation credits. However, we consider any discounting for this would be immaterial for the reasons discussed in section A.8.3

cash flows necessarily paid out.[365] For example, it is typical for a company to retain some earnings from a previous year to fund part of its future investment, rather than pay out all earnings as dividends and fully raise the funding of future investment from external sources. Work by Monkhouse (and others) extends the Officer framework by allowing for less than a full payout of cash flows and imputation credits each period. Handley advised that Monkhouse effectively shows that:[366]

$$\gamma = F\theta + (1 - F)\psi$$

where:

- F is the proportion of imputation credits generated that are distributed in a period (the 'distribution rate').
- θ (theta) is the utilisation value to investors in the market per dollar of imputation credits distributed (the 'utilisation rate').
- ψ (psi) is the utilisation value of a retained credit to investors in the market.

Handley also advised that in frameworks such as Monkhouse's the utilisation rate in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market:[367]

> This interpretation of theta as a complex weighted average of investor utilisation rates is consistent with that appearing in Monkhouse (1993) and Lally and van Zijl (2003)…

This is also supported by Lally's remarks on the work of Lally and van Zijl:[368]

> Although Officer (1994) provides no clarification on this matter, because his derivation of the model is intuitive rather than formal, Lally and van Zijl (2003, section 3) provide a formal derivation of a generalisation of Officer's model (with the Officer model being a special case), in which variation of utilisation rates across investors is recognised. In this derivation, they show that [the utilisation rate] is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion.

Consistent with the advice we received from Lally, in the Guideline we recognised that the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market. In the Guideline, we also defined the utilisation rate as the extent to which investors can use the imputation credits they receive to reduce

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365 This is evident in companies having positive franking account balances in aggregate.

366 Handley considered that, although Monkhouse does not use the term gamma, the interpretation is clear: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 11 and footnote 12.

367 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 18–20.

368 M. Lally, *The estimation of gamma*, 23 November 2013, p. 11.

their tax (or receive a refund). In this decision, consistent with Handley's advice, we consider the utilisation rate is the utilisation value to investors in the market per dollar of imputation credits distributed. However, we consider that our views in the Guideline and in this decision are broadly equivalent; that is, our definition of the utilisation rate in this final decision still reflects the extent to which investors in the market can use the imputation credits they receive. This is because, as discussed above and in sections A.5, A.7 and A.8.1, to be consistent with the Officer framework (and therefore the building block framework in the NER/NGR) the utilisation rate should reflect the before-personal-tax and before-personal-costs value of imputation credits to investors. On a before-personal-tax and before-personal-costs basis, an investor that is eligible to fully utilise imputation credits should value each dollar of imputation credits received at one dollar (that is, have a utilisation rate of 1). Therefore, the utilisation value to investors in the market will reflect the weighted average, by wealth and risk aversion, of the utilisation rates of investors—some of whom will have a utilisation rate of 1 and others who will have a utilisation rate of 0.[369] We discuss Handley's advice on this matter further in section A.8.1.

Returning to the expression for γ above, we have not explicitly included the value of retained credits, ψ, when determining the value of imputation credits. This is mainly because we recognise that investors can only use imputation credits to reduce tax or receive a refund once the credits have been distributed. There is also the practical problem of how to quantify the value of retained credits. Handley acknowledged the potential for retained credits to have value, but also the difficulty in quantifying it:[370]

> Retained imputation credits can be worth no less than zero but may be worth more than zero. Estimates of gamma using the traditional approach will therefore be downward biased to the extent that retained imputation credits have value. Although it is not possible to reasonably estimate the magnitude of the bias, its direction is clear.

We agree with Handley and consider assuming retained imputation credits have no value is a conservative assumption. We consider retained imputation credits have a positive value but it is difficult to quantify this value. There are many ways retained imputation credits could potentially benefit investors. For example, retained imputation credits may allow firms to conduct off market buy backs of their own stocks at a discount to prevailing market values. Off market buybacks can be structured in such a way that the purchase price is derived from both fully franked dividends and capital. Investors are prepared to sell back their shares at a discount as they derive value from imputation credits distributed and the capital gains loss that outweighs the capital loss they incur from selling at a discount.[371] Shareholders that do not participate in off market buybacks benefit from capital appreciation of their shares as the firm's capital is brought back at a discount to the prevailing market prices. An example of a

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369 Recall from section 4.3.3 that we define the relevant market as an Australian domestic market that recognises the presence of foreign investors to the extent that they invest in the Australian market.

370 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 14.

371 L. Gitman, R. Juchau and J. Flanagan, Principles of Managerial Finance, 6th Edition, 2011, p. 475.

recently completed off market buy back completed a discount that likely was used to stream imputation credits to those who could utilise them most highly was by Caltex Australia.[372]

However, we consider assuming retained imputation credits have no value might be a reasonable assumption to the extent that imputation distributions rates are expected to remain constant overtime. To the extent firms maintain in perpetuity a distribution rate less that a 100 per cent, the proportion of imputation credits that are not distributed are worthless. As we assume the historical cumulative payout ratios (for listed and all equity) are reasonable estimates of the future expected payout ratios, we consider our approach is appropriate.

A.7 Gray's comments on the conceptual framework[373]

In the previous section, we set out our position on the appropriate conceptual framework for the estimation of the value of imputation credits. In this section, we respond to Gray's view. Gray's view on the conceptual framework was largely adopted by the service providers in their proposals.

Gray's May 2014 report (for SFG) for the service providers submitted that:

- The advice and evidence cited in the Guideline does not support the interpretation of the utilisation rate in the Guideline.
- Officer shows that the value of imputation credits (gamma) represents the extent to which imputation credits are capitalised into the stock price.
- The utilisation rate in the framework provided by Monkhouse (and Lally and van Zijl) should not be used to estimate the value of imputation credits.

The submissions from Gray, including comments in his February 2015 report (for SFG) and his June 2015 and January 2016 report (for Frontier), do not change our view on the conceptual framework for the estimation of the value of imputation credits. We do not consider his work supports the position that our conceptual framework is not an appropriate basis on which to estimate the value of imputation credits.[374] We set out our reasoning below.

A.7.1 Gray's comments on the AER's position

Gray (for SFG) submitted that '…the AER's position is that theta (and consequently gamma) no longer represents the value (as in "worth" or "market value to investors")…'.[375] This is

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372 Caltex Australia Limited, *Off-market buy-back booklet*, 26 February 2016; Caltex Australia Limited, *Caltex successfully completes $270m off-market share buy-back*, 11 April 2016.

373 Professor Gray undertook reports for both SFG and Frontier economics. To avoid confusion, we have generally referred to Professor Gray by name with the consulting firm after his name.

374 SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 373.

375 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 42.

incorrect. Our definition of the utilisation rate in this final decision and our prior decisions released in 2014, 2015 and 2016 (our prior decisions) is the utilisation value to investors in the market per dollar of imputation credits distributed. Thus, we do consider that the utilisation rate represents the value to investors in the market. However, the key difference between our position and Gray's is we consider that, to be consistent with the underlying conceptual framework provided by Officer, we need to estimate the before-personal-tax and before-personal-cost value. This is discussed further in section A.7.3.

The Ausgrid Tribunal considered our reasoning ignored the fact that other parameters in the allowed rate return calculation are market values that already incorporate the effects of the difference in investors' tax position and transaction costs.[376]

In response to this, we remain of the view that market studies that estimate the value of imputation credits are influenced by differential personal taxation of ordinary income (which includes both cash dividends and the face value of imputation credits to eligible domestic investors) relative to capital gains. These differential taxation rates heavily influence these "market values" and therefore these market value estimates neither reflect a pre-personal nor post-personal tax value of imputation credits. None of our allowed rate of return parameter estimates require an explicit adjustment to make them consistent with the Officer Framework underpinning the rules. That is, they are already appropriate post (company) tax (pre-personal tax) estimates. This is discussed further below in section A.8.2.

Gray also submitted that '[t]he AER then estimates the redemption rate, which it interprets as being consistent with the specific reference to "value" in the Rules in that it is "the number that is adopted" for imputation credits'.[377] This is also incorrect. In this final decision and our prior decisions we estimate the utilisation rate. Further, nowhere in this final decision or in our prior decisions do we seek to support any aspect of our position with 'specific reference to "value" in the Rules in that it is "the number that is adopted" for imputation credits'.

We also disagree with Gray's view that:[378]

> The AER is not saying that it has identified a number of approaches for estimating the value (as in "worth to investors in the market") of imputation credits. Rather, the AER considers:
>
> a) Some approaches for estimating the value (as in "worth to investors in the market") of imputation credits – the market value studies; and

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[376] United Energy, Submission on AER preliminary determination - Submission on gamma, 26 April 2016; CitiPower/Powercor, Submission on implications of recent Australian Competition Tribunal Decision, 18 April 2016; ActewAGL, Implication of recent Tribunal decisions for final decision and updates to the allowed rate of return and forecast inflation estimate, 12 May 2016; Australian Competition Tribunal, Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, 26 February 2016, para. 1073.

[377] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 42.

[378] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 53.

b) Some approaches for estimating the redemption rate – the equity ownership and ATO tax statistic approaches.

By contrast, the approaches on which we rely in this decision to estimate the utilisation rate are all relevant for the reasons discussed in section **Error! Reference source not found.** of ttachment 4.

A.7.2 Gray's comments on certain evidence and advice cited in the Guideline

In his May 2014 report, Gray (for SFG) set out why it considered that certain evidence cited in the Guideline did not support the position in the Guideline.[379] This evidence included:

- The AEMC's 2012 rule change
- McKenzie and Partington (2013)
- Handley (2008), and
- Hathaway and Officer (2004).

In our decisions released in 2014, we set out why we disagreed with Gray's view on each piece of evidence.[380] In his February 2015 report (for SFG), Gray set out why his view on this evidence has not changed.[381] Gray's February 2015 report (for SFG) and June 2015 and January 2016 report (for Frontier) does not change our view as set out in our earlier decisions. It seems that the disagreement between us and Gray regarding this evidence is unlikely to be resolved.

A.7.3 Gray's comments on Officer (1994)

Gray set out his views on Officer's 1994 paper in his May 2014 and February 2015 reports for SFG, and in his 2015 and 2016 reports for Frontier. These views do not change our own view, consistent with the advice of Handley, that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis. We respond to Gray's comments on Officer below.

The text in Officer (1994)

Gray (for SFG) submitted that Officer's paper suggests that there are two possible interpretations of gamma:[382]

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379 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 294–313, 331–334 and 341(b).

380 See section A.6.1 of the draft decisions.

381 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 111–121 and 136–137.

382 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 122–123.

> (a) Officer means gamma to have a *value* interpretation and that words suggesting a *utilisation* interpretation were poorly drafted (i.e., the reference to utilisation should be read as simply identifying the source of value); or
>
> (b) Officer means gamma to have a *utilisation* interpretation and that words suggesting a *value* interpretation were poorly drafted (i.e., the reference to value should be read as "the number used for" rather than "worth.
>
> I concluded that the value interpretation was plausible and the utilisation/redemption interpretation was not, and set out my reasons for doing so. Nothing in the AER's recent draft decisions lead me to change my conclusion on this point.

We do not agree with Gray's opinion. As explained by Handley in his September 2014 report, interpretation of gamma on a before-personal-tax and before-personal-costs basis reconciles this apparent inconsistency in Officer;[383] that is, on this basis the 'value' and 'utilisation' interpretations are consistent. Handley reiterates this in his April 2015 report:[384]

> This is precisely the reason why Officer refers to gamma as the value of franking credits in some parts of the paper, and as the proportion of tax collected from the company which will be rebated against personal tax, in other parts of the paper. These two descriptions are equivalent when one interprets value to mean the value of imputation credits before personal tax and before personal costs.

There would appear to be further support for Handley's view in the first line of footnote 5 of Officer's paper, which seemingly equates the ideas of 'utilisation' and 'value':[385]

> For example, if the shareholder can fully utilize the imputation tax credits then ("value") γ = 1, e.g. a superfund or an Australian resident taxpayer.

Handley also noted:[386]

> It is clear that the Officer WACC valuation framework is a before-personal-tax framework. It is also a before-personal-cost framework in the limited sense that, there is no explicit adjustment (deduction) made to the cash flows or the discount rate for either personal taxes or personal costs.

On the other hand, if gamma was intended to reflect investors' personal taxes and costs, then the proportion of company tax returned to investors would never be equivalent to the value to investors per dollar of imputation credits. This is because, on an after-personal-tax

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383 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 8–9.

384 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

385 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

386 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 4.

and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value. Therefore, there would be no justification for defining gamma, as Officer does, in terms of the proportion of company tax returned to investors. As shown in the earlier quote, Gray attributes such a definition to 'poor drafting'. However, this is unconvincing to us.

Further, if the intended interpretation of gamma is on an after-personal-tax and after-personal-costs basis, then it would seem to make little sense to contemplate, as Officer does in footnote 5 of his paper, an investor having an individual utilisation rate of 1.[387] Again, this is because, on an after-personal-tax and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value. Conversely, Gray has previously argued that it is difficult to understand why Officer would contemplate in the same footnote the estimation of gamma via dividend drop off studies if the correct interpretation of gamma was as the proportion of company tax returned to investors.[388] However, as we have maintained throughout the Guideline and current determination process, implied market value studies remain a relevant estimation method for gamma. This is because any value attributed to credits which can be inferred from market prices is ultimately derived from the utilisation of those credits.

Finally, our view is supported by Officer's treatment of gamma in the numerical example in the appendix to his paper. Officer describes this numerical example as '…designed to help the reader through some of the obstacles to going from theory to practice':[389]

> Assume that 50 percent of the tax collected at the company level represents personal tax, i.e. 50 percent of tax credits can be utilized against personal tax liabilities so that γ = 0.5.

The formulas in Officer (1994)

Gray (for SFG) submitted that the formulas in Officer (1994) support his interpretation of the value of imputation credits:[390]

> …gamma represents the extent to which imputation credits are capitalised into the market value of equity. I note that this is precisely what is estimated by dividend drop-off analysis and other market value studies. The formula shows that one takes the present face value of imputation credits (IC/r_e) and then multiplies by gamma and the result makes up part of the market value of equity.
>
> Another way to see this is to rearrange the formula to isolate gamma as follows:

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387 Recall that the utilisation rate equals gamma under Officer's perpetuity framework.

388 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 319.

389 R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 11–17.

390 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 126–127.

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

where $E_{with-IC}$ represents the market value of equity including imputation credits, E_{ex-IC} represents the market value of equity excluding imputation credits and IC/r_e represents the present face value of imputation credits. It is clear in this formula that gamma does not represent the proportion of imputation credits that might be redeemed, but the extent to which imputation credits increase the market value of equity.

Handley reviewed Gray's submission and considered:[391]

> SFG (2015 para. 124-135) also suggests that the mathematical formulae in Officer (1994) support a value interpretation of gamma but not a redemption value interpretation since: *"It is clear in this formula [para.127] that gamma represents … the extent to which imputation credits increase the market value of equity"*. There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) [in Handley's report]. However, SFG fails to see that within Officer's framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

Thus, Handley appeared to agree with Gray that the formulas in Officer indicated that the value of imputation credits is capitalised into stock prices. However, Handley considers (for the reasons set out in the previous sub-section) that it is the before-personal-tax and before-personal-costs value which is capitalised into the stock price in Officer's framework. As also set out in the previous sub-section, we agree with Handley's interpretation of the Officer framework.

Interpretation of gamma in textbooks

In his June 2015 report (for Frontier), Gray stated:[392]

> I am unaware of any published work that interprets gamma in terms of the redemption rate.

However, there are several textbooks that describe gamma in a manner consistent with our understanding. For example, Peirson et al (2009):[393]

> Officer (1994) discussed several alternative ways of defining net cash flows and the cost of capital under imputation. One way to define the after-tax cash flows is that they are equal to the before-tax cash flows multiplied by $(1 - t_e)$, where t_e is the *effective* company income tax rate. The effective company tax rate is $t_e = t_c(1 - \gamma)$,

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391 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 7.

392 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 24.

393 G. Peirson, R. Brown, S. Easton and P. Howard, *Business Finance*, 10th Edition, 2009, pp. 429 and 432.

where t_c is the statutory company tax rate and γ represents the proportion of the tax collected from a company that is paid out to shareholders and recovered through tax credits associated with franked dividends.

…

For example, if…the company income tax rate is 30 cents in the dollar, and 60 per cent of the tax collected from the company is claimed as a credit by shareholders, then the effective company tax rate is $0.30(1 - 0.6) = 0.12$..

Berk et al (2014):[394]

In a 1994 study, Officer shows that for valuation purposes the cost of equity under an imputation system should be adjusted by a factor equal to:

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

where T represents the effective corporate tax rate and (γ) represents the proportion of tax collected from the firm that will be rebated against personal tax in the hands of shareholders.

Gitman et al (2011):[395]

If we let γ be the proportion of company income tax that can be used by shareholders to offset their personal income tax liabilities…

…

With dividend imputation, the calculation of the weighted average cost of capital depends heavily on the estimate of γ. For a good estimate of γ we would need to know the proportion of company income that has borne Australian income tax, and the proportion of the company's shareholders who were Australian residents who could benefit from dividend imputation.

Gray quoted approvingly from a textbook co-authored by Partington in 2000, but none of the statements quoted contradict our understanding of gamma. For instance, Gray quoted:[396]

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

However, there is no dispute here. As Handley explained:[397]

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394 J. Berk, P. DeMarzo, J. Harford, G. Ford, V. Mollica and N. Finch, *Fundamentals of Corporate Finance*, 2nd Edition, 2014, p. 535.

395 L. Gitman, R. Juchau and J. Flanagan, Principles of Managerial Finance, 6th Edition, 2011, pp. 543 and 546.

396 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 24.

397 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 9.

> Implicit in Officer's WACC framework (and the standard classical tax WACC framework) is the notion of market value and so the relevant measure of utilisation value is that value as determined by the market – in other words it is not the utilisation value of a credit to any single investor or the utilisation value to any single class of investors that we want but rather the utilisation value to the market as a whole. In contrast, much of the current debate appears to incorrectly suggest that market value and utilisation value are alternative concepts for this purpose.

Moreover, there are other references to gamma in Partington's textbook that accord more closely with the characterisation in Officer's paper:

> γ = the proportion of corporate tax recovered by investors through imputation tax credits.[398]
>
> …
>
> We assume a 100 per cent dividend payout and full use of imputation credits $(\gamma = 1)$…However, 100 per cent payout and full use of imputation credits are unrealistic assumptions. It is more realistic to assume that about 50 to 60 per cent of profits are paid out as dividends. Of the imputation credits attached to those dividends only about 50 to 60 per cent will be claimed by investors to offset their tax liabilities.[399]

Gray also quoted:[400]

> The results have been mixed, but they suggest that the market value of franking credits is positive, but significantly less than the credit's face value.
>
> …
>
> …the market value of the franking credit is likely to differ from its face value. We do not know exactly what the market value is, but the evidence suggests that franking credits are valued at a significant discount to their face value.

Again, there is no dispute. The estimates of the utilisation rate on which we rely are all significantly less than one, and our estimate of gamma is significantly less than one.

Finally, Gray quoted an explanation, with which he agreed, as to why imputation may have had an immaterial effect on the corporate cost of equity capital:[401]

> The impact of imputation may not have been that big. There are several reasons for this. As suggested by Bob Officer, in a small open economy like Australia, equilibrium rates of return are likely to be determined by capital flows from international investors.

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398 R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, 1st Edition, 2000, p. 523, footnote 8.

399 R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, 1st Edition, 2000, p. 526.

400 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 25.

401 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 25.

> If so, domestic tax changes are likely to have a reduced effect, or no effect at all, on equilibrium rates of return.

The implications of this quote for understanding or determining gamma are unclear to us. For instance:

- Gray appeared elsewhere to be of the view that imputation is having a material effect on the cost of capital. This is because he submitted that, in his view, the best estimate of the extent to which imputation credits are capitalised into stock prices per dollar of credit distributed is 0.35, and this is not immaterial.[402]
- The view in a recent paper co-authored by Partington did not appear to align with that in the quote:[403]

> Indeed, whether prices are set by a marginal investor, or by aggregation across investors, is an open question… It is our contention, therefore, that a policy decision should not be based on the assertion that the marginal investor setting prices in the Australian market is an overseas investor. To do so would base policy on an insecure foundation, and risks serious error.

Recent academic work

The recent paper co-authored by Partington has been raised in direct support of the position that the equity ownership approach is not an appropriate way to estimate the value of distributed imputation credits.[404] This paper largely draws on the existing literature and available evidence with the intention of contributing to the policy debate around the efficacy of dividend imputation.[405] While the paper does consider relevant matters, we consider that the paper raises a number of issues without making strong recommendations. Consistent with the above quote it notes:[406]

> Whether the marginal investor or aggregation approach better describes how imputation credits become priced in equilibrium is a point of debate. The marginal investor approach might be seen as more in keeping with the 'Economics 101' notions of price determination, and more consistent with general equilibrium analysis under which investor demand for (and supply of) imputation credits is jointly determined with the market clearing price. As a consequence, the marginal investor approach may assist in analysing the potential effect of changes in the demand curve. By contrast, aggregating observed demands assumes that investors have found their

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402 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 6.

403 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015.

404 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 45–48.

405 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 3.

406 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 14.

> equilibrium position given market prices [footnote 6: Monkhouse (1993) explicitly states this assumption]. It thus does not directly address how the market equilibrium emerges in the first place. Nevertheless, the aggregation approach may still provide a useful description of an existing equilibrium. In any event, the key point is that there is no clear consensus on the appropriate approach, adding another layer of uncertainty to the issue of whether imputation credits are priced.

As such, while the paper raises a number of points highlighted by Gray (for Frontier), we do not consider the paper provides evidence that the equity ownership approach that uses the aggregation approach to estimate the value of theta is not reasonable. Frontier has taken a number of statements from the paper that should not be read in isolation of the remainder of the paper. For example, in response to Gray's point at paragraph 189 where he states "Ainsworth, Partington and Warren (2015) note that the evidence generally suggests that the two companies do sell for the same price",[407] the paper makes clear this evidence needs to be treated with caution stating:[408]

> In contrast, examination of returns and price levels reveals little evidence that imputation credits are priced. Lajbcygier and Wheatley (2012) find that the presence of imputation credits is not associated with lower realised returns. Further, they find a positive relation between realised returns and imputation credits, which is significant under some specifications. This implies an (implausible) negative value on imputation credits. While the sign on the coefficient probably flags issues with the empirical method (see Section 4.2), it is nevertheless the case that no hint emerges that imputation credits have lowered the distribution of realised returns. Saiu, Sault and Warren (2015) find that imputation might be reflected in share prices under discounted cash flow models, at perhaps about $0.30 in the dollar. However, the imputation variable adds little explanatory power. Meanwhile, the results under the earnings yield model and portfolio sorts suggest that imputation credits are not priced, and in fact may be associated with higher earnings yields as well as lower prices relative to other valuation measures. The fact that the earnings yield results have the wrong sign suggests that caution needs to be applied in interpreting these findings (similar to Lajbcygier and Wheatley, 2012).

On the same page the paper also states in relation to some empirical evidence more generally:[409]

> A very mixed set of results emerges from this body of research. Figure 4 (over) summarises the findings from the majority of dividend drop-off and comparative pricing studies. While a wide range of estimates emerges, these studies on balance indicate that imputation credits are partially priced. The data points in Figure 4

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[407] Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 46.

[408] A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 17.

[409] A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 17.

average 0.38, which would suggest that imputation credits are priced at about $0.38 in the dollar.

Frontier considers that the Ainsworth, Partington and Warren (2015) paper support their position on gamma. However, Lally considers that Frontier has misrepresented the views of Ainsworth, Partington and Warren (2015).[410] Some key findings of Lally in respect to the paper are as follows:

- Frontier cites Ainsworth et al in support of the claim that imputation credits do not add to the value of a business.[411] Lally considers this claim is false as Ainsworth et al summarise evidence on the value of credits and conclude that "imputation credits are priced at about $0.38 in the dollar". Ainsworth et al also note that some types of studies point to no valuation impact but they are sceptical of such studies.[412]
- Frontier cites Ainsworth et al in respect to the claim that Australian companies in general do not explicitly take account of imputation credits in their assessment of investment projects. [413] However, Lally considers that Frontier fails to note that Ainsworth et al argues that there are potentially offsetting errors from not explicitly accounting for credits and that this mitigates the consequences of not explicitly accounting for them.[414]
- Frontier cites Ainsworth et al in support of the claim that the AER's approach to estimating the utilisation rate is "inconsistent with standard economic concepts of equilibrium". [415] Lally considers the concerns raised by Ainsworth et al about the aggregation approach are invalid, and therefore do not support Frontier's claim that the aggregation approach is "inconsistent with standard economic concepts of equilibrium".[416] Irrespective, we do not consider the Ainsworth paper clearly expresses a view that the aggregation method is not correct, rather it expresses the view that the aggregation method may correctly capture equilibrium even if it does not describe how equilibrium is reached.[417]
- Frontier adds the claim that the "AER's aggregation approach simply counts up the number of credits that are distributed to domestic investors and assumes that those investors value all credits at the full face amount and that this is reflected in the equilibrium share price and cost of capital". [418] However, Lally notes that the AER adopts the Officer (1994) CAPM, as do all Australian regulators. Having made that choice, Lally considers the AER must adopt definitions for parameters within that model in accordance

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410 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 3, 26.
411 Frontier Economics, *Issues in the estimation of gamma*, September 2016, p. 20.
412 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 16.
413 Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 20-21.
414 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 16-17.
415 Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 21-22.
416 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 17-20.
417 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 14.
418 Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 21-22.

with a rigorous derivation of the model. This leads to the utilisation rate being defined as the weighted average over investors' utilisation rates for imputation credits. Consistent with Australian tax law, the AER (sensibly) adopts utilisation rates of 1 and 0 for local and foreign investors respectively.[419]

A.7.4 Gray's comments on the Monkhouse framework

As discussed in section A.6, we consider that:

- The Officer framework provides the basis for the value of imputation credits adjustment in the NER/NGR.
- Monkhouse extends the Officer framework to a non-perpetuity setting, and shows that—assuming retained credits have no value—gamma from the Officer framework effectively equals the product of:
    - the distribution rate, and
    - θ (theta), which is the utilisation value to investors in the market per dollar of imputation credits distributed (the 'utilisation rate'), which in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market.

In his May 2014 and February 2015 reports, Gray (for SFG) provided a discussion of the class of CAPM employed by Monkhouse (and related literature).[420] Gray concluded that our recognition of foreign investors breaches the assumptions of this class of CAPM, and therefore we cannot estimate the value of imputation credits using the definition of theta in equilibrium from the Monkhouse framework. Gray's June 2015 report (for Frontier), upon which a number of service providers rely, holds the same view and notes the inconsistency between Lally and Handley's advice on this point.[421]

Handley responded to Gray's view in his September 2014 and April 2015 reports and his response is equally applicable to the June 2015 report by Gray (for Frontier). He disagrees with Gray's view, and considers reasonable our use of:[422]

- the definition of theta from the Monkhouse framework, and
- the equity ownership approach to estimate theta.

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419 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 20.

420 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, appendix 6; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, section 4.

421 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 17–18.

422 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 22–23, 30–31 and 35; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3–11.

In the remainder of this section we identify what we consider to be the key points of this debate, and their implications for our estimation of the value of imputation credits.

Gray's key point appears to be that:[423]

> [The relevant class of CAPM models] derive an equilibrium by solving a market clearing condition. This involves noting that:
>
> (a) All of the *m* investors must invest all of their wealth across the *n* assets and nothing else; and
>
> (b) All of the *n* assets must be owned entirely by the *m* investors and no one else.

This suggests that the only legitimate application of the CAPM is one which recognises all investors and assets in the world (that is, an international CAPM). However, CAPMs have been employed in contexts other than the international one. Handley suggested that the key consideration is whether assets and investors that are outside the model are relevant to the determination of the prices of assets inside the model:[424]

> [SFG's claim that a representative investor equilibrium does not apply in the AER's framework] – which appears to be SFG's major criticism of this approach – is not correct since it is based on SFG's incorrect assertion that the market clearing condition invoked in the CAPM class of equilibrium asset pricing models is based on an assumption that the *m* investors in the model invest all their wealth across the *n* assets in the model and nothing else.
>
> But the CAPM makes no such assumption – it is SFG who does.
>
> An implication of SFG's assertion is that one could validly use a "domestic" version of the CAPM say to price U.S. stocks only if you assume that investors in the U.S. stock market hold no other assets except U.S. stocks. Such an assumption would be clearly implausible.
>
> An alternative and less extreme assumption which is implicit in the use of a "domestic" version of the CAPM is that any assets outside the model and any investors outside the model are not relevant for determining the prices of the assets inside the model. This is equivalent to saying that the system is "closed" by definition – everything that matters is inside the model and anything outside the model does not matter – which means a standard market clearing condition can indeed be invoked and a valid equilibrium can be found. There is nothing in the Copeland and Rosenberg statements quoted in SFG (2015) which is inconsistent with this approach.

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[423] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 89.

[424] J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 10–11.

Therefore, it would seem that the criticisms of our use of the definition of theta from the Monkhouse framework, and our responses to those criticisms, might be summarised as follows:

- By not using all assets and investors in the world, we are breaching a fundamental condition required by CAPMs to derive an equilibrium value. However, CAPMs have been used in contexts other than the international one, and therefore we are not convinced that this criticism presents grounds to disregard these models.
- The following implicit assumption in our approach is unreasonable: that the foreign asset holdings of (both Australian and foreign) investors in Australian assets are not relevant to those investors' valuation of Australian assets. Gray's view is that the assumption is unreasonable.[425] Handley's view is, if the assumption is considered unreasonable, 'then one should bring the outside assets and outside investors into the model, for example, by using an international CAPM'.[426] However, neither Gray nor Handley suggested that we employ an international CAPM. Moreover, Handley clearly set out his view that our use of the definition of theta from the Monkhouse framework is reasonable.[427]

In conclusion, we are not convinced that we should disregard the definition of theta from the Monkhouse framework when estimating the value of imputation credits.

A.8 Further issues relating to the utilisation rate

As discussed in section A.6, we define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed. As also discussed in section A.6, the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors. For an 'eligible' investor, each dollar of imputation credit received can be fully returned to the investor in the form of a reduction in tax payable or a refund. Therefore, we consider that eligible investors have a utilisation rate of 1 (on a before-personal-tax and before-personal-costs basis). Conversely, 'ineligible' investors cannot utilise imputation credits and have a utilisation rate of 0. It follows that the utilisation rate reflects the extent to which investors can utilise the imputation credits they receive to reduce their tax or get a refund.

This is supported by Lally who considers that within the Officer Framework model, the utilisation rate is a weighted average over the utilisation rate for imputation credits by

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425 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, appendix 6; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 103–105.

426 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 14.

427 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 22–23, 30–31 and 35; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3–11.

individual investors and these utilisation rates are 1 if investors can use the credits and zero otherwise.[428]

In this section we provide further support for our position on the utilisation rate. In particular, we:

- explain how our position is consistent with the basis of the building block framework
- contrast our position with that of the service providers, including with reference to factors they considered should be reflected in the utilisation rate, and
- respond to NERA's view.

A.8.1 Consistency with the building block framework

To be consistent with the building block framework, the utilisation rate should reflect the before-personal-tax and before-personal-costs value of imputation credits to investors. In a before-personal-tax and before-personal-costs framework, an investor that is eligible to fully utilise imputation credits should value each dollar of imputation credits received at one dollar (that is, have a utilisation rate of 1).

This consideration is supported by Handley's advice on the basis of the regulatory (building block) framework:[429]

> The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.

Handley also referred specifically to the basis on which the utilisation rate should be estimated:[430]

> Since the objective is to estimate the after-company-before-personal-tax value of a distributed imputation credit and also to avoid compensating the regulated firm for transactions costs incurred at the shareholder level then the particular estimation

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[428] M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 8-9.

[429] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5.

[430] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

> methodology should allow for these factors – in other words, ideally we want the value of credits before administrative costs, personal taxes and diversification costs.

The service providers consider our interpretation of the utilisation rate conceptually incorrect and inconsistent with the requirements of the NER/NGR and the NEO/NGO.[431] They submitted that we are required to estimate the value of imputation credits, not the expected utilisation value of distributed credits, or a measure of investor's eligibility to utilise those credits.[432] Further, a number of service providers submitted:[433]

> 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.

Frontier submits that the value of distributed imputation credits can only be estimated using a market based approach such as dividend drop-off studies and simultaneous pricing analysis.[434] Frontier considers that such an approach is consistent with the regulatory framework.[435]

We disagree. We consider our approach is consistent with the NER/NGR. We have previously noted in the Guideline and in our prior decisions, and maintain in this final

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431 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 2,4,6; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 40; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-79; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 80; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 358; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 86; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 352; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 199.

432 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 6; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 108; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-79, 7-80; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 81; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 358; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 87; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 352; Powerlink, *Powerlink Queensland Revenue Proposal Appendix 9.02*, 31 January 2016, p. 6.

433 ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 2; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 4; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 5; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 4; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 4; JGN, *Gamma - response to the draft decision*, February 2015, p. 6; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 360; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 9; CitiPower,- *Appendix J - Gamma*, April 2015, p. 9; Powercor, *Appendix J - Gamma*, April 2015, p. 9; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 9 ; Energex, *Submission on Energex's regulatory proposal 2015-20 and AER issues paper - attachment 2*, January 2015, p. 6; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal,* June 2015, p. 7.

434 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 9.

435 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 10.

decision, that the Officer framework provides the basis for the rate of return framework in the NER/NGR.[436] This point has not been contested by the service providers or their consultants. If the Officer framework provides the basis for the rate of return framework in the NER/NGR, then it is reasonable—if not necessary—to estimate gamma in a manner consistent with Officer. Therefore, we have considered whether Officer's framework is intended to reflect factors such as personal taxes and personal costs when determining the rate of return. We consider that it is not, and that Handley's and Lally's advice supports our approach. Gray (for both SFG and Frontier) disagrees, but as discussed in section A.7.3, Gray's interpretation is unconvincing to us. The relevance of personal cost is further discussed in section A.8.4 below.

Put another way, our approach to estimating the value of imputation credits recognises that this parameter does not exist in isolation. That is, the NER/NGR employs the building block framework to determine a revenue allowance that contributes to the achievement of the NEO/NGO. The building block framework employs the Officer framework to determine a rate of return that contributes to meeting the NEO/NGO, and gamma forms part of the Officer framework. We consider that proper regard to the NER/NGR's use of the Officer framework best promotes the objectives and requirements of the NER/NGR.

Handley supports our approach and has explicitly stated that the AER's definition of theta does correspond to a "market value" on a before personal taxes and before personal costs basis:[437]

> When used in everyday language, the meaning of the term “value” is generally well understood. However, in a cost of capital context, the term value is potentially ambiguous. Value can be used to refer to a value before taxes or a value after taxes. It can refer to a value before costs or a value after costs. The term “rate of return” (or discount rate) is similarly potentially ambiguous. A return can be measured or defined before taxes or after taxes. A return can also be measured or defined before costs or after costs.
>
> This is why it is very important to be absolutely precise about how the key inputs of a WACC analysis – cash flow and discount rate – are defined and to ensure that they are defined on the same basis.
>
> The AER definition of theta does indeed correspond to a market value (as in “worth to investors”) interpretation of theta if value is taken here to mean the value of imputation credits before personal taxes and before personal costs. This interpretation is neither novel nor new. It comes directly from the seminal 1994 paper by Officer.

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[436] See section A.5 of the draft decisions and: AER, *Better regulation: Explanatory Statement Rate of Return Guideline, Appendices,* December 2013, p. 138.

[437] J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3-4.

Finally, given the discussion above that indicates why we consider our definition of theta is an estimate of the value of imputation credits to investors in the market before personal taxes and personal transactions costs, we consider there is little in the service providers position that imputation credits should either be interpreted as the value of distributed credits, or the proportion of distributed credits likely to be redeemed by investors. Handley also states with respect to the alleged difference between the value of imputation credits and the redemption value:[438]

> There is no either-or decision to be made here. The value of distributed credits and the proportion of credits redeemed are the same thing when one uses the proper definition of "value" in relation to theta (and gamma). Specifically, theta is the value of a dollar of distributed credits before personal taxes and before personal costs. In this case, the value of the credits and the proportion of the credits redeemed are one and the same thing. This is why Officer (1994) uses both descriptions interchangeably when referring to gamma in his seminal paper.

Handley also states:[439]

> SFG (2015 para. 124-135) also suggests that the mathematical formulae in Officer (1994) support a value interpretation of gamma but not a redemption value interpretation since: "It is clear in this formula [para.127] that gamma represents … the extent to which imputation credits increase the market value of equity". There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) above. However, SFG fails to see that within Officer's framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

A.8.2 Consistency with other allowed rate of return parameters

We consider we are estimating the value of imputation credits consistently with the other allowed rate of return parameters on a post company tax basis before personal taxes and personal costs.

For instance, when estimating the MRP, the dividend yield component is determined by the face value of dividends where one dollar of dividends paid by the company is valued at one dollar to the investor. We do not account for the personal costs and personal taxes associated with cash dividends when estimating the MRP using observed historical market returns. By contrast, dividend drop-off studies estimate the value one dollar of distributed cash dividends at less than one dollar (in the range of eighty one cents to ninety three cents in the case of SFG's study).[440] This highlights that dividend drop off studies are not

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438 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 2, 3.

439 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 7.

440 SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013, pp. 18-20.

estimating a post-company pre-personal tax return (which is the full face value of one dollar per one dollar of dividends distributed). Therefore, given imputation credits are also post tax income (like dividends), estimates of the value of imputation credits from these studies will require an adjustment to convert them to a post-company pre-personal tax return. Absent such an adjustment they are not appropriate to use as estimates of the post-company pre-personal tax value of distributed imputation credits for use in the Officer Framework underpinning the rules.

When estimating the MRP we do not use a ninety cent value per one dollar face value of dividends. Doing so would significantly reduce the MRP estimate and would be inappropriate. The incorrect post tax valuation of cash dividends from dividend drop off studies is most likely driven by differential personal tax of dividend income and capital gains. As noted above, the correct post (company) tax (pre-personal tax and personal costs) value of dividends is clearly one dollar per dollar of dividends distributed and not ninety cents or less as implied by the SFG study. The undervaluation relative to the full face value is likely primarily driven by investors valuing capital gains more highly than dividend income as capital gains are generally taxed at a concessional personal tax rate.[441] We consider that the incorrect post tax valuation of cash dividends in SFG's dividend drop of study will also be reflected it the estimates of the value of imputation credits. This is because imputation credits are also taxed as ordinary income like cash dividends. Therefore, the uncorrected estimate of the value of imputation credits from a dividend drop off study is not an appropriate post tax value to use in our post (corporate) tax regulatory framework which is based on the Officer Framework.[442] It neither reflects the post-tax cost faced by the regulated businesses, nor the post-tax value received by investors. This is further discussed in section A.15.3, where it is shown that the pre-personal tax value of an imputation credit is equal to the face value of the imputation credit.

Under the Officer 1994 framework we are effectively assessing the regulated business at the company level (post company tax and pre personal tax and pre personal costs) and a dollar of dividends costs the regulated business one dollar and benefits the shareholder by one dollar. The same argument holds true for imputation credits distributed to eligible domestic investors. The issues with dividend drop off studies are further discussed in section A.15.3.

The Ausgrid Tribunal decision considered our reasoning ignores the fact that other parameters in the WACC calculation are market values that already incorporate the effects of the difference in investors' tax position and transaction costs.[443] In response we note that we consider our estimates across the rate of return inputs and gamma inputs are consistent and we have not ignored how the rate of return parameters are estimated. For example, as

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441 Capital gains are normally taxed at half the marginal tax rate if the investment was held for a period of 12 months or more. See ATO: https://www.ato.gov.au/general/capital-gains-tax/working-out-your-capital-gain-or-loss/working-out-your-capital-gain/ accessed: 20 May 2016.

442 N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004.

443 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1073.

outlined above, when estimating the value of the MRP using historical returns, the value of cash dividends are not assessed on market values which are influenced by pre-personal costs and pre-personal tax factors. For instance:

- Unlike the cash dividend and the imputation estimates from market based studies, the return measured from market price of debt securities (both corporate bonds and commonwealth government security) is a genuine post company tax (pre-personal tax and personal costs) return. As noted above, the estimates of the value of cash dividends and imputation credits from market based studies are neither pre nor post-personal tax estimates. They are an estimate of the ordinary income value measured relative to capital gains income (that are generally taxed at a lower rate and are therefore more valuable). All other input parameters used in the estimate of the cost of debt and risk free rate, the coupons and principal amount, are valued at 'face value' in order to determine the yield to maturity. That is, our modelling assumes the investors receive the face value of the cash flows on these securities, a post-tax value consistent with the Officer Framework before personal taxes and personal transaction costs are incurred.
- Historical capital gains used in estimating the market risk premium are directly observable post (company) tax returns to investors in the market before personal taxes and personal transaction costs are incurred.

In the allowed rate of return framework, we use both market values and face values. In table 4-11 below, we highlight all the parameters that are used in order to calculate the return on equity using the CAPM.

Table 4-11 Parameters used to determine the return on equity

	Market Value	Face Value
Risk Free Rate	Price of CGS	Coupon, Principle
Market Risk Premium	Price of equity	Dividends, Imputation credits
Beta	Price of equity	Dividends

As is evident in table 4-11, in order to determine the return on equity we use a combination of market values and face values. When determining whether to use market value or face value, we have to consider whether it is consistent with the Officer framework. All input parameters in table 4-11 are to measure cost of equity on the post-company tax but pre-personal tax and personal costs basis and reflect the cost faced by the firm. For instance, the return measured from the market price of equity is the post company tax value investors actually receive before they pay personal taxes and this market price reflects the cost of equity if a firm tried to issue new capital. Similarly, the face value of dividends and imputation credits reflects the post company tax cost to the firm and is the value before personal taxes are incurred. Hence they are post-company tax (pre-personal tax and personal costs) values.

Similarly, we use a mixture of market values and face values to determine the return on debt. This is demonstrated in table 4-12.

Table 4-12 Parameters used to determine the return on debt

	Market Value	Face Value
Return on debt	Price of debt	Coupon, Principle
Risk Free Rate	Price of CGS	Coupon, Principle

As is evident in table 4-12, the return on debt estimated via the yield to maturity is determined from using a combination of market values and face values. All input parameters are to measure the cost of debt on a post-company tax but pre-personal tax basis. For example, the debt holder has to pay personal tax on the face value of the coupon payments and if a bond holder sells their bond they have to pay personal on the return measured from market price of the bond. The input parameters also reflect the cost faced by the firm. The firm has to pay the face value of the coupon and principal to the bond holders. Also the market price of a bond determines how much funds a firm can raise given a certain coupon and principal payment.

Consistent with our view, Lally does not consider there is an inconsistency with the cost of debt and equity being market rates and the utilisation rate being determined on the face value:[444]

> Both the cost of equity and theta appear in equation (1), with the cost of equity being a market rate and theta not being a market value. This equation arises from the set of assumptions underlying the Officer (1994) model.

All allowed rate of return parameters are estimated on a post company tax basis before personal taxes are incurred. For capital gains component of return on equity estimate, investors have to pay capital gains tax on the post company tax capital gain. For the dividend income grossed up with redeemable imputation credits and interest income of bonds, investors pay personal tax at their marginal tax rate on the post company tax income. Importantly, the allowed return we estimate is estimated from observed post company tax returns before these personal taxes are incurred. As a result, all input parameters into the allowed rate of return are genuine post company tax estimates before personal taxes are incurred.

Further, all input parameters in the allowed rate of return are also estimated on a pre-personal cost basis. For example, all components of the return on equity (capital gain, dividends and imputation credits) are estimated pre-personal costs. If an investor wants to realise their capital gains by selling their stock, they have to pay transaction costs like brokerage fees and costs associated with filling in a tax return. These costs are not accounted for in our post-tax regulatory framework. Similarly, for dividends and bond returns, personal costs are incurred by investors when realising these returns and these costs are not accounted for in our regulatory framework. The allowed return we estimate is estimated

[444] M. Lally, *Gamma and the ACT Decision*, May 2016, p. 12.

from observed post company tax returns before these personal costs and taxes are incurred (for example, historical estimates of the MRP are before personal costs have been incurred).

Lally agrees that our approach to estimating gamma is consistent with the way we estimate the cost of equity:[445]

> The AER estimates the cost of equity using the Officer model, gamma is a parameter within that model, and therefore the AER must estimate gamma as defined within the Officer model. A rigorous derivation of the Officer model (Lally and van Zijl, 2003) reveals that gamma is the product of the distribution rate for credits (the proportion of company taxes paid to the ATO that are attached to dividends as credits) and a utilization rate for credits (a weighted-average over investors' utilization rates for the credits). The methods used by the AER for estimating these two parameters are consistent with their definitions.

A.8.3 Market Risk Premium adjustment for gamma

In regard to the how the return on equity is estimated, it is set out in the Officer paper:

$$Dividend\ including\ imputation\ benefits = Cash\ dividends \times \left[1 + \frac{\rho \times \theta \times \tau}{1 - \tau}\right]$$

Where: τ is the corporate tax rate, which equal 30 per cent.
ρ is the proportion of dividends that are franked, which is 0.75
θ is the utilisation rate, which is 0.6

γ is defined earlier on page 4 of the Officer paper, as the proportion of tax collected form the company which gives rise to the tax credit associated with a franked dividend. Officer defines this as the franking credit that can be utilized as a tax credit against personal tax liabilities of the shareholder.

When determining the return on equity, it is the Market Risk Premium (MRP) that is adjusted for the effect of imputation credits. The AER use two approaches to determine the MRP: (1) historical excess returns and (2) the dividend growth model. The mathematical formula for the imputation credit adjustment for both approaches is outlined below.

Historical excess returns

For historical excess returns, we adjust the returns for imputation credits using the methodology applied in Brailsford et al. The adjustment proposed by Brailsford is different

[445] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 27.

depending on whether the data is pre-1998 or post-1998. For pre-1998, the AER adjusts the MRP for imputation credits using the following formula: [446]

$$c_t = p_t d_t \frac{T_t}{1 - T_t}, \qquad (1)$$

Where d_t represents the annual dividend yield implied from the Historical Stock Price Index and the Historical Stock Accumulation Index, p_t is the (average) proportion franked and T_t is the tax rate at which dividends are franked.

This C_t value can be directly substituted into Officer's formula (15) above. It is important to note that d_t is the face value of the dividend and it determines the face value of the imputation credit when multiplying the face value of the dividend by T/(1-T).

For the period post 1998 the AER does not adjust for imputation using the formula above. Instead the AER obtains the imputation credit adjustment using the (weighted) average imputation credit yield on the ASX All Ordinaries index for the 12 months ending December of each year, as sourced from the Australian Taxation Office.[447] From this source we obtain C_t/p_{t-1} which can be inserted into the Officer formula (15). As before Ct is the face value of the imputation credit.

Dividend growth model

In the dividend growth model, the face value of cash dividends is multiplied by the formula below to determine the gross dividend which is the sum of the face value of the cash dividend and the face value of the imputation credit.

$$Dividend\ including\ imputation\ benefits = Cash\ dividends \times \left[1 + \frac{\rho \times \theta \times \tau}{1 - \tau}\right]$$

Where: τ is the corporate tax rate, which equal 30 per cent.
ρ is the proportion of dividends that are franked, which is 0.75
θ is the utilisation rate, which is 0.6

[446] Brailsford, Handley, Maheswaran, '*Re-examination of the historical equity risk premium in Australia'*, Accounting and Finance, Vol. 48, 2008, pp. 84–85.

[447] Source: https://www.ato.gov.au/Rates/Company-tax---imputation--average-franking-credit---rebate-yields/?page=2#List_of_yields

Although stated in different terms, this adjustment is identical to the Brailsford et al. adjustment for pre 1998 data. It is clear from this formula that it is the face value of the dividend that is used and when multiplied by T/(1-T) it determines the face value of the imputation credit.

It is clear from the example above that the face value of the imputation credits multiplied by theta is added to the capital gains and dividend component to determine the return on equity. Therefore, if the gamma estimate used is increased (decreased) then the estimates of the MRP based on historical data will also increase (decrease).

A.8.4 Factors affecting investors' valuation of imputation credits

A large number of service providers submitted that estimates of the utilisation value from the equity ownership approach and tax statistics do not reflect a number of factors which affect investors' valuation of imputation credits.[448] They have submitted the equity ownership approach is at best an upper bound as domestic investors cannot use imputation credits due to the 45 day rule and investors that can use imputation credit do not value them at full face value.[449]

Service providers submit that tax statistics provide a closer value of imputation credits in comparison to equity ownership, but it still fails to recognise that investors might value imputation credits at less than face value due to transaction costs, time value of money and portfolio effects.[450] Gray (for Frontier) supports this by submitting that the redemption rate should be used as an upper bound (0.45-0.46) for utilisation value and that it should not be

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[448] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 294; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, 1; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 112-114; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-83, 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 84-86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 362-364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 90-92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 356-358; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 207.

[449] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 296, 298; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 112-114; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-83, 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 84-86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 362-364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 90-92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 356-358.

[450] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 298-299, 305; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 11-12; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 114-115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 85-86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 363-364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 357-358.

used as a point estimate for the utilisation rate.[451] Similarly, Frontier considers that redemption rates cannot be used to estimate theta as they at best provide an upper bound for theta.[452] However, Gray (for Frontier) considers that the tax statistics estimate should be preferred to the equity ownership estimate.[453]

We addressed each of these factors in our prior decisions, and concluded that they are either immaterial or should not be accounted for when estimating the properly defined utilisation value. Nothing in the service providers' proposals, or in the recent Ausgrid Tribunal decision, give us cause to change this conclusion. We have expanded on the following points in other sections of this decision:

- Why estimates from tax statistics and the equity ownership approach are not upper bounds and can be used as valid point estimates for the utilisation rate (or theta). See sections A.12, A.13
- Why the 45 day rule and other factors preventing utilisation by eligible investors are not expected to be responsible for the difference between the estimated utilisation rate from tax statistics and the equity ownership approach. See the following sub section.

The 45-day holding rule

To be eligible to utilise imputation credits, an otherwise-eligible investor must have held the shares that distributed the credits 'at risk' for at least 45 days (90 days for certain preference shares).[454] However, this rule does not apply if the investor's total credit entitlement is below $5,000. A number of service providers stated:[455]

> It has been estimated that the 45-day rule has about a 5-10% impact on the redemption rate.

The source of this estimate is a 2010 paper by Handley. The relevant passage from this paper is:[456]

> Post 1 July 2000, [Handley and Maheswaran in their 2008 paper] assume full utilization of credits by resident individuals since excess credits were refundable from that time. It is of course likely that the actual utilization rate would be somewhat lower due to for example, "investor irrationality" and the impact of the 45 day rule but any

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451 Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 7.

452 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 10.

453 Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 7.

454 See: https://www.ato.gov.au/Individuals/Investing/In-detail/Investing-in-shares/You-and-your-shares-2013-14/?page=11. Accessed 9 April 2015.

455 ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 14; Directlink, *Directlink submission on gamma*, May 2014, p. 15; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 14; Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 14; JGN, *Gamma proposal*, June 2014, p. 17; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 19.

456 J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.

> difference is likely to be small. (The effect of the 45 day rule is that the franking credit is denied i.e. the credit is worthless unless certain conditions are satisfied. I am not aware of any data on the extent to which credits have been denied pursuant to this rule, but one would expect that it continues to have some operation each year. As a guide, in their table 4, [Handley and Maheswaran] report that the estimated credit utilization rate for resident individuals was 94% in 1998, 89% in 1999 and 90% in 2000. Since the rule was operating at this time and assuming the less than 100% utilization is fully attributable to the impact of the 45 day rule (which would not be the case since credits were not refundable at that time), then the rule would have had about a 5-10% impact on the utilisation rate.)

Thus, it seems the service providers' submission as to the impact of the 45-day holding rule misinterprets the source data upon which it relies, being Handley and Maheswaran's 2008 paper. It does not appear that Handley ever intended the 5 to 10 per cent figure to be considered a point estimate of the effect of the 45-day holding rule. Rather, we consider that it was presented as a 'guide' to the maximum theoretical effect of the rule's operation as indicated by the analysis conducted in Handley and Maheswaran. Our interpretation of Handley's intention is supported by the fact that in their paper Handley and Maheswaran consider the post-2000 utilisation rate to be 1. That is, we consider that if Handley and Maheswaran had available to them a reliable estimate of the effect of the 45-day holding rule, then they would have used it. As Handley stated in his 2010 paper, he 'is not aware of any data on the extent to which credits have been denied pursuant to this rule'.[457] Handley maintained this view in his April 2015 report.[458]

It is also appears from the above quote that Handley and Maheswaran considered that, if anything, the 5 to 10 per cent estimate would be an overestimate of the impact of the 45 day rule. This is because they attribute the full underutilisation of credits in 1998, 1999 and 2000 to the 45 day rule. However, they also note that, in reality, part of this underutilisation would reflect that credits for eligible investors that did not have a tax liability were not refundable in those years (whereas they are now refundable for cash).

The Ausgrid Tribunal did not agree with our position.[459] The Ausgrid Tribunal considered that the issue is not whether such a class exists (domestic investors that hold for less than 45 days), but the size of that class to which the value of imputation credits is lower as a result of domestic shareholders being unable to use them.[460] However, as outlined below, we remain of the view that the 45 day rule and other facts preventing utilisation by eligible investors is likely to be having an immaterial impact on the utilisation value by domestic investors. For

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457 J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.

458 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 29.

459 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048 and 1090.

460 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1092.

clarity, we do not claim there are no domestic investors that hold shares for less than 45 days over the ex-dividend date. However, we consider this class of investors (that holds share for less than 45 days over the ex-dividend date) is likely to be immaterial in size and the extent to which the value of imputation credits is lower as a result of domestic investors being unable to use them due to this is likely to be immaterial. We also note there is no compelling evidence to the contrary.

One source of evidence on the effect of the rule is Hathaway's analysis of ATO data. This analysis indicates the reported amounts of fully franked dividends received and imputation credits utilised by taxpayers. Taxpayers are required to report in their tax returns all franked dividends received, but only those imputation credits that they are eligible to utilise (bearing in mind the 45-day holding rule and other criteria).[461] We know that the amount of imputation credits attached to a dollar of fully franked dividends is $0.43 ($1 x 0.3/(1–0.3)).[462] Accordingly, we can compare the amount of imputation credits utilised by taxpayers with the amount of imputation credits received by those taxpayers as implied by the amount of fully franked dividends received. If the 45-day holding rule is having a material effect, then we would expect to see that the amount of credits utilised is materially lower than the amount of credits implied to have been received. Table 4-13 shows the relevant data for the two major classes of investor eligible to utilise imputation credits: individuals and superannuation funds. It shows that the amount of credits utilised is effectively the same as the amount of credits that are implied to have been received.[463] This suggests that the 45-day holding rule is not having a material effect.

Table 4-13 Imputation credits received and utilised, 2004–2011 – $ billions

	Individuals	Superannuation funds
Fully franked dividends received	188.1	84.8
Implied imputation credits received	*80.6*	*36.3*
Imputation credits utilised	81.2	36.2

Source: N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013; AER analysis.

[461] See: https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/. Accessed 9 April 2015.

[462] Franked dividends must be paid out of after-tax profits. Accordingly, if the corporate tax rate is 30 per cent, then the pre-tax profit (X) that gives rise to $1 dollar of fully franked dividends is given by the expression X - 0.3X = $1 where X = $1.43. Therefore, $0.43 of tax is paid on (and $0.43 of imputation credits can be attached to) each $1 of fully franked dividends.

[463] The fact that credits implied to have been received by individuals is higher than credits utilised could reflect rounding or issues with the dividend data in the ATO statistics. Our residual concerns with the ATO statistics are discussed in section **Error! Reference source not found.** of attachment 4.

However, service providers submitted the analysis that underpins this analysis is based on data that is unreliable.[464] We recognise the data limitations, but as outlined in section A.10.4, we note this is the best data available and there is no evidence before us that the 45 day rule is having a material effect.

Based on these considerations, the 45-day holding rule does not appear to have a material effect on the utilisation rate. The analysis above was presented in our draft decisions released in 2014, but the service providers subject of those proposals did not comment on it in their revised proposals. Instead, they submitted:[465]

> The AER seeks to dismiss the impact of tax rules affecting eligibility of domestic investors to redeem imputation credits by saying that:
>
> > "…we do not consider that there is clear evidence as to effect that these rules have or should be expected to have."
>
> …[we do] not consider that there must be "clear evidence" as to the effect of particular tax rules in order for these to be taken into account. The fact is that these rules exist and that they will affect the eligibility of certain domestic investors to redeem imputation credits.
>
> In any event, the fact that the redemption rate indicated by tax statistics is significantly below the domestic equity ownership rate does indicate that these tax rules (and possibly other factors as discussed below) are affecting domestic investors' ability to redeem imputation credits. As the AER observes, the redemption rate indicated by tax statistics is approximately 0.43, which is well below the domestic equity ownership rate for all equity.

We do not consider that this represents clear evidence as to the effect of the 45-day rule and other tax rules. First, the service providers' approach does not contemplate error or inaccuracy in the tax statistics. In section **Error! Reference source not found.**, we set out ata concerns that exist regarding the tax statistics. Further, these service providers, in their initial proposals, submitted that no weight be placed on estimates of the utilisation rate from

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[464] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 288; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 10; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 113; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-83; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 84; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 362; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 90; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 356.

[465] ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 4; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 5–6; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 7; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, pp. 5–6; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 5–6; and JGN, *Gamma - response to the draft decision*, February 2015, p. 7.

tax statistics because of significant unresolved problems with the data.[466] While it does now appear some service providers we regulate may consider tax statistics can be used to estimate an upper bound for theta,[467] we do not consider the above analysis provides compelling evidence that the 45 day rule is having a material impact given residual concerns with the data.

Second, the service providers' conclusion is contradicted by the analysis of tax statistics we presented in our prior decisions and which we repeat above. While we acknowledge the limitations of the tax data used for this analysis, the service providers themselves have not demonstrated the rule is having a material impact, and we do not consider the rule would be expected to have a material impact.

Frontier considers the 45-day rule has some effect because otherwise it would be redundant to have the rule.[468] We do not agree. A key outcome of the requirement to hold shares at risk for 45 day in order to receive an imputation credit will be to prevent the streaming of imputation credits to investors that value them the most.[469] This could happen where investors that values imputation credits, for example superannuation funds, buy the share before the ex-dividend date and sell the share after the ex-dividend date and hedges their risk exposure over the investment holding period. Therefore, the 45 day rule could logically be not having a material impact on the utilisation value, while still working as intended and preventing investors from streaming imputation credits to investors that value them the most.

In his June 2015 report for a number of service providers Gray assert that "[o]ne cannot assume that the effect of the 45-day rule is negligible in the absence of any data about it."[470] The new report by Gray (for Frontier) does not change our view that the 45 day rule is unlikely to be having a material impact on the utilisation rate. It does not present any data to demonstrate that the 45 day rule is having a material effect on utilisation of imputation credits.

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466 ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 15; Directlink, *Directlink submission on gamma*, May 2014, p. 16; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 15. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 15–16; JGN, *Gamma proposal*, June 2014, p. 19; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 21.

467 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 286, 288, 305; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 4; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 41, 115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 357.

468 Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 28.

469 See: http://taxreview.treasury.gov.au/content/FinalReport.aspx?doc=html/publications/Papers/Final_Report_Part_2/chapter_b2-3.htm. Accessed: 21 May 2016; M. Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

470 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 41.

We consider Lally's recent report supports our positon that the 45 day rule is not having a material impact on the utilisation value. Lally notes that that the 45 day rule prevents some 'genuine' investors from obtaining the credits, and therefore drives down the redemption rate, but this downward effect is unlikely to be significant because 'genuine' investors have the option of changing the time of their transactions and would have strong incentives to do so.[471] Further, Lally considers the 45 day rule constrains tax arbitrage and therefore minimises the gap between the correctly estimated redemption rate (tax statistics), and the proportion of Australian equities held by local investors.[472]

Transactions costs

Service providers submitted that the redemption of imputation credits may involve transactions costs, such as requirements to keep records and follow administrative processes.[473] Service providers also submitted that these transactions costs will tend to reduce their value to investors and may dissuade some investors from redeeming (utilising) imputation credits.[474] A 'transaction cost' at the investor level is a type of 'personal cost' and both terms are used interchangeably in this section.

Firstly, we note that Handley advised that we specifically do not take account of these costs:[475]

> Since the objective is to estimate the after-company-before-personal-tax value of a distributed imputation credit and also to avoid compensating the regulated firm for transactions costs incurred at the shareholder level then the particular estimation methodology should allow for these factors – in other words, ideally we want the value of credits before administrative costs, personal taxes and diversification costs.

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471 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 21.

472 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 21.

473 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 299; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 85; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 363; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 357.

474 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 297, 299; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 85; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 363; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 357; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 207

475 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

To elaborate, all parameters and discount rates need to be measured on a consistent basis. Some service providers submit that its gamma estimate is based on the post personal tax and personal cost market value and this is consistent with the rules.[476] However, such an approach is incorrect as pre-personal tax/cost estimates cannot be used in conjunction with post personal tax/cost estimates. In a valuation all parameters need to be estimate on an internally consistent basis.

A valuation can be conducted on many different bases, such as:

- Nominal vs real
- Pre-company tax vs post-company tax

In accordance with the rules, we set our cash flows on a nominal post-company tax basis. That is, our regulatory framework we use to set cash flows is effectively a post-company tax valuation framework. A post company tax analysis looks at the cash flows after company tax is paid and before investors incur personal level taxes and transaction costs.

However, just because our framework is done on a post-company tax basis (before personal costs and personal taxes are incurred) does not mean that investors are not compensated for their personal costs and personal taxes. Rather, post-company tax returns by definition provide investors adequate compensation to cover all their expected personal taxes and personal costs. In setting the WACC we provide an equity return in line with the post-tax return in the Australian stock market (for a firm of equivalent risk to the BEE). The ex-ante expected post-company tax return on the Australian stock market, directly estimated from historical stock returns, is before investors incur any personal costs or personal taxes. While we acknowledge that pre the introduction of the imputations credits in 1987 no incremental personal costs associated with imputation credits were reflected in stock prices, we have advice from Lally that these incremental costs are likely to be immaterial.[477] We also note that the observed market risk premium post 1987 is lower than earlier periods further supporting that no further compensation is required for any (expected immaterial) costs not reflected in earlier periods.[478]

Consistent with the post-company tax framework in the rules, the AER values redeemed imputation credits at their full face value on a pre-personal cost/tax basis. To the extent investors value redeemed imputation credits at less than their face value due to personal cost, this will be picked up in the market value of the stock which drives the difference between the pre and post personal cost return on equity. This is also supported by Lally who considers no adjustment is required to the MRP for transaction costs because empirical

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[476] AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 199, 204.

[477] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 25.

[478] See tables 3-11 and 3-12 in Attachment 3.

estimates of the MRP will reflect the existence of any such costs.[479] Lally also notes that these costs will be expected to be immaterial.[480]

Second, we are not convinced that transactions costs are likely to dissuade a material number of investors from redeeming imputation credits. Our considerations on this are as follows:

- When filling out a tax return, one is *required* to report the franked dividends received and the imputation credits that are eligible to be utilised.[481]
- Investors are already incurring the transactions costs associated with shareholding, and most would also be already incurring the transactions costs associated with completing a tax return. This applies particularly to professional organisations, such as charities and superannuation funds, which we expect would utilise all imputation credits as a matter of proper accounting. But we consider it true also of individual investors, particularly when innovations such as 'e-tax' and automatic pre-filling of tax returns would reduce any incremental costs if they exist.[482]

As outlined in A.8.2, we consider that we are estimating the value of imputation credits consistently with the other allowed rate of return parameters on a before personal taxes and personal costs basis. For all cost of equity components (capital gains and dividend income) and cost of debt components (capital gains and interest income) investors have to incur transaction costs in order to realise their returns. These transaction costs include brokerage fees and costs associated with filling in a tax return. Compensation for these costs is inconsistent with our post tax framework. Our benchmarking of the required return on equity and the required return on debt is based on a post-company pre-personal tax returns before investor level transaction costs are incurred. We also consider any incremental costs associated with claiming imputation credits would be immaterial for the reasons outlined above.

We only compensate regulated businesses for the transaction cost incurred by regulated businesses via debt and equity raising costs. However, these costs are incurred at the company level and only require compensation so that the post company tax allowed return reflects the required post company tax return in the market. We do not compensate regulated businesses for the costs incurred by investor in regulated businesses as all the allowed rate of return parameters and gamma are estimate on post company tax (pre-personal tax and pre personal cost) basis. If we were to compensate regulated businesses

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479 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 28-29.

480 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 25, 27, 29.

481 See: https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/. Accessed: 9 April 2015.

482 Eligible investors that do not need to submit a tax return can have imputation credits refunded by submitting this form to the ATO: https://www.ato.gov.au/uploadedFiles/Content/MEI/downloads/ind39831n40980614.pdf. Accessed 9 April 2015. We consider that the form is quite straightforward, and therefore the cost of filling it out and submitting it is unlikely to outweigh the benefit of any material amount of imputation credits.

for investors' transaction costs in addition to the post tax return we set, it would result in an over compensation of the firms and their investors relative to the efficient returns in the market. This would not be expected to lead to efficient investment, or to be in the long term interests of consumers.

Lally considered that transaction costs associated with investors redeeming credits cannot be dealt with by reducing theta. Instead, if considered important (which Lally considers not to be the case) these transaction costs can only be addressed through an extension of the Officer model.[483] Given we use a beta estimate of 0.7 for regulated utilities, Lally considers that the possible transaction costs not compensated for is not a material issue because these costs are very small.[484] In his most recent report for us, Lally, while expressing the view personal costs could theoretically influence the results of a DDO study, considers these costs would be immaterial.[485]

Based on these considerations, we consider that in estimating the utilisation rate, adjustments should not be made for transactions costs. And even if an adjustment was to be made, it would likely have an immaterial effect on the utilisation rate.

Time value of money

Service providers submitted that the delay between the distribution of an imputation credit and the time at which it is redeemed may be expected to reduce an investor's valuation of the credit.[486] In response, we note that:

- We are unaware of any evidence that indicates the average size of this time delay across all investors.
- Even if there were a material time delay that should be accounted for when estimating the utilisation rate, we consider that the appropriate discount rate to apply to such delay would be a short-term risk free rate. This is because an imputation credit represents a promise from the Australian Government to reduce an investor's tax liability by the size of the credit or to refund the credit. Current interest rates on two year Commonwealth Government bonds suggest that the appropriate discount rate would be likely less than 2

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483 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 29.

484 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 9-10; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 27-29.

485 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 25, 27.

486 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 299; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 11; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 85; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 363; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 357; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 207.

per cent. Therefore, the magnitude of the adjustment would be quite small. Handley agreed with the immateriality of any required adjustment for time delay.[487]

Based on these considerations, we conclude that it is reasonable to not adjust any of our estimates of the utilisation rate for the time value of money where this effect is not already accounted for.

Portfolio effects

Service providers submit that investors may shift their portfolio away from the optimal portfolio towards a more local portfolio in order to utilise more imputation credits.[488] It is submitted that to the extent than an investor reduces the value of their overall portfolio simply to increase their redemption of imputation credits, this loss in value will be reflected in a lower valuation of imputation credits. Gray's report (for SFG) to the service providers on this topic referred to the 'cost of losing diversification'.[489] However, as discussed in section A.8.1, Handley advised that our estimate of the utilisation rate should exclude 'diversification costs'. More specifically, we do not agree that portfolio effects would mean that a dollar of imputation credits in the hands of an eligible investor would be worth less than one dollar to that investor on a post-company pre-personal-tax and pre-personal-costs basis. We made this point in our prior decisions and the service providers and their consultants have not commented on it. We consider that it is reasonable to not adjust any of our estimates of the utilisation rate for portfolio effects.

The SAPN Tribunal considered that it was unclear whether portfolio effects would have an impact on the value of imputation credits.[490]

> Given that there is a well-documented "home-bias" in investor portfolios (found internationally generally regardless of tax systems), implying incomplete diversification benefits, the extent to which this is an additional factor of significant materiality is unclear.

The 'illustrative impact' of these factors

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[487] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

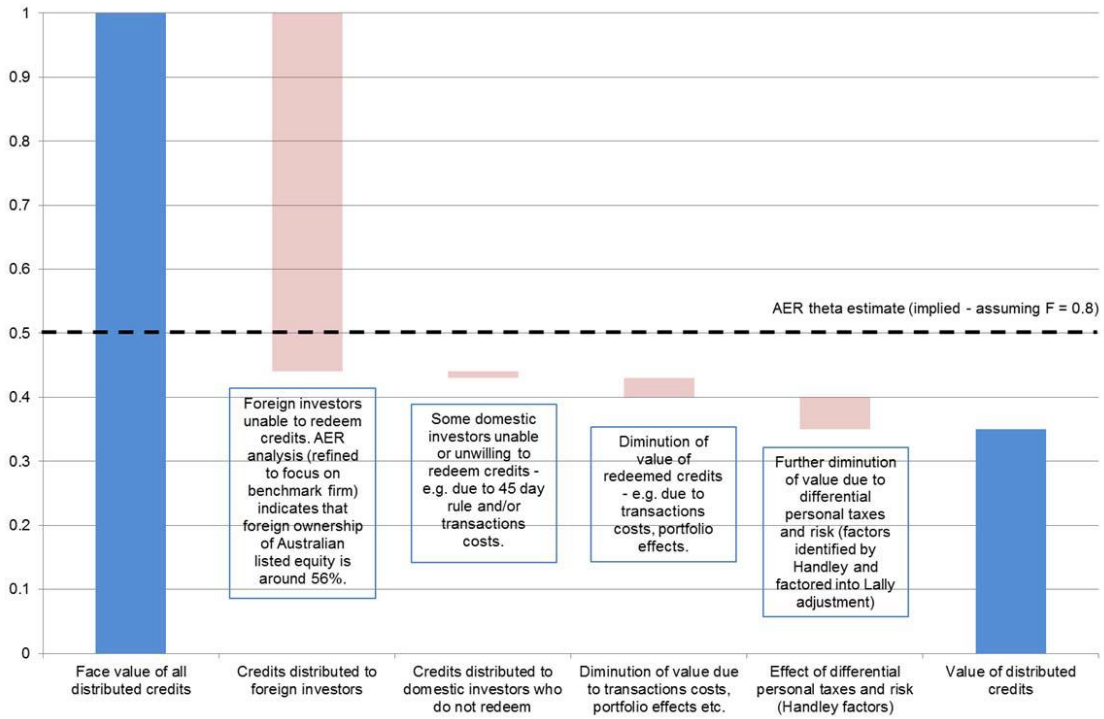
[488] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 299; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 12; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 115; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-84; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 83-84; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 363-364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 92; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 357-358; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204, 207.

[489] SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 65(e).

[490] Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 177.

Service providers submitted that, because of the factors set out above, our implied point estimates of the utilisation rate are 'well above any possible measure of the value of distributed imputation credits'.[491] In support of this, a number of service providers presented figure 4.1 and figure 4.2.

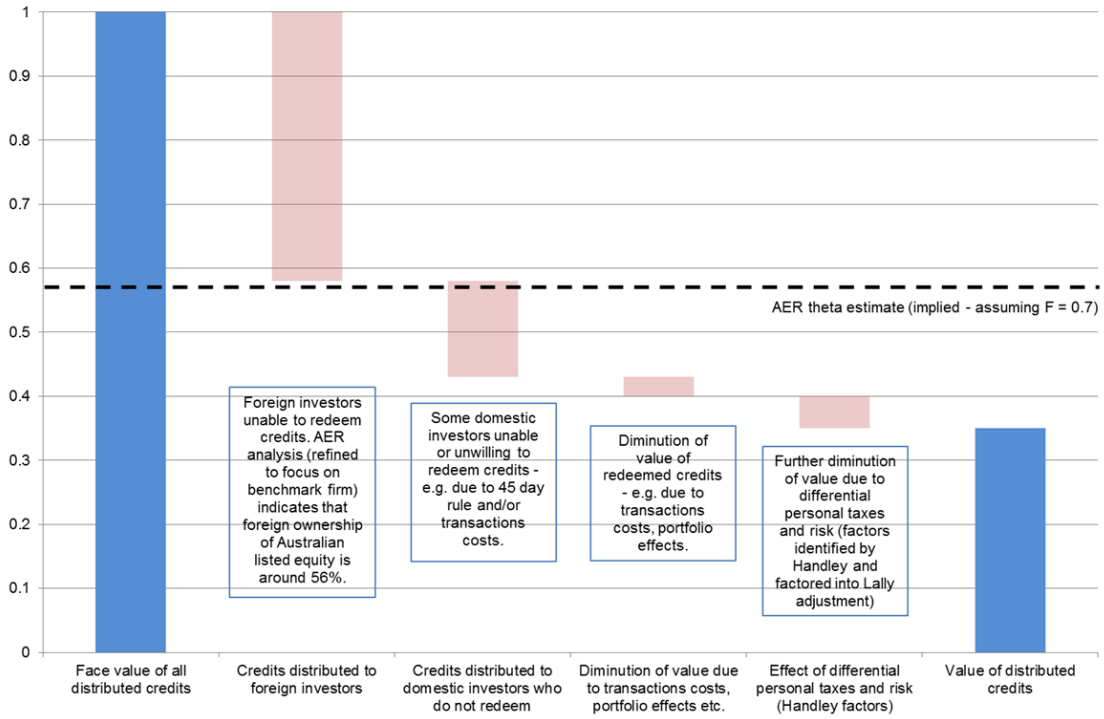
Figure 4.1 Illustrative impact on value of imputation credits – listed equity



Source: Ausgrid, *Attachment 7.07 Ausgrid's revised proposal on gamma*, January 2015, p. 16.

[491] ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 14; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 15; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 20; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 15; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 15; and JGN, *Gamma - response to the draft decision*, February 2015, p. 18.

Figure 4.2 Illustrative impact on value of imputation credits – all equity



Source: Ausgrid, *Attachment 7.07 Ausgrid's revised proposal on gamma*, January 2015, p. 17.

As already discussed, there is disagreement between the service providers and us on whether the utilisation rate (and therefore the value of imputation credits) should be estimated on a basis that is 'before' or 'after' the taxes and costs incurred by investors. The service providers consider that the value of imputation credits should be estimated 'after' these factors. Given these factors can only result in the diminution of the value of credits, it follows that the service providers' preferred estimate of the value of imputation credits will be no higher than that estimated on a before-personal-tax and before-personal-costs basis.

This notwithstanding, we consider that there are a number of problems with figure 4.1 and figure 4.2. Moreover, the figures suggest that the value of distributed credits on which the service providers rely is likely understated relative to the (after-personal-tax and after-personal-costs) value to investors in all equity.

The relevant equity ownership share

The key difference between the figures is that in figure 4.1 the SFG estimate of the value of distributed credits is ultimately compared to the refined share of foreign ownership of listed equity, and in figure 4.2 the comparison is made with the refined share of foreign ownership in all equity. However, Gray (for SFG) indicated that if the value of distributed credits is

estimated via a 'market value approach' (such as SFG's dividend drop off study), then the estimate will represent 'an average across all listed firms'.[492] Accordingly, the relevant foreign ownership share is that of listed equity, and it would be internally inconsistent to compare the SFG estimate of the value of distributed credits with the foreign ownership share of all equity (as the service providers have done in figure 4.2).

It also seems that the SFG estimate of the value of distributed credits reflects the average value over the sample period of the data used by SFG: July 2001 to October 2012. If so, this estimate should be compared with the average, refined foreign ownership share of listed equity over a similar period (June 2001 to December 2012). This is equal to 0.51.

Implications for the value of distributed credits across investors in all equity

Although we have above identified the inconsistency in comparing SFG's dividend drop off estimate of the value of distributed credits to the foreign ownership share of all equity, figure 4.1 and figure 4.2 appear to be intended to indicate that the presence of foreign investors is a relevant source of the diminution of the market-wide value of distributed credits. This suggests that, all else held equal, an implied market value study conducted over all equity might produce a higher estimate of the value of distributed credits. This would be because the foreign ownership share of all equity is lower.

Using the relevant estimate of the foreign equity ownership share discussed above, the logic of figure 4.1 and figure 4.2 indicates that SFG's estimate of the value of distributed credits (0.35) represents the diminution of the face value of distributed credits by 51 per cent due to the presence of foreign investors and by (1 - 0.35 - 0.51 =) 14 per cent due to other factors (including differential personal taxes and risk). If the combined diminution due to these other factors is the same for investors in all equity, then the logic of the figures indicates that the value of distributed credits across investors in all equity might be (1 - 0.14 - 0.39 =) 0.47.[493]

Comparison to the redemption rate from tax statistics

The figures suggest that the difference between the foreign ownership share and the redemption rate from tax statistics is an estimate of the credits distributed to domestic investors who do not redeem them. The figures suggest that this might be because of the 45-day holding rule and/or transactions costs. We consider that there are a number of problems with this estimate.

First, the redemption rate from tax statistics reflects all equity, and therefore it is inconsistent to compare it to the foreign ownership share of listed equity.

Second, this estimate does not contemplate error or inaccuracy in the tax statistics. In section **Error! Reference source not found.**, we set out the data concerns that exist

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[492] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 216.

[493] The refined foreign ownership share of all equity between June 2001 and December 2012 was 0.39 on average.

egarding the tax statistics. The service providers that we released draft decisions for in 2014 submitted in their initial proposals that no weight be placed on estimates of the utilisation rate from tax statistics because of significant unresolved problems with the data.[494] NERA has subsequently submitted that tax statistics can be used to estimate a value for theta consistent with a 70% distribution rate, and can also be used to estimate an upper bound value for gamma.[495] Gray (for Frontier) appears to support this.[496] Frontier considers that gamma can be estimate reliably from tax statistics as the ratio of credits redeemed to credit generated.[497]

However, given the issues with the tax data and Hathaway's caveated comments regarding the data where he says "[t]he conclusion is that I accept the tax payments and FAB data as given post-2003, and assume that the problem is more likely to have arisen within the franked dividend payments data"[498], we remain of the view we should treat estimates of theta based on tax data with caution. Hathaway's draft 2014 report gives us no cause to change our view.[499] Lally, in his 2016 report, indicates he considers the most likely reason for a difference between the estimate of the utilisation rate from the equity ownership approach and tax statistics is data issues with the tax statistics.[500] The reliability of tax statistics is further discussed in section A.13. Dr Lally, in his most recent report for us, also expresses the view in response to Frontier that the taxation statistics should continue to be viewed with caution.[501]

Thirdly, we are not convinced that the 45-day holding rule and transaction costs are contributing to a material amount of credits not being redeemed. As discussed above, this is because:

- Our analysis of the 45-day rule suggests that it is not having a material effect. Although we acknowledge this analysis is subject to any data quality issues with the tax statistics.
- We do not consider that transactions costs are likely to dissuade a material number of investors from redeeming imputation credits.

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494 ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 15; Directlink, *Directlink submission on gamma*, May 2014, p. 16; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 15. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 15–16; JGN, *Gamma proposal*, June 2014, p. 19; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 21.

495 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, pp. 25–28.

496 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 6–7.

497 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 3-4, 12-15.

498 Neville Hathaway, Imputation Credit Redemption ATO data 1988–2011 Where have all the credits gone?, September 2013, p. 25.

499 Neville Hathaway, Franking Credit Redemption ATO data 1988–2012 Where have all the credits gone? Draft only comments welcome, October 2014.

500 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 23.

501 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 12-13.

In response to the service providers' submissions,[502] we do not consider there is any inconsistency between Handley's earlier work and subsequent work indicating taxation statistics can be used as a point estimate of theta. Handley has clearly explained why tax statistics can be used as a point estimate for theta, a position we agree with.[503] While we acknowledge that the ultimate source of the value for imputation credits is from redemption, this does not prevent an estimate of the redemption value from taxation statistics being a point estimate. We note, given the uncertainty with estimates based on the tax data, the true (unobservable) redemption value could be above or below the estimate.

In section A.14, we analyse the difference between the utilisation value from the equity ownership approach and taxation statistics.

A.8.5 NERA's comments on the utilisation rate

NERA submitted that theta is the value that a representative investor places on a dollar of distributed imputation credits.[504] NERA also presented a simple derivation of theta. The simple model employed by NERA consisted of, among other things: a set of domestic and foreign investors; a domestic asset that distributes imputation credits; and a foreign asset that does not distribute imputation credits. NERA showed that in this model:

$$\theta = \frac{D}{D + F}$$

where D is the wealth of domestic investors and F is the wealth of foreign investors.[505] NERA also showed that the redemption rate of imputation credits does not equal theta in this model, and is instead given by the ratio of domestic holdings of the domestic asset to the sum of domestic and foreign holdings of the asset. NERA concluded:[506]

> In a small open economy – like Australia – the proportion of credits created that are redeemed is likely to exceed by a substantial margin the value of a dollar of tax credits created to a representative shareholder.

That is, if domestic investors make up only a small proportion of all investors, then theta will be small. However, this conclusion appears to rely on determining theta in an international CAPM context—domestic and foreign investors can invest in both domestic and foreign assets. By contrast, we determine the value of imputation credits (and other rate of return parameters) using a domestic CAPM. In the domestic CAPM context, domestic investors

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502 SA Power Networks, *Revised regulatory proposal 2015–20*, July 2015, p. 373; Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, p. 10, July 2015.

503 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 39; J. Handley, *Further Advice on the value of imputation credits*, 16 April 2015, p. 28.

504 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

505 Strictly, D is the number of domestic investors and F is the number of foreign investors. However, NERA's model assumes that each investor has starting period wealth of $1.

506 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

that are eligible to redeem credits make up a significant proportion of all investors that invest in domestic assets. Further, the scope for a material 'wedge' to arise between the redemption rate and theta in the domestic CAPM context is not clear from NERA's analysis because it only considers the international CAPM context.

Our view is supported by Handley's review of NERA's submission. Handley concluded:[507]

> The problem with the NERA model is that it is an international asset pricing model – along the lines of the Black (1974) International CAPM – whereas the current framework is based within a domestic market setting. This means that domestic investors have only a small market weighting by definition. Clearly, the value of imputation credits in an international asset pricing model will be substantially different from the value of imputation credits in a domestic asset pricing model.
>
> …
>
> In my opinion, NERA's analysis does not establish the presence of a wedge between theta and the redemption rate and so does not invalidate the use of tax statistics to estimate theta.

NERA responded to our position in the JGN decision in its June 2015 report.[508] In this report NERA put forward several propositions:

- It would be expected that the proportions of credits that are redeemed would significantly exceed the value of a dollar of credits to a representative shareholder in a small open economy like Australia.
- Our use of a domestic Australian CAPM does not justify any presumption that theta take a non-negligible value.
- The estimated cost of capital from a domestic CAPM will equal the cost of capital from an international CAPM under certain assumptions.

In response, we note that we consider our approach is consistent with our definition of the Australian domestic market in the presence of foreign investors.

While NERA does show a model consistent with the redemption of credits exceeding the value for theta, you may only get theta falling significantly below the redemption rate under specific assumptions.[509] We also note that NERA's model is an international asset pricing

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[507] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 6 and 7.

[508] NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015.

[509] NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 6–7.

model.[510] This model is inconsistent with our definition of the domestic market. We also consider the use of the international CAPM, with a high proportion of wealth held by foreign investors (NERA using 98 per cent in its primary example) is prima facie inconsistent with the way in which the service providers estimate the return on equity using an Australian Domestic CAPM. Handley shows that NERA's claimed "wedge" between the redemption rate and theta can be either small, if input assumptions are made consistent with our definition of the market (domestic in the presence of foreign investors), or zero or even negative depending on your assumption about a number of largely unobservable factors.[511] NERA response to one of Handley's examples that shows the wedge may be small makes clear they are using an International CAPM to argue Handley's response is invalid stating:[512]

> "The assumption that Australian aggregated wealth makes up 60 percent of the world wealth is also very clearly at odds with the evidence and so we conclude that Handley's second example is similarly of no practical relevance."

We consider this response by NERA of limited relevance given our definition of the relevant market is a domestic market in the presence of foreign investors, a market which we have used to estimate both the return on equity and the value for imputation credits. Handley's example is appropriate given this definition.

While NERA responded to the position that theta could exceed the redemption rate arguing the market will not clear, irrespective of this we consider the wedge is not clearly material under our definition of the market and as Handley notes, the current framework is based within a domestic market setting.[513] NERA's comment in a separate report that it does not recommend the use of an International CAPM does not resolve this inconsistency issue.[514]

In addition, while NERA has effectively put forward the position that the use of a domestic CAPM to set the return on equity and the use of an international CAPM to determine theta are not inconsistent because both models may generate the same return on equity estimate under certain assumptions, we consider NERA's position is not adequately supported. An International CAPM may give a materially different required return on equity estimate. This may be lower or higher depending on whether local (domestic) systematic risk can be diversified away in the global market, or if specific risk in the domestic market contains

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510 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, p. 6.

511 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 6–7.

512 NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. 7.

513 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, p. 6.

514 NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p. 79.

global systematic risk.[515] While NERA appear to have made a number of assumptions to show both a domestic version of the SLCPAM and international version of the SLCAPM can hold simultaneously[516], these are assumptions that can only be tested empirically. An academic article by Koedijk, Mathiijs and van Dijk explains the underlying premise of such a test stating:[517]

> The testing methodology boils down to assessing whether the exposure of an individual company to the global risk factors is effectively captured in the international pricing of the domestic market index. If not, a significant pricing error will exist, which implies that global factors do have a substantial impact on the cost of capital. In effect, the domestic CAPM will underestimate the cost of equity capital of a company if the specific risk according to the domestic CAPM contains additional systematic risk related to the priced global factors. The domestic CAPM will lead to an overestimation of the cost of capital if part of the systematic risk indicated by the CAPM can be diversified away in the global market.

NERA appear to agree this is an empirical question as it states earlier in its report "[w]hether equity markets are integrated or segmented is an empirical issue."[518]

We also note that some work by Associate Professor Lally at the time of the development of the Rate of return guideline indicated that the required return on equity for Australian firms could be materially lower under full integration.[519]

A.9 Estimation approach considerations

Two considerations that were not proposed in the Guideline in determining the value of imputation credits are discussed below.

A.9.1 Evidence from all equity or only listed equity

When determining the value of imputation credits, we remain of the view it is appropriate to have regard to evidence from all companies and their investors (all equity) and just listed companies and their investors (only listed equity). There is no consensus on which should be the preferred approach.

The Ausgrid Tribunal recently considered that the AER had erred in using a listed equity only measure.[520] In this decision the Ausgrid Tribunal considered that the AER had not provide

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515 Koedijk, K,G, and van Dijk, M, A., 2004, Global risk factors and the cost of capital, *Financial analysts journal*, March/April 2004, p. 33.

516 NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 8–10.

517 Koedijk, K,G,, and van Dijk, M, A., 2004, Global risk factors and the cost of capital, *Financial analysts journal*, March/April 2004, p. 33.

518 NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. 3.

519 Lally, *The estimation of gamma*, November 2013, pp. 39–43.

sufficient explanation for introducing the distribution rate for only listed equity and that the considered it appropriate to continue to follow past practice.[521]

We have had regard to experts' comments on the issue. Lally made some comments in support of considering all equity:[522]

> The more important point here is whether unlisted equity should be included, in principle. Arguably, the fact that only listed equity is used to estimate the MRP and beta suggests that the same limitation be applied to the present issue. However, the limitation is only imposed for the MRP and beta because data from unlisted firms is entirely inadequate for estimating returns. Furthermore, MRP estimates are generally based on a subset of listed equity (such as the ASX200), the subsets used may vary and are sometimes never specified (in surveys), and betas are typically estimated from foreign returns data. All of these results could reasonably be viewed as proxies for the results that would arise from using Australian data on all equities. In addition, treating the CAPM as a model that applies to only listed equities would rule out using it to estimate the cost of equity for an unlisted company (and some regulated businesses are unlisted). Thus, in principle, I favour inclusion of unlisted equity for estimating the proportion of Australian equities held locally.

Lally considers that all equity rather than listed equity should be used to estimate the utilisation value. Lally considers that using all equity data suggest the utilisation value of 0.60.[523]

However, Handley suggested that evidence from listed equity is more relevant:[524]

> Specifically, the NERA estimate [of the distribution rate] is based on aggregate [franking account balance] data for all companies – including public companies and private companies. In contrast, one can reasonably argue that the estimate should be based on public companies only since this is more likely to reflect the composition of the Australian domestic market for equity funds – private companies by definition are financed in entirely different ways – and so be a more relevant proxy for a benchmark efficient entity.

Gray's view (for SFG) is not clear to us. In his May 2014 report, Gray stated:[525]

> The 45% foreign ownership figure in Figure 9 above is based on listed equity. In our view, this is the appropriate calculation given that all other WACC parameters are

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520 United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016.

521 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1106.

522 M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 34.

523 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 18; M. Lally, *Issues in the estimation of gamma*, April 2017, p. 29.

524 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 28.

525 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 412.

> estimated with reference to exchange-listed businesses because they are more reflective of the efficient benchmark entity.

And in his February 2015 report (for SFG) Gray stated:[526]

> There is also a question about whether data should be restricted to listed firms or whether it should be expanded to include private firms as well. Since the benchmark efficient entity is not necessarily listed, this would imply that private firms are also relevant.

A number of the service providers indicated clearly in their initial or revised proposals, or in a submission on their proposal, their view that the value of imputation credits should be estimated with regard to evidence from all equity:[527]

> Gamma is conventionally estimated as a market-wide parameter and therefore there is no reason to measure the distribution rate based on data for listed equity only, in circumstances where data is available for both listed and unlisted firms.

Despite this view, the service providers propose to rely on the 'best estimate' of the utilisation rate from implied market value studies, which by definition relate to only listed equity.[528] The service providers do not recognise that the evidence they have presented on their preferred estimate of the utilisation rate implies that it likely understates the value of distributed credits to investors across all equity (see our discussion in section A.8.3).

We have considered all the material before us. We agree that the utilisation rate is a market wide parameter. However, as set out above, there is no consensus on whether it should be estimated using all equity or listed equity. Therefore, we consider both. On the information before it, the SAPN Tribunal found no error in our decision in SAPN to exercise our discretion to consider estimates of the distribution rate from listed equity.[529]

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526 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 222.

527 ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 1; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 3; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 3; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 3; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 3; and JGN, *Gamma - response to the draft decision*, February 2015, p. 4; CitiPower, *Appendix J - Gamma*, April 2015, p. 6; Powercor, *Regulatory Proposal 2016–20,* April 2015, p. 6; Energex, Submission on Energex's regulatory proposal 2015-20 and the AER issues paper, January 2015, p. 4.

528 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 284; ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 13; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 14; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 19; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 14; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 14; and JGN, *Gamma - response to the draft decision*, February 2015, p. 17; CitiPower, *Appendix J - Gamma*, April 2015, pp. 4-5; Powercor, *Regulatory Proposal 2016-20*, April 2015, pp. 4-5; Energex, *Revised regulatory proposal 2015-20*, July 2015, p. 13.

529 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 184.

In relation to the distribution rate, we note it is a firm specific parameter in principle. However, as Lally advised, there are reasons why it may not be appropriate to use firm specific data or industry averages, so sector wide data can be used as a reasonable proxy.[530] Therefore, we consider it is appropriate to use estimates of the distribution rate based on listed equity and all equity. We also have regard to Lally's recommended estimate of the distribution rate for listed equity estimated from financial reports of the top 20 listed firms (that is, 0.83).[531] Lally considers this estimate is reflective of the distribution rate for a benchmark efficient entity.

We note that the Ausgrid Tribunal did not find a clear error in our approach prior to using its preferred approach. We remain of the view that our approach is open to us, and results in a conservative estimate (see section A.10).

A.9.2 Relationship between the distribution rate and the utilisation value

In developing the Guideline, we did not recognise the relationship between definitions and estimates of the distribution rate and the utilisation rate. This relationship is that a given estimate of the distribution rate represents the proportion of credits distributed by a given set of companies to the set of investors in those companies. In decisions released post the Guideline we considered that for consistency in estimating the value of imputation credits, a corresponding estimate of the utilisation rate should reflect the utilisation of that same set of investors.

We considered that this relationship should be recognised when determining estimates of the value of imputation credits. We therefore considered that estimates of the utilisation rate determined with regard to investors in only listed equity should be paired with estimates of the distribution rate that are also determined with regard to only listed equity. Similarly, we considered that estimates of the utilisation rate determined with regard to all equity should be paired with estimates of the distribution rate that are also determined with regard to all equity.

The service providers do not agree that the estimate of the utilisation value based on listed equity (all equity) can be paired only with a listed equity (all equity) distribution rate.[532] They

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530 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 24–26.

531 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5, 29.

532 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 8, 22; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 4, 11, 128; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-81, 7-95; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 82, 96; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360, 374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 88, 103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 354, 368; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205.

submit that for the equity ownership approach both ownership and distribution data is available for all equity and listed equity and it should be necessary to consider which of these measures is more reflective of the benchmark firm.[533] Service providers consider that the distribution rate should be set with reference to all equity to avoid the influence of imputation credits being attached to foreign income.[534] For the utilisation value they consider that it should to be estimated with reference to only listed equity in order to reflect foreign ownership in the benchmark firm.[535]

Both Stephen Gray (for Frontier) and NERA submitted that there is no inconsistency with paring the distribution rate for all equity with a theta value (or utilisation rate) for listed equity as the distribution rate is firm specific within the Officer model.[536] As a result they appear to consider we should use either the distribution rate from the broadest market (all equity) in combination with a theta estimate from listed equity,[537] or alternatively we should use of a distribution rate estimated from listed equity excluding the 20 largest firms in the market, both of which yield an estimated distribution rate of around 70%. They effectively consider the use of the 20 largest listed firms to estimate the distribution rate from listed equity data alone will overestimate the distribution rate for the benchmark efficient entity as we assume this entity is not a large listed entity.[538]

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533 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 17; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 111, 121, 128; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-81, 7-90, 7-95; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 82, 91, 96; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360, 369, 374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 88, 98, 163; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 354, 363, 368.

534 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 292; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, p. 3.

535 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 8; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 111, 128; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-81, 7-95; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 82-83, 96; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360, 374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 88-89, 103-104; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 354, 367-368.

536 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 26–27; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. iii.

537 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 28–30; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 17–18.

538 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 28–30; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 17–19.

Gray (for Frontier) considers that the distribution rate is firm specific, while theta is a market wider parameter.[539] Gray (for Frontier) draws an analogy between gamma and the CAPM, where the distribution rate is similar to beta and theta is similar to the MRP. Handley previously considered these issues and supported our decision in JGN to not remove the largest listed equity firms from the estimation of the distribution rate on the basis foreign sourced income allows them to distribute a higher proportion of imputation credits.[540] Further, as outlined in section A.10.1, Lally has demonstrated there is a negative relationship between foreign operations and the distribution rate.[541] This demonstrates that foreign income actually decreases the distribution rate and not increases it as suggested by Frontier.

The service providers consider that two benchmark characteristics, foreign ownership and foreign income, justify a lower gamma estimate. However, we consider that are other benchmark characteristics that may justify a higher gamma estimate and/or a lower corporate tax allowance. For instance, the EMRF has submitted that the Franking account balance of APA Group, Envestra Limited (pre-sale) and JGN's parent company is zero.[542] This could imply that regulated businesses distribute all their imputation credits and therefore the appropriate benchmark distribution rate is closer to one hundred per cent. Alternatively, this could imply that the regulated businesses do not generate any imputation credits as they do not pay company tax. We consider the benchmark should be considered holistically and individual characteristics of the benchmark should not be considered in isolation.

Lally considered there is no necessity to combine estimates of the distribution rate and utilisation rate from the same dataset and good reason not for not doing so.[543] Following this, we consider it is not necessary to 'match' estimates of distribution rates and utilisation rates based on the dataset used, although we note the choice is open to us. While we principally maintain our previous approach, we also have some regard to Lally's preferred approach (which combines an all equity utilisation rate from the equity ownership approach with a distribution rate for listed equity from financial reports of the top 20 listed firms).[544] We note that Lally's preferred approach suggests a distribution rate of at least 0.83 and a utilisation rate of 0.60.[545] This suggests a gamma value of at least 0.50, which is higher than our estimate of 0.4.[546]

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539 Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, pp. 12-13.

540 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 21.

541 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 27.

542 EMRF, *NSW gas distribution revenue reset, Draft decision by the Australian Energy Regulator on Jemena's Gas Networks Access Arrangement, A response*, March 2015, p. 71.

543 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

544 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 5–6, 24–26, 29.

545 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 7.

546 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 7.

A.10 Estimating the distribution rate

We consider that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors. We set out our position on the distribution rate in section 4.4.1 of attachment 4. Consistent with the Guideline, we estimate it using the 'cumulative payout ratio approach', which uses data from the ATO on the accounts used by companies to track their stocks of imputation credits ('franking account balances'). Using this approach, NERA estimated a distribution rate across all equity of 0.7 for the period 1987 to 2011.[547] Hathaway found a similar estimate for the period 2004 to 2011.[548] Gray (for Frontier) submitted that the distribution rate for all equity and listed equity excluding the impact of the top 20 listed companies is approximately 70%.[549] Also using this approach, Handley estimated a distribution rate across only listed equity of 0.8 for the period 1987 to 2011.[550] Our own analysis indicated that the distribution rate over only listed equity is 0.8 for the period 2004 to 2011—we calculated the aggregate net tax paid by public companies over this period to be $255.6 billion and the change in aggregate franking account balances of those companies over the same period to be $50.2 billion (suggesting that $205.4 billion, or 80 per cent, of imputation credits generated were distributed).

We relied on an estimate of the distribution rate over all equity of 0.7 in the Guideline and decisions released in 2014 and April 2015 and June 2015. We also relied on an estimate of the distribution rate over only listed equity of 0.8 in the decision released in 2014 and April 2015. We reviewed these estimates in light of an updated analysis of the ATO data to the 2012 tax year by NERA, which was submitted to us as part of JGN's decision process.[551] Handley also reviewed NERA's analysis, and provided his own report.[552] Both NERA and Handley found an estimate of 0.7 for the period 2004 to 2012.[553] However, both NERA and Handley found that the distribution rate over only listed equity has fallen slightly from 0.8. Specifically, Handley found an estimate of 0.77 over the period 2004 to 2012. We used this updated estimate for the decisions released in June, October and November 2015.

Gray (for frontier) replicated and updated using the latest Taxation Statistics cumulative payout ratio for public and private companies in NERA's (2015) report.[554] However, Gray's (for frontier) replication of Handley (2014) and Handley (2015) cumulative payout ratio is

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547 NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

548 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

549 Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 15.

550 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 28–29.

551 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

552 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015.

553 As discussed in section A.13, we have regard to Hathaway's finding that the ATO statistics are subject to a number of issues prior to 2004.

554 Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 20.

slightly different due to what Gray considered to be a different rounding method.[555] The update payout ratios presented below in Table 4-14.

Table 4-14 Frontier Economics updated distribution rates

	2001-2012	2001-2013
Handley (public companies)	0.76	0.742
Handley (Private companies)	0.52	0.507
NERA (public companies)	0.755	0.742
NERA (Private companies)	0.505	0.495

Source: Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 22.

For this final decision the AER has updated the cumulative distribution rate to 2014. Through this process we have estimated that the distribution rate for listed equity has fallen to 0.75 and this value is adopted in this final decision. Consistent with the regulated businesses proposals, the AER adopts a 0.7 distribution rate for all equity in this final decision.

We note that Lally recommends we use the distribution rate for listed equity estimated from financial reports of the top 20 listed firms. This is due to Lally considering that listed equity is more representative of the benchmark efficient entity, stating:[556]

> Furthermore, since privately-owned regulated businesses in Australia are typically listed firms or subsidiaries of listed firms, the appropriate set of firms to use to estimate the distribution rate of regulated businesses would seem to be listed firms.

Lally also considers the data on the top 20 firms is of a higher quality (via financial statements) relative to the ATO data which contains unresolved discrepancies.[557] We note that if we were to adopt Lally recommendation in this decision it would result in our estimate for the distribution rate of the benchmark efficient entity (and therefore gamma) increasing. Therefore, while we have not used this advice to increase gamma above 0.4, it does provide support to reject the proposals from the service providers to reduce the gamma value to 0.25 based on the Ausgrid Tribunal decision.

In the remainder of this section we respond to the service providers' and Gray's comments on the distribution rate; describe the cumulative payout ratio approach and alternative approaches to estimating the distribution rate; and discuss an updated report on tax statistics from Hathaway.

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555 Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 20.

556 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 25.

557 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 31.

A.10.1 Service providers', Gray's and NERA's comments on the distribution rate

The service providers and Gray (for SFG) submitted that it would be inappropriate to apply a distribution rate based on evidence from only listed equity and that the distribution rate for all equity is likely to be a reasonable proxy for that of the benchmark entity.[558] We disagree and set out our reasons below.

There appears to be agreement between the service providers, Gray and us that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors. There also appears to be agreement between the service providers and us that the distribution rate should be estimated on a broad basis; for instance, a number of service providers submitted:[559]

> Gamma is conventionally estimated as a market-wide parameter and therefore there is no reason to measure the distribution rate based on data for listed equity only, in circumstances where data is available for both listed and unlisted firms.

In the decisions previously released in 2014, 2015 and 2016, and in section A.9 and A.10 of this decision, we consider that there are good reasons for using estimates of the distribution rate based on all equity and listed equity.

Gray's report (for SFG) appears to support an estimate of the distribution rate that is not affected by the distribution behaviour of very large public firms or very small private firms. That is, Gray (for SFG) stated:

> Conceptually, the task is…to estimate the distribution rate for the benchmark efficient firm.[560]

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[558] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 292; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 7; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 109; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-80; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 81; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 359; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 87; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 353; APNT, *Access Arrangement Revised Proposal to Draft Decision*, January 2016, p. 92; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 204-206; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas, September 2016,* p. 3.

[559] ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 1; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 3; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 3; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 3; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 3; and JGN, *Gamma - response to the draft decision*, February 2015, p. 4; CitiPower, *Appendix J - Gamma*, April 2015, p. 6; Powercor, *Regulatory Proposal 2016-20*, April 2015, p. 6; Energex, *Submission on Energex's regulatory proposal 2015-20 and the AER issues paper*, January 2015, p. 4.

[560] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 211.

…

> For the same reason that very large multinational firms are not comparable to the benchmark efficient entity, very small private firms would also not be close comparators.[561]

In particular, Gray submitted that the distribution behaviour of large multinational firms seemed unrepresentative of the benchmark efficient entity on account of their foreign-sourced income.[562] Gray concluded that the 'best estimate' of the distribution rate from analysis which considered only listed equity was not materially different from 0.7.[563] Handley considered Gray's analysis to be ' incomplete and oversimplified to support such a strong conclusion'.[564] Gray (for Frontier) considers that Handley's response does not address the issue that any firm with foreign profits will be able to distribute more imputation credits.[565]

We agree with Handley that Gray's analysis is oversimplified. There are many factors that determine a firm's imputation payout ratio. The introduction of the imputation system in Australia itself resulted in higher dividend payout ratio in order to distribute more imputation credits.[566] This would imply that firms recognise that investors value imputation credits and want to distribute a certain amount of them in order to maximise value to shareholders. It is also important to note that even if other firms do not have any foreign earnings they still have an ability to distribute their imputation credits via methods including higher dividend payments and off-market share buybacks. Subsequently if these firms need to retain more of their earnings to fund growth they can achieve this via dividend reinvestment plans and secondary equity raisings. Ultimately, the service providers have not shown the imputation payout ratio is higher due to foreign income or if any increase due to this is material. They have simply asserted that because these firms have foreign source income, and because this may allow these firms to pay a higher imputation payout ratio (without using things like dividend reinvestment plans), these firms should be excluded from the calculation of the dividend payout ratio.

Lally examined this issue for us and concluded that firms with higher foreign earnings actually appear to be distributing less imputation credits.[567] Lally empirically assessed the seven largest tax paying entities on the ASX and found that the proportion of profit from foreign operation is monotonically decreasing in the distribution rate (correlation of -0.95),

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561 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 222.

562 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 215 and 217–218; Frontier, *The appropriate use of tax statistics when estimating gamm*a, January 2016, p. 6.

563 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 223; Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 6.

564 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 21.

565 Frontier, The appropriate use of tax statistics when estimating gamma, January 2016, p. 12.

566 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 34.

567 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 26-29.

which is in the opposite direction to that claimed by Frontier.[568] Lally concluded, based on his analysis, we should use a distribution rate for listed equity from the top 20 listed firms.[569]

Frontier responded to the Lally analysis by noting that the relevant question is whether large multinationals have higher imputation distribution rates than other firms.[570] Further, Frontier considers Lally's analysis of the top 7 firms did not control for difference in dividend payout ratios.[571] Frontier concludes that:[572]

> a. Mathematically, for any given dividend payout ratio, the imputation credit distribution rate is an increasing function of the proportion of foreign profits; and
>
> b. The evidence clearly supports the proposition that large multinationals are able to distribute a higher proportion of the imputation credits that they create (83%) relative to the average firm (70%).

Frontier argues that to determine the effects of foreign income on imputation distribution the correct comparison should be between firms without foreign income and those with it, rather than amongst firms that have some foreign income.[573] However, Lally considers the far superior approach would be to examine the entire distribution of firms, as Lally (2016a, section 3.5) has done.[574] The seven firms examined by Lally (Lally, 2016a, Table 1) have foreign income proportions ranging from 6% to 60%, and therefore the degree of extrapolation is minor to estimate the imputation distribution rate with the absence of foreign activities.[575] Lally considers that the most important requirement is for the firms in the analysis to have large company tax payments to the ATO, so as to obtain the best estimate of the imputation distribution rate for the market in aggregate.[576] Lally considers that examining a set of firms that had no foreign activities but constituted 10% of the value of the market would be very unsatisfactory.[577]

Frontier submits that the average Australian company has a distribution rate of about 70%, compared to the 84% for the 20 largest ASX firms, given the latter firms have foreign income

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568 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 27.

569 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 24-26, 28-29.

570 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 6-11.

571 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas, September 2016,* pp. 6-11.

572 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas, September 2016,* pp. 10-11.

573 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas, September 2016,* p. 9.

574 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 9.

575 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

576 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

577 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

it is not suitable for estimating the distribution rate for the BEE.[578] However, Lally has demonstrated that the top 20 firm's imputation credit distribution is 0.84 and when adjustments are made for foreign income this imputation credit distribution actually increases rather than decreases.[579] As a result, Lally does not consider the difference between the imputation distribution rate for the top 20 firms and all firms is explained by foreign income.[580] Rather Lally considers the difference is driven by unlisted equities lower dividend distribution rates.[581] The SAPN Tribunal also recognised this:[582]

> At one extreme there are small companies owned by individuals on high marginal tax rates who may prefer earnings retention to generate concessionally-taxed long-term capital gains or to defer the additional tax which would need to be paid on franked dividends. At the other extreme, large foreign-owned Australian registered companies may also prefer retention and reinvestment of earnings rather than distribution of dividends and attached franking credits which would be wasted.

In respect to using listed firms other than the top 20 to estimate the imputation distribution rate, Lally considers some of these will have foreign activities and the effect of this foreign income would have to be determined before this rate can be used.[583] Lally notes that Frontier has not determined the impact of foreign income on the imputation distribution of the listed firms minus the top 20 firms.[584] Further, Lally considers that imputation distribution rate for the listed firms excluding the top 20 firms draws upon ATO data and such data is unreliable because it generates markedly different estimates of the credits distributed according to whether dividend or company tax data is used and even Frontier, accepts this reliability problem.[585] Overall, Lally considers that suitable firms to use to determine the distribution rate is publicly listed firms and the suitable means of estimating the distribution rate of these firms (stripped of the effect of foreign activities) is from their financial statements.[586] Consistent with this, Lally considers that the imputation distribution rate should be set at least 0.83 which is the imputation distribution rate of the top 20 firms estimated from their financial statements data.[587]

In response to Frontier's submission that Lally failed to control for the difference in dividend payout rates when determining the impact of foreign income, Lally agrees.[588] However, Lally

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578 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, p. 9.

579 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

580 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

581 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

582 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 182.

583 M. Lally, Issues in the estimation of gamma, April 2017, p. 10; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 9-10.

584 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

585 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

586 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 10.

587 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 10-11, 27, 29.

588 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 11; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, p. 10.

considers that Frontier has failed to provide a valid reason for why it is important to control for dividend payout rates and none is evident.[589] Lally considers that all phenomena that arise from foreign activities must be accounted for, which comprise not only the foreign income but any change in the dividend payout rate arising from foreign activities.[590] Controlling for any changes in the dividend payout rate would subvert that purpose.[591]

In regards to Frontier's submission that Lally only focus on the largest seven firms, Lally responds that the purpose of the exercise is to estimate the imputation credit distribution rate of the market.[592] Lally submits that the top seven firms collectively account for 79% of the taxes paid to the ATO by the 20 largest ASX firms.[593] As a result, Lally considers the number of firms in his sample is sufficient. He considers it is not the number of firms that is important, rather it is the collective size of those firms that is important.[594]

We also consider it is inappropriate to focus on one aspect of the benchmark (foreign ownership and foreign income) and not look at the benchmark holistically. We should be looking at how all regulated businesses distribute imputation credits to investors, rather than focus on the foreign ownership. As the EMRF submitted, the listed regulated businesses (APA, Envestra (pre-sale) and JGN's parent company) have a franking account balance of zero.[595] This can imply one of the following: (a) the regulated businesses distributed all either imputation credits to investors and therefore the distribution should be set to 100 per cent or (b) the regulated business do not generate any imputation credits as they do not pay corporate tax. This raises the question of whether our tax building block allowance may be too high. Based on the material submitted by the EMRF, it might be posited that our overall tax assumptions (including the use of a gamma of 0.4) are conservative (in the favour of the regulated businesses).

Regarding internal consistency when combining estimates of the distribution and utilisation rates, Gray (for SFG) submitted:[596]

> Since all credits from all companies are identical, it must be the case that, in equilibrium, the credits have the same value throughout the economy. Consequently, it is generally accepted that theta is a market-wide parameter – with a single value that would apply to all firms.

589 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 11, 23.

590 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 11, 23.

591 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 23.

592 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 12*;* Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, p. 10.

593 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 12.

594 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 12.

595 EMRF, *NSW Electricity Distribution Revenue Reset, AER Draft Decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, A response*, February 2015, p. 71.

596 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 209.

That is, if the only value of theta is the market-wide value, then it is internally consistent to combine it with any estimate of the distribution rate. NERA agreed:[597]

> As theta should not vary from firm to firm, however, there should be no link between how one estimates theta and how one estimates the distribution rate.

Gray (for Frontier) considered this matter again in his June 2015 report (for Frontier) and stated:[598]

> In my view, 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.

The service providers submit that the distribution rate for listed equity is likely to be skewed by the practices of multinational firms with significant foreign earnings.[599]

However, for the reasons outlined above, we consider it is not clear that foreign income results in a higher imputation payout ratio. Lally's analysis actually implies the opposite.[600] Further, when determining the gamma value for the benchmark efficient entity, the benchmark has to be determined holistically and individual aspect of the benchmark should not be considered in isolation. We do not exclude the impact of the top 20 firms when determining the cost of equity (MRP historical, DGM and beta) and consider it would be inconsistent to exclude the top 20 firms when estimating the imputation distribution rate to be used for estimating a gamma value for listed equity.

NERA appears to agree with SFG that one should not consider the largest listed companies. It also considers "it is difficult to see there is a case for setting the distribution rate to be any different to the value … of 0.7".[601]

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597 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

598 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 28.

599 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 292; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 7-8; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 109; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-80; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 81; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 359; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 87; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 353; APNT, *Access Arrangement Revised Proposal to Draft Decision*, January 2016, p. 91; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206.

600 M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 26-29.

601 NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. 18.

Service providers have submitted that the appropriate distribution rate for both listed and all equity is 70 per cent consistent with the advice from Gray and NERA.[602] Service providers also consider that theta under the equity ownership approach should be determined with regard to only listed equity as listed equities foreign ownership is more reflective of the benchmark efficient entity. To summarise, service providers want to ignore firms with foreign income when estimating the distribution rate which reduces gamma and want to include firms with foreign ownership for the purposes of estimating the utilisation value which also reduces gamma.[603] We do not agree with this approach and considers it will not give a reasonable estimate of gamma for the benchmark efficient entity for the reasons outline above.

NERA's views and Gray's views (for SFG and Frontier) must be reconciled with the fact that different investors can value imputation credits differently. For instance, foreign investors do not value credits and eligible domestic investors do. Therefore, a given estimate of theta will reflect the set of investors over which it is calculated. Gray (for SFG) appears to recognise this elsewhere in his report:[604]

> If theta is estimated using a market value approach, the estimate will represent an average across all listed firms.

This is further illustrated in figure 4.1 and figure 4.2 submitted by a number of service providers, which indicate that SFG's dividend drop off estimate of theta reflects the proportion of foreign investors in listed equity.

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.

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602 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 288, 292; AusNet Services, 2016-20 Regulatory Proposal, April 2015, pp. 353-354; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, pp. 1–4; CitiPower, *Appendix J - Gamma*, April 2015, pp. 4–7; Powercor, Appendix J - Gamma, April 2015, pp. 4–7; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, pp. 6–8; SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 378; Energex, *Revised Regulatory Proposal*, July 2015, pp. 124–125; Ergon, *Revised Regulatory Proposal*, July 2015, p. 153; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, pp. 4-6; Australian Gas Networks, *Access Arrangement Information - Attachment 11.2 Value of Imputation Credits*, July 2015; pp. 3–6. Amadeus Gas Pipeline *Access Arrangement Revision Proposal Submission*, August 2015, p. 153; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 111; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-82; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 83; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 360-361; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 89; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 355; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 205-206.

603 ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 122; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-90; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 91; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 369; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 98; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 363.

604 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 216.

Accordingly, 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) and will give a gamma value for this subset of equity. The service providers, NERA and Gray (for SFG and Frontier) give us no cause to change this view. Handley also supported our view:[605]

> It is correct to say that theta is not firm-specific and the distribution rate is firm-specific. But I do not agree with the suggestion that there need be no link between how one estimates theta and how one estimates the distribution rate.
>
> We are interested in estimating the value of imputation credits to the market as a whole. In setting prices, investors in the market will take into account the quantity of credits expected to be distributed by all firms in the market. Since gamma is effectively defined as a price (theta) times a quantity (distribution rate) then in my opinion, it is obvious that both components should be based on consistent data sets which relate to the same market.

The regulated businesses submit that Lally considers that consistency between the distribution rate and utilisation value is not essential nor is it precluded.[606] In his latest report, Lally has updated his position to say that there is good reason for not matching.[607] While we acknowledge this, Lally considers that the distribution rate (for listed equity) should be estimated with reference to the top 20 listed firms and the utilisation value should be estimated with reference to all equity.[608] This implies that gamma is at least 0.5, which indicates our value of gamma may be too low.[609]

We also note that even if we were minded to do so, there is not necessarily a correct way to filter listed equity data to make it more reflective of the benchmark efficient entity (as the benchmark entity has a number of characteristics). While Gray (for SFG and Frontier) and NERA have proposed filtering based on a single characteristic (excluding the 20 largest listed firms) in a way that leads to a lower estimated distribution rate (and therefore a lower estimated value of imputation credits), they have not demonstrated their filtering method will lead to a better estimate of the distribution rate for the benchmark efficient entity. Further, advice that we have received for Lally suggest that the filtering is unnecessary and if anything the best estimate of the distribution rate is based on the financial data of the top 20 firms.[610] We note Lally's choice of the top 20 firms as a proxy for the estimate of the distribution rate for listed equity is not based on filtering listed equity based on the

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605 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 7–8.

606 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 25; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 205.

607 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 13, 24.

608 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 7.

609 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 29.

610 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 29.

characteristics of the benchmark efficient entity, although he does consider listed firms more relevant to the estimation of the distribution rate for the benchmark efficient entity.

Handley indicated that Gray's analysis was 'incomplete and oversimplified' to support the restriction proposed, and we consider that Gray's June 2015 report (for Frontier) and NERA's June 2015 report add nothing material to the discussion.

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, yet the service providers have not suggested an industry benchmark distribution rate. We also do not propose an industry benchmark for the reasons set out in the Guideline, although we note Lally's estimate of 0.83 for the broader listed equity market does not seem unreasonable.[611] However, we note the EMRF submitted that our assumed distribution rates are lower (and, therefore more favourable to service providers) than those relevant to a pure play energy network.[612]

A.10.2 The cumulative payout ratio approach

The cumulative payout ratio approach is applied as follows. It starts with the change in the total value of imputation credits in firms' franking account balances over a particular period of time. This reflects the cumulative additions and subtractions of imputation credits over that particular period of time. Then, subtracting this from total company tax paid over the same period of time produces an estimate of the imputation credits that have been distributed in total. This relies on the idea that every dollar of company tax paid generates an imputation credit, which can either be distributed or retained in franking account balances. Then, dividing this estimate by the value of company tax paid over the same time period produces an estimate of the distribution rate over this time.

A limitation of this approach is that factors other than the distribution of imputation credits can lead to a decrease in aggregate franking account balances.[613] However, we are unaware of the materiality of these factors. Moreover, as discussed in the next section:

- Hathaway and NERA each preferred this approach to an approach involving data on franked dividends, and
- an estimate of the distribution rate across only listed equity using this approach is broadly reinforced by evidence from the financial statements of the largest listed companies.

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611 AER, *Better regulation: Explanatory Statement Rate of Return Guideline,* December 2013, pp. 163–164.

612 EMRF, *NSW Electricity Distribution Revenue Reset, AER Draft Decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, A response*, February 2015, pp. 31–32.

613 The ATO website contains a list of events that cause a debit to a company's franking account balance: https://www.ato.gov.au/Business/Imputation/In-detail/Simplified-imputation---the-franking-account/?page=5#When_does_a_franking_debit_arise_. Accessed 9 April 2015. NERA identified that the bankruptcy of a company and the failure of a company to report its franking account balance can also cause the aggregate franking account balance to decrease: NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 5.

A.10.3 Alternative approaches

There are at least two alternative approaches to estimating the distribution rate:

- Hathaway and NERA each estimated a distribution rate of around 0.5 using ATO statistics on the franked dividends distributed by companies as reported in their tax returns.[614] However, neither advocated the use of this estimate. NERA considered:[615]

  > In our opinion, the cumulative payout ratio is the most reliable estimate that is least likely to be affected by potential distortions in the underlying data set.

- And Hathaway considered:[616]

  > As was explained in section 3, I have more faith in the [franking account balance] data than in the dividend data. The dividend data appears to be missing about $87.5 billion and the ATO has had substantial problems with the dividend data in the past.

Lally examined the financial statements of the 20 largest ASX-listed firms by market capitalisation, and found an aggregate distribution rate across these firms of 0.83.[617] We consider that this broadly reinforces the higher cumulative payout ratio estimate across only listed equity.

A.10.4 Hathaway (2014)

After the publication of the draft decisions in 2014, and deep into the process of preparing the final decision for JGN, we became aware of an updated analysis of the tax statistics by Hathaway dated October 2014.[618] This report updates the analysis to include tax data for the 2011–12 financial year, which were published by the ATO during 2014. Hathaway (2014) remains in draft form. Importantly, Hathaway (2014) appears to come to the opposite conclusion of his 2013 analysis regarding the FAB data:[619]

> …the FAB data indicate a *net* $337.4 billion of credits have been distributed and a *gross* $428 billion was distributed.
>
> This gross distribution seems highly improbable and is quite inconsistent with the recorded franking credit income. It represents a gross payout ratio of 88% of all company tax as franking credits for the period 2004-12. This is in stark contrast to the

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614 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 97; NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 11.

615 NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 11.

616 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 99.

617 M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 30; M. Lally, *Gamma and the ACT Decision*, May 2016, p. 26.

618 N. Hathaway, *Imputation credit redemption ATO data 1988–2012: Where have all the credits gone? (draft)*, October 2014.

619 N. Hathaway, *Imputation credit redemption ATO data 1988–2012: Where have all the credits gone? (draft)*, October 2014.

> gross 66% distribution recorded by the payment of franked dividends. We conclude that the FAB data are a concern.

To the extent that the new conclusions in Hathaway (2014) are well founded, the potential implication is that an estimate of the distribution rate using franked dividend data might be more appropriate (that is, around 0.5, or at least between 0.5 and 0.7). However, on first assessment, we are not convinced by Hathaway's main reason for concluding that the FAB data are a concern—the idea that they imply a gross distribution rate of 0.88 which is 'improbable' and much higher than the gross distribution rate implied by franked dividend data (0.66, which appears to be considered by Hathaway to be probable). This is because Lally's estimate of the gross distribution rate across the largest listed companies is 0.83, and therefore we do not consider that an estimate of 0.88 is necessarily improbable.

While we are aware of it, we do not place reliance on the conclusion in Hathaway (2014) regarding the FAB data in this final decision. This is because:

- We do not find Hathaway's reasoning for his conclusion convincing.
- This conclusion does not appear contingent on any new information provided by the release of the 2011–12 statistics. Therefore, this conclusion would appear to have been open to Hathaway, NERA and Handley previously, yet none of them came to it.

We also note the report is still marked draft nearly one year after initially being completed.

A.11 Application of rate of return criteria to evidence on the utilisation rate

Our main assessment of the various approaches to estimating the utilisation rate is set out in section **Error! Reference source not found.** of attachment 4, with supporting evidence rovided in this appendix. However, we have also considered these approaches and the evidence they employ against the criteria used to assess evidence on the allowed rate of return (table 4-15). Assessment against these criteria broadly supports our main assessment of the approaches.

Table 4-15 Application of rate of return criteria to evidence on the utilisation rate

Criteria[(a)]	Equity ownership approach	Tax statistics	Implied market value studies
Where applicable, reflective of economic and finance principles and market information. - Estimation methods and financial models are consistent with well accepted economic and finance principles and informed by sound empirical analysis and robust data.	Accords with Monkhouse framework and principle of investor rationality (e.g. eligible investors expected to utilise credits to which they are entitled). Analysis is straightforward and sound. Data is from credible source (ABS).	Market information on the amount of imputation credits utilised. Analysis is straightforward and sound. Data is from credible source (ATO), but some data concerns have been identified.	Mainly based on the principle that share prices reflect the present value of future dividends (and imputation credits) and 'no arbitrage'. Varying opinions on the soundness of analysis across studies. Underlying data is typically from credible sources (e.g. Bloomberg, ASX).
Fit for purpose. - The use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose. - Promote simple over complex approaches where appropriate.	ABS data used to estimate the domestic ownership share of Australian equity, which is consistent with its purpose. Approach is simple.	ATO statistics used to observe the reported amount of imputation credits utilised by investors, which is consistent with their purpose. Approach is simple.	Some studies undertaken for the specific purpose of estimating the utilisation rate for regulatory purposes. Results of some studies need to be interpreted carefully to be consistent with the regulatory framework. Studies can employ complex and sometimes problematic estimation methodologies.
Implemented in accordance with good practice. - Supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Transparent and replicable using published data. Some knowledge of ABS classifications required.	Transparent and replicable using published data, although detailed knowledge of tax return labels required. Some data concerns have been identified.	Less transparent and replicable, as econometrics knowledge required and data not always publicly or freely available.
Where market data and other information is used, this information is: credible and verifiable; comparable and timely; and clearly sourced.	ABS is a credible source. Relevant statistics are published online on a quarterly basis.	ATO is a credible source. Relevant statistics are published online on an annual basis, with a two-year lag (e.g. 2011–12 statistics published in 2014). Some data concerns have been identified.	Underlying data typically from credible sources (e.g. Bloomberg, ASX) and is produced on a timely basis. Data not always publicly or freely available. Use of econometrics makes the results difficult and complex to verify.
Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	Reflects current ownership of Australian equities. However, might not reflect any tax law changes that reduce eligible investors' utilisation rates below 1.	Reflects conditions up to two years ago.	Reflects current conditions to the extent that recent data is used. Different studies span various time periods.

Source: AER analysis.

(a): The criteria relating specifically to return on equity and return on debt quantitative models are excluded because they are not applicable.

A.12 The equity ownership approach

Recalling that eligible investors have a utilisation rate of 1 and ineligible investors have a utilisation rate of 0, we consider that the value-weighted proportion of domestic investors in the Australian equity market is a reasonable estimate of the utilisation rate. This is because, in general, domestic investors are eligible to utilise imputation credits and foreign investors are not. We refer to this approach as the 'equity ownership approach', and we use data from the National Accounts to estimate the domestic ownership share.[620]

Our views on the equity ownership approach to estimating the utilisation rate are set out in section **Error! Reference source not found.** of attachment 4. In this section, we rovide further detail on our application of the approach. We also compare our assessment of the approach in this final decision with our assessment in the Guideline.

We place significant reliance on the equity ownership approach for the reasons set out in section **Error! Reference source not found.** of attachment 4. We have regard also o the limitations of this approach, but we do not consider them significant:

- The approach does not take into account the effect of the 45-day holding rule (or any other rules that can affect the eligibility of domestic investors to claim imputation credits). However, as discussed in section A.8.3, we do not consider that there is clear evidence as to effect that these rules have or should be expected to have. Moreover, we consider that the most relevant evidence on the effect of these rules suggest that they have a negligible effect.
- The approach allows investors' utilisation rates to be weighted by wealth, but not by risk aversion, as required by the definition of the utilisation rate in the Monkhouse framework. However, we do not consider that we can feasibly weight our estimates in this regard, as this would require specific calculations or assumptions regarding the portfolios and risk preferences of individuals or classes of investors. Moreover, neither Handley nor Lally identified the inability to weight by risk aversion as an unacceptable limitation of the approach.[621]

Lally considers the utilisation value is a weighted average over the utilisation rates for investors, equal to 1 for those who are eligible to use the credits and zero otherwise.[622] This is consistent with our equity ownership approach.[623]

We consider that a reasonable estimate for the utilisation rate from the equity ownership approach is between:

- 0.56 and 0.68, if all equity is considered, and

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620 Specifically, we use data from Australian National Accounts: Finance and Wealth (ABS cat. 5232.0).

621 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 24–25; M. Lally, *The estimation of gamma*, 23 November 2013, pp. 11–12.

622 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 16.

623 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 16.

- 0.38 and 0.55, if only listed equity is considered.

In the Guideline, we considered that the equity ownership approach supported a utilisation rate between 0.7 and 0.8. This range was based on:

- A 2007 feature article by the ABS, in which it was estimated using data from the National Accounts that domestic investors held 71 per cent of Australian equity.[624]
- A graph in a September 2013 report by Hathaway, which suggested that the domestic ownership share of Australian equity had fluctuated between 75 and 81 per cent over the period 1988 to 2012.[625] The data underlying this graph also came from the National Accounts.

Since the Guideline's publication, we have examined more closely the relevant data from the National Accounts. This has allowed us to update and refine our estimates. Moreover, we now express estimates for both all equity and only listed equity, consistent with the approach set out in section A.9 and A.10.

We consider that the equity ownership approach can be refined by filtering the National Accounts data to focus on the types of equity that we consider most relevant to the benchmark entity, and the specific classes of investor that are expected to either utilise or waste the imputation credits they receive. That is, we can:

- 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'.
- Calculate the equity held by those classes of investor that are eligible to utilise imputation credits as a share of the equity held by all classes of investor that either utilise or waste credits. In the National Accounts, this is calculated as the equity held by 'households', 'pension funds' and 'life insurance corporations' as a share of the equity held by these classes plus 'rest of world'. 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 final decision, consistent with the approach we took for the decisions we released in 2015 (October and November) and 2016 (May and September), we exclude government-held equity from the calculation of the refined domestic ownership share. This is because the value of imputation credits forms part of our determination of the rate of return required by private investors in the benchmark

[624] Australian Bureau of Statistics, *Feature article: Foreign ownership of equity*, September 2007. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5302.0Feature%20Article10Sep%202007?opendocument&tabname=Summary&prodno=5302.0&issue=Sep%202007&num=&view. Accessed 9 April 2015.

[625] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, figure 5.

efficient entity.[626] In doing this we are estimating market-wide utilisation rates (for both listed and all equity) reflective of the capital invested by private investors. We do not consider this is inconsistent with other parameter estimates used for estimating the WACC and consider this will lead to an overall return that should lead to efficient investment in regulated assets.

The service providers have submitted that our refinement of the data may not be complete as it is limited by the coarseness of the data and that there are a number of concerns with the quality of the data as documented by the ABS.[627] Further, Frontier considers that if the redemption rate is to be estimated as a market-wide parameter, then all of the credits in the market should be considered and not just a subset of the market.[628] Frontier considers the AER's equity ownership rate is neither a market wide nor a firm specific estimate.[629]

First, we do not consider that the data limitations that may exist in all datasets is a valid reason not to refine data. We consider there are valid reasons to refine the ABS data. Second, it should be noted that our approach to removing the government sector is conservative. Alternatively, we could have assumed the government sector has a utilisation value of 1 given this equity is Australian owned.

Further, we do not consider the refinement of the ABS data is what drives the difference between the equity ownership approach and taxation statistics. We consider the difference is primarily driven by data issues with taxation statics and other issues. This is further discussed in section A.14.

Our estimate ranges in this final decision differ from the corresponding ranges in the draft decisions released in 2014. These changes in part reflect the views of service providers, Gray (for SFG) and Handley. We discuss our consideration of these views below.

A number of service providers have submitted that we erred in our earlier decisions because:[630]

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626 If governments are assumed to waste the credits they receive, the equity ownership approach supports an estimate of the utilisation rate of between 0.54 and 0.65 if all equity is considered, and between 0.38 and 0.54 if only listed equity is considered.

627 Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 7.

628 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 16.

629 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 16.

630 ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015, pp. 485–486; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 1; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 1; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 1; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 1; and JGN, *Gamma - response to the draft decision*, February 2015, p. 1; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 1: Energex, *Revised Regulatory Proposal*, July 2015, p. 13; Powercor, *Regulatory Proposal 2016–20*, April 2015, p. 249; CitiPower, *Regulatory Proposal*, April 2015, p. 241; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, pp. 367–368; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, pp. 19–20.

> …the ranges used by the AER for the equity ownership rate are inconsistent with the evidence in the Draft Decision.

The service providers then referred to the data presented in the draft decisions released in 2014 on the refined domestic ownership share (figures 4.4 and 4.5 of the draft decisions). However, as indicated in the draft decisions, our estimates were based on evidence across both the refined domestic ownership share (figures 4.4 and 4.5 of the draft decisions) and simple domestic ownership share (figures 4.2 and 4.3 of the draft decisions).

In his recent advice, Handley advised that, although it is reasonable to rely on both the simple and refined domestic ownership share, 'the refined share should (subject to the limitations in the data) be more relevant by construction'.[631] Accordingly, as we did in the decisions released in 2015 (April, June, October and November) and 2016 (May, July and September), in this final decision we rely only on the refined domestic ownership share.

Service providers have also submitted that only the most recent point estimates of the equity ownership share are relevant.[632] Frontier, also considers that the prevailing rate for equity ownership should be used.[633]

However, we disagree. Given that the series exhibits considerable volatility, we think it is reasonable to not rely solely on the most recent point estimate. Handley supported this view:[634]

> Referring to the refined data, it is apparent that there is substantial volatility in the reported ABS estimates over time. There are also residual issues with the ABS data. This suggests that more than just the most recent estimates should be taken into consideration, although the length of period to be considered is open to judgment.

Frontier, considers that there is insufficient support for the upper bound of the range for listed equity (0.6) and for all equity (0.7) for the equity ownership approach ranges we

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631 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 12.

632 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 304-305; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 18; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 121, 123; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-90, 7-91; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 91, 92; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 368, 370; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 98, 99; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 362, 364; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 210.

633 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, pp. 13-15.

634 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 13.

adopted.[635] However, as outlined in Figure 4.3, the upper estimate of the range we relied upon is 0.55 for listed equity and 0.68 for all equity.

In determining whether to use the current value of equity ownership or a historical average, Lally considers that it depends on whether the series is following a random walk or mean reversion.[636] Lally does not concluded whether the series is mean reverting or not and states the current observation are not unusually high or low. He suggests that even if the series are mean reverting, a reasonable point estimate for the next five years would still be approximately the latest values.[637] We note that Lally uses the current equity ownership rate of all equity to estimate an utilisation value of at least 0.6. In contrast we assess the utilisation value for all equity using the lowest point of the range over the last 15 years. As a result, for the equity ownership approach for all equity our approach of using a value towards the bottom end of the range is conservative relative to Lally's use of a value of around the current estimate.

On Handley's point regarding the length of period to considered, we agree with Gray's view (for SFG) that:[638]

> It is not clear why estimates of what the domestic equity ownership proportion was in the 1980s are relevant to the current determination for the forthcoming regulatory period.

We consider that the most relevant period to consider is that since July 2000, when eligible investors became entitled for a refund of excess credits. This accords with one of the periods Handley considered relevant.[639] It is also consistent with the service providers' proposed estimation of the value of distributed credits via SFG's dividend drop off study. This study employs data from July 2001 to October 2012.

The service providers submit that the July 2000 start date is arbitrary and that more recent events such as the GFC could provide a more appropriate start date.[640] However, the AER considers that the service provider have not provided any evidence why the GFC would result in a structural change in the value of imputation credits. The AER considers that the 2000 tax law change is a structural change and would be expected to increase the value of imputation credits to investors. The same cannot be said about the GFC where the impact on imputation credits is unclear.

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635 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, pp. 13-15.

636 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 17.

637 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 17.

638 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 147(a).

639 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 16.

640 Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 18; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 123; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-91; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 92; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 370; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 99; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 364.

Gray (for Frontier) submitted that we are incorrect to exclude from the equity ownership calculation entities that are wholly owned by the public sector and to the extent we exclude them theta will be upward biased.[641] We disagree for the reasons stated above as set out in our April and June 2015 decisions. We consider that the Vanilla WACC framework as embedded in the rules is aimed at ensuring private investors are fairly compensated. This should ensure efficient investment and use of regulated network infrastructure. We consider an estimate of gamma reduced due to government entities being assumed to not redeem credits is not appropriate.

The Ausgrid Tribunal in its decision handed down on 26 February 2016 found that the equity ownership approach overstates the redemption rates and would only be useful as a further check on other estimates.[642] In this decision the Ausgrid Tribunal also indicated that since the equity ownership approach utilisation value is higher than the estimation of the redemption rate from tax statistics this implies that there are investors who we assume are eligible to redeem imputation credits but, for whatever reasons, either cannot redeem them or attribute so little value to the credits that they do not redeem them.[643] We have carefully considered the Ausgrid Tribunal reasoning and remain of the view that the equity ownership approach based estimate can be used as a point estimate for the utilisation value. Lally supports this view by noting the equity ownership approach is not an upper bound on the utilisation value but an unbiased estimate.[644]

The Ausgrid Tribunal found that we are effectively redefining the utilisation value as the proportion of distributed imputation credits available for redemption, and this is inconsistent with the concept of gamma in the Officer Framework for the WACC.[645] As set out in sections A.5, A.6 and A.7, we consider our approach is consistent with the post-tax Officer Framework for the WACC. We consider the face value of imputation credits is the post-company pre-personal tax value of imputation credits distributed to eligible investors and reflects the cost of these imputation credits to the regulated businesses. The face value of imputation credits distributed to eligible investors also reflects the post-company pre-personal tax value of distributed imputation credits to these equity investors.

With regard to these considerations, the relevant data is shown in figure 4.3.

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641 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 31–32; Frontier, The appropriate use of tax statistics when estimating gamma, January 2016, p. 7.

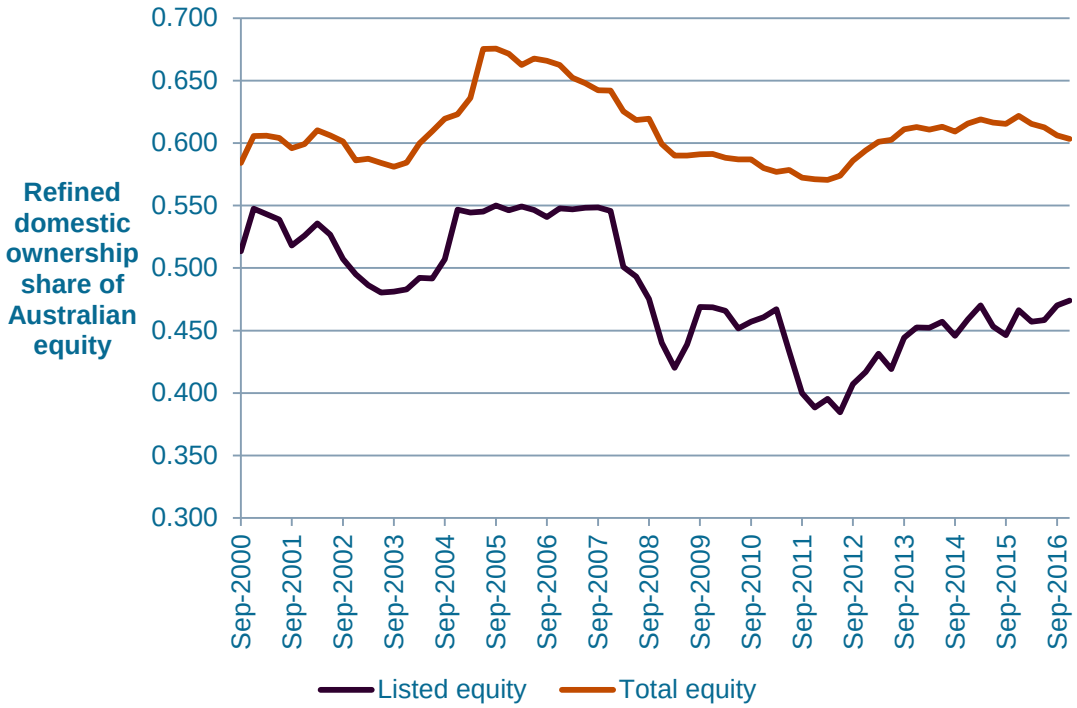
642 United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1093.

643 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1090.

644 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 16.

645 United Energy, *Submission on AER preliminary determination - Submission on gamma*, 26 April 2016; Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1100.

Figure 4.3 Refined domestic ownership share of Australian equity



Source: Australian National Accounts: Finance and Wealth (ABS cat. 5232.0), tables 47 and 48.

Figure 4.3 indicates that the refined domestic ownership share of total equity has ranged from 0.56 to 0.68 over the relevant period, while the refined domestic ownership share of only listed equity has ranged from 0.38 to 0.55.

A.13 Tax statistics

The ATO publishes aggregate statistics on the tax returns submitted by individuals, superannuation funds and companies, as well as on the imputation credits refunded to certain income tax exempt entities (for example, charities).[646] These statistics can be used to derive a measure of the total amount of imputation credits utilised by eligible investors to offset tax or to be refunded. As discussed in relation to the distribution rate, ATO statistics also provide estimates of the amount of imputation credits distributed. We consider that the reported value of credits utilised divided by the reported value of credits distributed is a reasonable estimate of the utilisation rate.

Our position on the use of tax statistics to estimate the utilisation rate is set out in section **Error! Reference source not found.** of attachment 4. In this section, we xplain how our position has changed compared to that in the Guideline.

[646] These statistics are available at: https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/. Accessed 9 April 2015.

In the Guideline, we considered that tax statistics supported a utilisation rate between 0.4 and 0.8. This was based on:

- A 2013 report by Hathaway, which sought to estimate the proportion of distributed credits that have been utilised. This report produced two estimates for the period 2004 to 2011: 0.43 and 0.61. The two estimates reflect two alternative measures of the value of credits distributed, which in turn imply two alternative estimates of the distribution rate (as discussed in section A.10). The 0.43 and 0.61 estimates of the utilisation rate correspond to estimates of the distribution rate of around 0.7 and 0.5 respectively.[647]
- A 2004 paper by Handley and Maheswaran, which sought to estimate the proportion of distributed credits that were used to reduce investors' tax liabilities. This paper produced an estimate for the period 2001 to 2004 of 0.81.

Since the Guideline we have continued to examine this evidence. We now consider that greater reliance should be placed upon estimates that are:

- derived from post-2004 data, consistent with Hathaway's findings that the ATO statistics are subject to a number of issues prior to 2004,[648] and
- consistent with our preferred estimates of the distribution rate estimated using cumulative distribution rate data. However, we note this consistency principle does not preclude the combination of a utilisation rate estimated based on this principle with a higher estimate of the distribution rate for the benchmark efficient entity based on Lally's latest advice.

Applying these considerations, in our prior decisions, we did not rely on:

- Handley and Maheswaran's estimate of 0.81, because this is (predominantly) derived from pre-2004 data.
- Hathaway's estimate of 0.61, because this corresponds to an estimate of the distribution rate of around 0.5 whereas we adopt an estimate of the distribution rate over all equity of 0.7. We note this does not apply to Lally's latest analysis, as he determines the distribution rate from annual reports and not tax statistics. Lally considers that the difference between the two Hathaway's utilisation rate estimates demonstrates the unreliability of tax statistics data.[649]

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[647] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013. 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, we round 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.

[648] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

[649] M. Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

NERA updated analysis of the ATO data to the 2012 tax year and found an estimated utilisation rate of 0.45.[650] This analysis was subsequently updated by Frontier to the 2013 tax year which found an estimated utilisation rate of 0.46.[651] We further updated the estimate using tax statistics to the 2014 tax year and found a utilisation value of 0.48.

As discussed in section A.10, for this decision we place no reliance on Hathaway's new report and therefore it does not change our conclusions regarding the utilisation rate indicated by tax statistics.

The Ausgrid Tribunal considers that tax statistics can only provide an upper bound on the estimate of theta.[652] Frontier, also consider redemption rates are at best an upper bound for theta if theta is defined as the value of imputation credits.[653] We remain of the view that tax statistics can be used as a point estimate for the utilisation value (see section 4.4.1 and our reasoning below). We consider tax statistics produce estimates of the utilisation rate. These estimates are uncertain and dependent on the quality of the underlying data (which is an issue for tax statistics, as shown in section 4.4.1). As such, the true (unknown) value could be higher or lower. We consider this cannot constitute an upper bound for the true utilisation rate. Having considered all the information before us, we remain of the view that tax statistics do not provide an upper bound for the utilisation rate, but rather an unreliable estimate. We note the SAPN Tribunal decision supports this view[654]

Lally considers that the correctly measured tax statistics provides an upward biased estimate for the utilisation value.[655] This is because local investors tilt their shareholding to stocks with higher imputation credit yields. However, Lally considers our estimate of 0.45 (updated to 0.48 in this decision) is not an upper bound as tax statistics are unreliable and we use the lower of two possible tax statistics estimates for the utilisation rate.[656]

Further, Lally notes that the Ausgrid Tribunal considered tax statistics produce an upper bound estimate on utilisation value, due to time delays, administrative costs in

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650 NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

651 Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 31–32; Frontier, *The appropriate use of tax statistics when estimating gamma*, January 2016, p. 31.

652 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1048, 1090 and 1095.

653 Frontier, *Regulatory estimation of gamma report prepared form Powerlink*, January 2016, p. 10; Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, p. 3.

654 Australian Competition Tribunal, *Application by SA Power Networks [2016] ACompT 11*, 28 October 2016, para. 193.

655 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 20; M. Lally, *Issues in the estimation of gamma*, April 2017, p. 24.

656 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

distributing the credits, portfolio effects, and the effect of the 45 day rule.[657] Lally considers the Ausgrid Tribunal based this on the belief that the utilisation value is a market value and the fact that these phenomena would depress the market value of the credits.[658] However, Lally considers that the utilisation value is not a market value, rather it is a weighted-average of investors' utilisation rates for imputation credits, and this alone undermines the Ausgrid Tribunal's reasoning.[659] Furthermore, Lally considers that the inability to estimate the redemption rate from ATO data would also preclude any such estimate being an upper bound on theta, although noting that if anything the ATO data would be biased up.[660]

Ultimately, as set out above, we consider any uncertain estimate is not an upper bound. Given the uncertainty associated with the utilisation rate estimate, we also do not consider the tax statistics would be inconsistent with a higher estimate of gamma than 0.4 for the benchmark efficient entity. In particular, we note an estimate of gamma of approximately 0.4 is obtained when combining a utilisation rate of 0.48 (consistent with FAB data) with Lally's preferred estimate of the distribution rate for a benchmark efficient entity of 0.83.[661]

Given the concerns with tax statistics data, we consider the equity ownership approach provides the best point estimate for the utilisation value currently available. This is due to the value of imputation credits being equal to face value on a post-company pre-personal tax and pre-personal cost basis. Given the 45 day holding rule should not be having a material impact on the utilisation of imputation credits (see section A.8.3), we consider the proportion of local investor in the equity markets is a reasonable point estimate of the utilisation value.

Frontier considers that gamma can be measured reliably from tax statistics as the ratio of credits redeemed and credits created.[662] It submits that the credits distributed data is the unreliable data in the tax statistics and this data is not required to determine gamma directly.[663] This data is only required when the gamma statistic is separated into two components, theta and distribution rate. Frontier considers that the gamma estimate from tax statistic is at best an upper bound for gamma.[664]

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657 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13, 24*;* Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, paras. 1066, 1093, 1095.

658 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13.

659 M. Lally, Issues in the estimation of gamma, April 2017, pp. 13, 24.

660 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 13, 24.

661 Lally, *Gamma and the ACT Decision*, May 2016, p. 5.

662 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 3-4, 12-15*;* AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 210.

663 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 3-4, 14-15.

664 Frontier Economics, *Issues in the estimation of gamma, Report prepared for AGN, Multinet Gas, AusNet Transmission and AusNet Gas,* September 2016, pp. 3-4.

However, we do not agree that tax statistics are reliable to estimate any parameter concerned with franking credits. This is supported by Neville Hathaway, who considers that caution should be exercised when using ATO statistics.

> Until the reconciliation has occurred or it can be explained to me how to account for those credits, I urge all caution in using ATO statistics for any estimates of parameters concerned with franking credits.[665]

We recognise Hathaway's comment that the tax data of the ATO is the most likely to be accurate as after all what other tax data is there but tax collection by the ATO. However, we also note Hathaway's statement in regards to estimating gamma directly [emphasis added]:

> This overall approach is reasonable as the tax statistics are **unlikely to be in major error** for the amount of tax paid and the amount of tax credits claimed.[666]

Stating that a data set is unlikely to be in major error is not equivalent to saying that the data is reliable.

Further, we note that Hathaway states that the only reliable estimate that can be obtained from the taxation statistics is the access fraction (imputation distribution rate), which is obtained from FAB data.[667] Hathaway considers there are too many unreconciled problems with the ATO data for reliable estimate to be made about the utilisation of franking credits.[668] Consistent with Hathaway's statement of conclusions we consider caution should be exercised with using ATO statistics to estimate any parameters concerned with franking credit which include gamma, distribution rate and utilisation value.

Lally also has concerns with Frontier's argument that tax statistics produce a reliable estimate for gamma, such as:

- The Officer model requires an estimate of the utilisation value to determine the MRP. Given the data reliability issues tax statistics cannot produce a reliable estimate of the utilisation value. [669]
- Using tax statistics to directly estimate gamma requires all equity data to be used for both the distribution rate and the utilisation value. However, Lally considers there is no necessity to do so and good reason for not doing so. Lally considers

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665 Hathaway, *Imputation Credit Redemption ATO data 1988-2011 Where have all the credits gone,* September 2013, p. 5.

666 Hathaway, *Imputation Credit Redemption ATO data 1988-2011 Where have all the credits gone,* September 2013, p. 39.

667 Hathaway, *Imputation Credit Redemption ATO data 1988-2011 Where have all the credits gone,* September 2013, p. 39.

668 Hathaway, *Imputation Credit Redemption ATO data 1988-2011 Where have all the credits gone,* September 2013, p. 39.

669 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 13, 24.

that the distribution rate should be determined by listed equity only and the utilisation rate should be set with reference to all equity.[670]

- Whilst the problems in the ATO may be limited to credits distributed (because the data offers two conflicting estimates of that quantity, from dividend data and FAB data), the credibility of the entire ATO database is damaged by both the conflicting estimates of the credit distribution rate and the inability of the ATO to identify the source of that conflict.[671]

Finally, we note that even if the taxation data did produce a reasonable estimate of gamma (across the economy), something we do not consider it does based on expert advice, it is not necessarily the correct value for gamma for the benchmark efficient entity. This is because the distribution rate is not market wide.

In comparison to tax statistics market studies do not provide as appropriate an estimate of the utilisation value as they are determined by the marginal investor and the not aggregate investors. As a result, we consider market studies do not provide as good an estimate of the value of distributed imputation credits as estimates from the equity ownership approach and tax statistics. Market studies are also influenced by differential personal tax and personal cost factors and do not reflect a post-company pre-personal tax rate of imputation credits under our post-tax framework (see section A.15.3). For these reasons we provide them relatively less weight.

A.14 Difference between equity ownership approach and tax statistics

In its decisions, the Ausgrid Tribunal considered it is apparent there are investors who the AER assumes are eligible to redeem imputation credits but, for whatever reasons, either cannot redeem them or attribute so little value to the credits that they do not utilise them.[672] This is due to the equity ownership approach indicating the utilisation rate is above the estimate specified through tax statistics. Further, the Ausgrid Tribunal considered the value of the utilisation value produced by taxation statistics is evidence that Australian investors do not value imputation credits at their face value, because they may be unable to use them.[673]

We have considered the Ausgrid Tribunal's reasoning and consider there is no reason to expect that the equity ownership approach and the taxation statistics should result in the same utilisation value. We do not consider the difference is likely to be driven either by the 45 day holding rule or by investors valuing imputation credits at less than face value because they may be unable to use them. We consider the difference between

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670 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 13, 24.

671 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 13, 24.

672 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1090.

673 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.

the equity ownership approach and tax statistics is likely driven primarily by data issues associated with the tax statistics. The data issues with tax statistics was recognised by the Ausgrid Tribunal.[674] Lally supports this view by noting that the most obvious explanation for the difference between the equity ownership and tax statistics is explained by our tax statistics estimate being too low.[675] Although, we note that an estimate of gamma of approximately 0.4 is be obtained when combining a utilisation rate of 0.48 (consistent with tax statistics, FAB data) with Lally's preferred estimate of the distribution rate for a benchmark efficient entity of 0.83.[676]

Further, we note there is no compelling evidence before us that the 45 day rule is having a material impact, or that investors are valuing imputation credits at less than their face value because they may be unable to use them. As noted earlier, the estimate from tax statistics that we rely upon is not an upper bound on the utilisation value. [677]

Finally we note that even if the data was highly reliable, the equity ownership approach and taxation statistics are a slightly different measures based on different data sets and methodologies. Therefore, there should be no expectation that both measures should yield exactly the same estimates of the utilisation value. We consider both measure are relevant in determining gamma. However, we place more reliance on the equity ownership approach given they are conceptually more correct (see section A.12) and there are data issues associated with tax statistics. The Ausgrid Tribunal itself has acknowledged these data issues in its latest decision.[678] In light of the Ausgrid Tribunals acknowledgement of the data issues, we consider taxation statistics cannot be used to infer the upper bound for theta (see section A.13). Moreover, having regard to the potential data limitations and alternate estimates, we consider the evidence from tax statistics is not inconsistent with the evidence from the equity ownership approach.

The variability in the annual tax statistics and quarterly equity ownership data is evident in Figure 4.4 below. Historically the equity ownership data was higher than the redemption data from tax statistics, but this has changed recently. In 2013 tax statistics redemption rates were higher than the proportion of all equity held locally. While we do not consider that prevailing quarterly or annual data should be used to determine gamma due to volatility in the data, we note that current estimates from both approaches currently support a gamma estimate of at least 0.40.

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674 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.

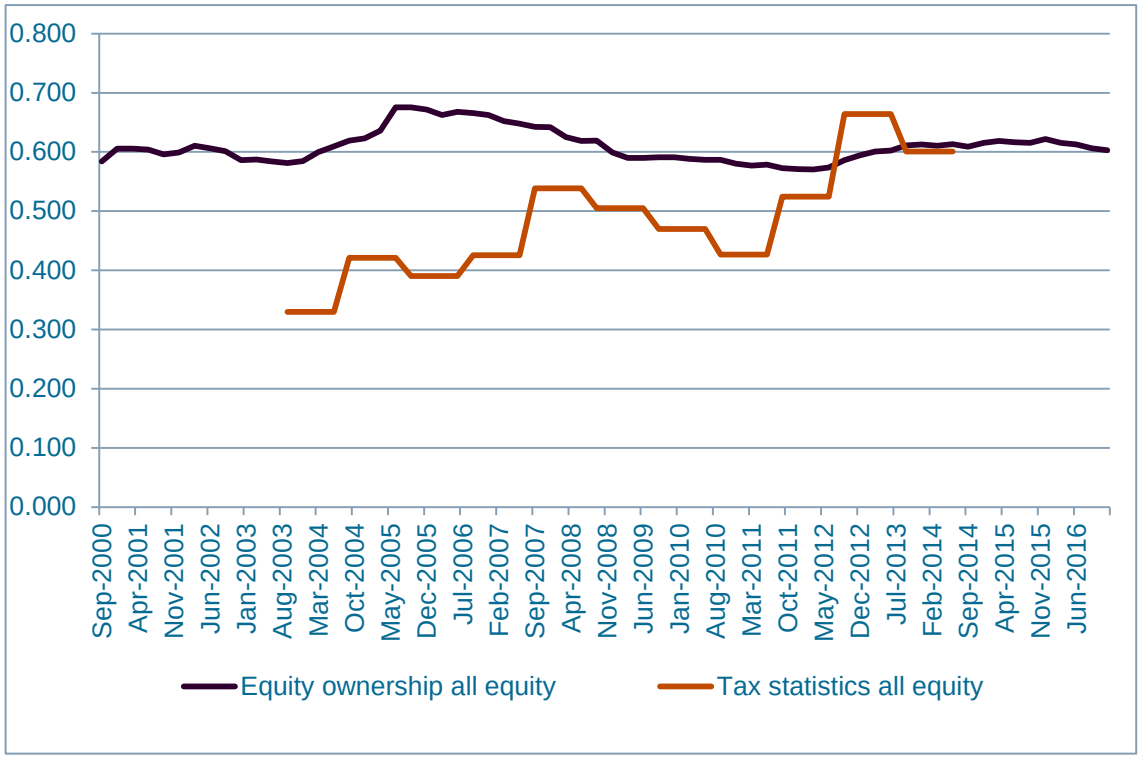
675 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 21.

676 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 5; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 27, 29.

677 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 20.

678 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.

Figure 4.4 Variability in tax statistics and equity ownership



A.15 Implied market value studies

Implied market value studies seek to infer from market prices the value of distributed imputation credits. Our position on the use of implied market value studies to estimate the utilisation rate is set out in section **Error! Reference source not found.** of ttachment 4.

This section sets out further evidence which supports our position on the use of implied market value studies to estimate the utilisation rate. It describes the types of study available, and estimates from these studies. As we discuss in section **Error! eference source not found.** of attachment 4, the level of reliance we place on implied market value studies reflects the limitations of these studies. We discuss the limitations of the most common type of implied market value study, dividend drop off studies, in sections A.15.5.

A.15.1 Types of implied market value studies

In this section, we describe the key characteristics of dividend drop off studies and other implied market value studies.

Dividend drop off studies

Dividend drop off studies are the most common type of implied market value study. These studies involve comparing share prices between:

- the cum-dividend date—the last day on which investors owning shares will be eligible to receive dividends and the attached imputation credits, and
- the ex-dividend date—the first day on which investors owning shares will not be eligible to receive dividends and attached imputation credits.

That is, an investor that buys a share on the cum-dividend date will be eligible to receive a dividend from that company. An investor who buys a share on the ex-dividend date will not. The difference in these prices should therefore reflect investors' valuation of the combined package of dividends and imputation credits, all other things being equal. Dividend drop off studies often will report this as a dividend drop off ratio. This is the reduction in the share price as a proportion of the face value of dividends paid out.

Table 4-16 identifies the dividend drop off studies that we are aware of, and describes the methodology of each study. The results from these studies are presented in table 4-19.

Table 4-16 Summary of available dividend drop off studies

Authors	Data range	Assessment relative to other studies in that class
Dividend drop off study – Compare share prices before and after dividend events (with and without imputation credits).		
Frontier (2016)[679]	2001-2016	Updates SFG (2011) – same author, longer data series.
Vo et al (2013)[680]	2001-2012	Builds on SFG (2011), includes additional econometric permutations and sensitivity analysis.
SFG (2013a)[681]	2001-2012	Updates SFG (2011) – same author, longer data series.
SFG (2011)[682]	2001-2010	Study commissioned by the Australian Competition Tribunal.
Minney (2010)[683]	2001–2009	Partitions by firm size; sub-periods 2001–2005 and 2006–2009.
Beggs and Skeels (2006)[684]	1986-2004	Key study in the AER's 2009 review of rate of return parameters. Data calculated yearly.
Hathaway and Officer (2004)[685]	1986-2004	Study partitions by firm size, dividend yield level.

679 Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and Transgrid*, September 2016.

680 D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

681 SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

682 SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7,* 21 March 2011.

683 A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, pp. 29–34.

684 D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, pp. 239–252.

685 N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004.

Authors	Data range	Assessment relative to other studies in that class
Bellamy and Gray (2004)[686]	1995-2002	Several regression forms and sample selections. Partitions by size and time period (pre and post 45-day holding rule). Use of simulation to inform regression equation.
Bruckner et al (1994)[687]	1987-1993	Early study with limited data; sub-periods 1987–1990 and 1991–1993.
Brown and Clarke (1993)[688]	1973–1991	Compares dividend drop off before and after imputation; presents yearly figures and sub-periods.

Source: As specified in table.

Alternative implied market value studies

Besides dividend drop off studies, there are alternative market-based implied valuation approaches to estimating the utilisation rate. Generally, these studies are based on similar arbitrage principles to dividend drop off studies. This means they compare two security prices where one security includes the entitlement and one security excludes the entitlement. They then assume the difference reflects the market valuation of the entitlement. However, they are designed to avoid the other influences in the data that affect traditional dividend drop off analysis. In particular, these studies typically use simultaneous price differentials that make them less affected by general market movements. That is, the differentials should more accurately reflect the implied market value of the specific dividend event. Some examples of alternative market-based valuation approaches involve:

- Simultaneous trading of shares with and without entitlements.
- Simultaneous trading of derivatives and futures and of their underlying shares.
- Hybrid securities which trade with imputation credits.
- Comparison of the capital gains and (cash) dividend returns across time.

Table 4-17 identifies the alternative implied market value studies that we are aware of, and describes the methodology of each study. The results from these studies are presented in Table 4-20.

686 D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004.

687 P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994.

688 P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, pp. 1–40.

Table 4-17 Summary of alternative implied market value studies

Authors	Data range	Assessment relative to other studies in that class
Dividend drop off using hybrids – Similar to standard DDO but using debt/equity hybrid securities.		
Feuerherdt et al (2010)[689]	1995–2002	Uses hybrid securities (such as convertible preference shares), 165 ex-dividend events for 46 securities which are primarily fully franked.
Futures study (using individual firms or index) – Compare simultaneous prices for securities and futures contracts.		
SFG (2013b)[690]	2000–2013	Updates Cannavan et al (2004). Compares matched trades in individual shares to futures contracts and low exercise price options for 98 firms (over 52,000 trades).
Cannavan et al (2004)[691]	1994–1999	Uses matched trades (four minute window) in individual shares and futures contracts for 19 firms (over 14,000 trades). Sub-periods 1994–1997 and 1997–1999.
Cummings and Frino (2008)[692]	2002-2005	Uses entire ASX200 index (rather than specific firms) and futures over the index, distinct from other studies in this class (which use individual shares).
Rate of return study – Compare past returns (capital gains and cash dividends) or future returns (dividend forecasts).		
NERA (2013b)[693]	1987–2012	Updates the Lajbcygier and Wheatley paper; same author and more relevant data set. Sub-period splits 1987–2000 and 2000–2012.
Lajbcygier and Wheatley (2012)[694]	1987–2009	Compares current prices to past returns from capital gains and dividends. Includes sub-periods from 1987–2000 and 2000-2009.
Siau et al (2013)[695]	1996–2011	Compares current prices to expected future returns. Uses ASX300 index firms and consensus analyst dividend forecasts.
Siau et al (2015)[696]	1996-2011	Journal published version of the 2013 paper by Siau et al with relatively minor editorial changes
NERA (2015)[697]	1987-2013	Updates the results of the Lajbcygier and Wheatley and NERA (2013) studies.

689 C. Feuerherdt, S. Gray and J. Hall, 'The value of imputation tax credits on Australian hybrid securities', *International review of finance,* vol. 10(3), 2010, pp. 365–401.

690 SFG, *Using market data to estimate the equilibrium value of distributed imputation tax credits, Report for the Energy Networks Association*, 3 October 2013.

691 D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, pp. 167–197.

692 J. Cummings and A. Frino, 'Tax effects on the pricing of Australian stock index futures', *Australian journal of management*, vol. 33(2), December 2008, pp. 391–406.

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

694 P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, pp. 476–494.

695 K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013.

696 K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *Accounting and Finance,* Vol. 55, 2015, pp. 241–277.

697 NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015.

Authors	Data range	Assessment relative to other studies in that class
Simultaneous share trades – Compare simultaneous prices for shares that are/are not entitled to imputation credits.		
Chu and Partington (2008)[698]	1996	Uses shares trading in two forms (one with dividend, one without) as a result of the CRA bonus issue. 154 matched trades (one minute window) across 3 months.
Chu and Partington (2001)[699]	1991–1999	Uses shares trading simultaneously with and without dividend after certain rights issues - 3,356 trades (matched within a minute) from 26 rights issues for 23 firms.
Walker and Partington (1999)[700]	1995–1997	Looks at shares trading cum-dividend in the ex-dividend period. 1,015 data points (trades matched within a minute) for 93 ex-dividend events from 50 securities.

Source: As specified in table.

A.15.2 Estimates from implied market value studies

This section presents the results from the available implied market value studies.

Table 4-19 reports estimates of the utilisation rate from the set of available dividend drop off studies. As a high level summary table, it attempts to report the single utilisation rate preferred by the authors for the scenario most relevant to our rate of return framework. The service providers consider the AER does not have regard to the estimation period for the market value studies and in particular to whether the analysis is based on pre or post 2000.[701] This is not true as seen in table 4.10 where the table separately reports results based on whether the underlying data is (primarily) from before or after 2000, when the change in tax law entitled eligible investors to a full refund of excess imputation credits. In the recent Ausgrid Tribunal decision, the Ausgrid Tribunal stated that the AER could have excluded earlier market based studies that were not relevant, such as the studies that were conducted on pre 2000 data.[702]

When determining the point estimate from the range in the equity ownership approach (0.4 to 0.41), the AER considers that studies post 2000 are more relevant, but still has

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698 H. Chu and G. Partington, 'The market valuation of cash dividends: The case of the CRA bonus issue, *International review of finance*, Vol. 8(2), June 2008, pp. 1–20.

699 H. Chu and G. Partington, 'The market value of dividends: evidence from a new method', *Paper presented at the Accounting Association of Australia and New Zealand Annual Conference, Wellington,* 2001.

700 S. Walker and G. Partington, 'The value of dividends: Evidence from cum-dividend trading in the ex-dividend period', *Accounting and Finance*, vol. 39(3), November 1999, pp. 275–296.

701 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 306; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 20; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 126; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-94; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 95; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 373; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 102; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 367.

702 Australian Competition Tribunal, *Application by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1*, 26 February 2016, para. 1092.

regard to pre 2000 studies. Post 2000 is the most relevant period, as the year 2000 is the year when the last significant event that affects the value of imputation credits occurred. Table 4-19 highlights the significant events that occurred since the imputation tax system was introduced in Australia. However, it should be noted that even if the AER was to completely disregard the pre 2000 market studies this would not change the outcome of selecting the lowest point estimate in the range from the equity ownership approach.

Table 4-18 Significant events

Event:	Date	Impact on the value of imputation credits
45-day rule	July 1997	The holding period rule requires investors to continuously hold shares 'at risk' for at least 45 days (90 days for certain preference shares) to be eligible for a franking tax offset.
Capital gains tax	September 1999	The method to calculate capital gains tax change from the indexation method to the CGT discount method.
Refund of excess credits	July 2000	If the amount of imputation credits received exceeds an investor's tax liability, that investor can receive a cash refund for the balance

Table 4-20 is the equivalent table for alternative implied market value studies. In this table, several results are recorded as 'N/A', even though there is a specific date range provided. In such cases, that particular technique (or data limitations) did not permit the disaggregation of the value of the dividend component and the imputation credit. In this situation, the study typically reports the combined value of the cash dividend and imputation credit together. The minimum value for the imputation credit component of this package will arise if the cash dividend is fully valued, and these estimates are presented in the 'notes' column.

Table 4-19 Estimates of the utilisation rate from dividend drop off studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study			
Frontier (2016)[703]		0.35 (2001–2016)	0.26 to 0.41 (95 per cent confidence interval for all of the specifications).
Vo et al (2013)[704]		0.35–0.55 (2001–2012)	Range derived from large number of permutations and sensitivity tests.

[703] Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and TransGrid*, September 2016.

[704] D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

Authors	Pre-2000 results	Post-2000 results	Notes
SFG (2013a)[705]		0.35 (2001–2012)	Author's point estimate across a number of different regression forms.
SFG (2011)[706]		0.35 (2001–2010)	
Minney (2010)[707]		0.39 (2001–2009)	Average of results from 2001–2005 and 2006–2009 sub-periods. For the most recent sub-period (2006–2009), utilisation rate is 0.53.
Beggs and Skeels (2006)[708]	0.20 (1992–1997)	0.57 (2001–2004)	Several other pre-2000 periods are presented.
Hathaway and Officer (2004)[709]	0.49 (1986–2004)		Authors suggest that estimate has increased post-2000.
Bellamy and Gray (2004)[710]	0.36 (1995–2002)		Range of 0.0–0.60 is also presented.
Bruckner et al (1994)[711]	0.69 (1991–1993)		Also present an earlier period (1987–1990).
Brown and Clarke (1993)[712]	0.80 (1988–1991)		

Source: As specified in table.

As is evident in the table above, dividend drop off studies suggest that the utilisation value is in the range of 0.35 to 0.57 when using post 2000 data and is in the range of 0.2 to 0.8 when using pre 2000 data. This is consistent with the finding in Ainsworth, Partington and Warren (2015) which considers that the dividend drop-off and

705 SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013, p. 1.

706 SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7,* 21 March 2011, p. 3.

707 A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, p. 32.

708 D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, p. 247.

709 N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004, p. 21.

710 D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004, pp. 5 and 21.

711 P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994, p. 27.

712 P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, p. 1.

comparative pricing studies they examine would suggest that imputation credits are partially priced at about $0.38 in the dollar.[713]

Regulated businesses have solely relied on the SFG 2011 dividend drop off study to determine their theta estimate. Frontier has updated this SFG study for the most recent data and has concluded that a theta estimate of 0.35 still remains appropriate.[714] It is submitted that Professor Gray has extended the dataset from 2013 update through to June 2016. Having undertaken the same analysis as in the SFG 2011 study, Gray concludes that the updated data supports an unchanged theta estimate of 0.35.[715]

Lally has reviewed the updated dividend drop-off study and found that:

- Other studies using market prices generated a very wide range in the estimates of the utilisation rate, even over the same period. This damages the credibility of all such estimates unless it can be demonstrated that one methodology is clearly superior, which has not been done.[716]
- The variation over time in results from the same methodology does not exhibit a pattern that is consistent with changes in the tax regime, and this also damages the credibility of all such estimates.[717]
- Despite the very large sample size in Frontier's analysis, there is considerable statistical uncertainty in the results, arising from 'noise' in the data.[718]
- Applying the same methodology and data filtering rules to data from an almost identical period to that in SFG (2013), Vo et al (2013) generates some quite significant different point estimates for the coefficients on the credits and their standard errors in contrast to SFG (2013). This damages the credibility of both sets of estimates. [719]
- Frontier's method of assessing the impact of outliers on the result[720] is unconventional and would have the effect of suppressing the apparent impact of

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713 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p. 17.

714 Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and Transgrid*, September 2016, p. 6; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, pp. 209, 212.

715 AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 209; Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and Transgrid*, September 2016.

716 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 4.

717 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 4.

718 Due to bid-ask bounce and to unrelated price movement over the cum to ex-day interval, aggravated by the high correlation between the imputation credits and the cash dividend which makes it difficult to identify the impact of only the credits on market prices even if the aggregate effect from the cash dividend and the credit were clear. See: M. Lally, *Issues in the estimation of gamma*, April 2017, p. 4.

719 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 5.

720 Progressively removing the 20 most extreme pairs of observations comprising the one that exerts the most upward effect on the estimated franking credit coefficient and the one exerting the most downward effect, and rerunning the model after each pair is deleted.

outliers upon the estimated franking credit coefficient. Consistent with this, Vo et al's (2013) more conventional approach[721] shows more variation in the results.[722]

- In respect of the robust regression models used by both Frontier (2016a) and Vo et al (2013), Frontier adopts the default option value for the "tuning coefficient" in the models whilst Vo et al considers various values of this "tuning coefficient" and obtains significantly different estimates of the coefficient on franking credits to that of SFG (2013), across the range of values for the tuning coefficient and for each of SFG's four models. [723]
- Frontier does not include a constant in their regression model, the case for doing so is not clear, and the omission of the constant could materially alter the estimate for the coefficient on the franking credits.[724]
- Frontier deletes observations from companies with a market cap below 0.03% of the market index. Since they also (sensibly) delete observations if trades are not present on both the cum and ex-dividend dates, this company size rule has no apparent merit. Furthermore, the choice of 0.03% is highly arbitrary, the rule tends to exclude observations that are least likely to be contaminated by tax arbitrage (the best ones), and the rule may have significantly biased Frontier's results.[725]
- Frontier favours results from Model 4, but their basis for doing so (as described in SFG, 2011) is inadequate in failing to use formal tests and in using the wrong type of graphical analysis.[726]
- Although the utilisation rate is a value-weighted average over all investors in the market, the use of DDO studies will produce an estimate of it that reflects the action of tax arbitrageurs, and these investors may be quite unrepresentative of the entire market.[727]
- Many DDO studies have identified various anomalies that cannot be attributed to any kind of tax explanation, this raises the possibility that ex-day behaviour is also affected by factors other than taxes, and this concern has been raised by a number of researchers in this area (including Professor Gray himself).[728]

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721 Progressively removing the 30 most extreme observations in absolute terms, and rerunning the model after each deletion.

722 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 5.

723 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 5, 8-9.

724 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 5.

725 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 5, 7.

726 Mero et al (2017) conduct a number of formal tests of these models. Remarkably, they find that only Model 4 fails the heteroscedasticity test despite the fact that SFG (2011) develops it in order to address this problem and Frontier (2016a) favours it. See: M. Lally, Issues in the estimation of gamma, April 2017, pp. 5-6.

727 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 6.

728 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 6.

Lally notes that most of the issues identified above are inherent in the dividend drop off approach and cannot be overcome by an alternative dividend drop off methodology. [729] However, some points can be overcome by:[730]

- Dividing the estimate coefficient on the credit by the estimate on cash dividends
- Assessing the effect of outliers individually rather in pairs
- Presenting results for a range of values for the tuning coefficient in robust regression
- Additionally presenting results with a constant in the regression model
- Not deleting observations from small companies

As a result of the analysis from Lally, we remain of the view that estimates from the 2011 SFG dividend drop off study and subsequent 2016 update should be given less weight for estimating the value of theta than the use of estimates from taxation statistics and the equity ownership approach. Lally considers that the drawbacks identified are so severs as to warrant giving the lowest weight on the results from dividend drop off studies.[731]

Further, we do not agree that Professor Gray has undertaken the same analysis that was undertaken in the 2011 study when updating the study for the most recent data. We have reviewed the 2016 Frontier's paper and note that it does not determine a new point estimate for theta using the most recent data as per the 2011 study. Rather it determines whether a theta of 0.35 is within the confidence intervals around all of the specifications and hence remains an appropriate estimate for theta.

> We begin by noting that our preferred final estimate of 0.35 lies within the standard statistical 95% confidence interval for all of the specifications. The range of overlap in the confidence intervals is from 0.26 to 0.41, which has a mid-point of 0.34.[732]

However, we consider that such an approach is inappropriate and Frontier should determine a new point estimate using the most recent data. In the 2011 study SFG used the following methodology to get a point estimate:

> In determining a final recommendation point estimate, we assign more weight to the results of Model specification 4 and to the results of robustness regression estimation. This is because these results are the most stable and consistent across the range of sensitivity analysis and robustness checks that we have performed. In this regards, we note that:

729 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 7.

730 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 7.

731 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 25.

732 Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and Transgrid*, September 2016, p. 31.

a. The average of the robust regression estimate of theta in Table 6 is 0.34; and

b. The average of the estimate of theta from Model Specification 4 across Table 5 to 8 is 0.35. [733]

We note that Frontier in its most recent report has not provided enough data to compute a new point estimate as per the methodology in the 2011 SFG study. However, from the data that has been presented it appears the point estimate may have slightly increased.[734] Overall from the new Frontier report the only outcome that can be obtained is that that theta is in between 0.26 to 0.41.

Lally considers that given Frontier methodology and results, and having a preference for Model 4, a 0.35 theta estimate is reasonable.[735] However, Lally does have concerns with the methodology and this has been highlighted above.[736]

[733] SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7,* 21 March 2011, pp. 32-33.

[734] Consistent with the 2011 methodology, we note that average of the robust regression estimate of theta is 0.34 which is consistent with the 2011 study. However, the average of the estimate of theta from Model Specification 4 across Table 5 to 6 is 0.38 using the most recent data which is higher than the 0.34 presented in the 2011 study. In the latest Frontier report we have not been provided for data for table 7 and 8. As a result we have only average table 5 and 6. It should be noted that a theta estimate of 0.38 is also consistent with the confidence intervals presented in the latest Frontier report (0.26 to 0.34).

[735] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 8.

[736] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 8.

Table 4-20 Estimates of the utilisation rate from alternative market value studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study using hybrids			
Feuerherdt, Gray and Hall (2010)[737]	N/A (1995–2002)		Combined drop off of 1.0. With dividends at full value, this is a utilisation rate of 0.
Futures study (individual or index)			
SFG (2013b)[738]		0.12 (2000–2013)	Uses individual firms.
Cannavan et al (2004)[739]	0–0.15 (1994–1999)		Uses individual firms.
Cummings and Frino (2008)[740]		0.52 (2002–2005)	Uses index.
Rate of return study			
NERA (2013b)[741]	-1.57 (1987–2000)	-1.90 (2000–2012)	Uses past returns. For the entire period, estimate is -1.50.
Lajbcygier and Wheatley (2012)[742]	-1.57 (1987–2000)	-1.68 (2000–2009)	Uses past returns. For the entire period, estimate is -1.88
Siau et al (2013)[743]		-0.29–0.30 (1996–2011)	Uses forecast returns. Note range is from negative 0.29 to positive 0.30.
Siau et al (2015)[744]		-0.29–0.30 (1996–2011)	Uses forecast returns. Note range is from negative 0.29 to positive 0.30.
NERA (2015)[745]	-0.90 (1987-2000)	-3.18 (2000-2013)	Uses past returns. For the entire period, estimate is -1.76

737 C. Feuerherdt, S. Gray and J. Hall, 'The value of imputation tax credits on Australian hybrid securities', *International review of finance,* vol. 10(3), 2010, pp. 365–401.

738 SFG, *Using market data to estimate the equilibrium value of distributed imputation tax credits, Report for the Energy Networks Association*, 3 October 2013, p. 3.

739 D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, pp. 167–197.

740 J. Cummings and A. Frino, 'Tax effects on the pricing of Australian stock index futures', *Australian journal of management*, vol. 33(2), December 2008, pp. 391–406.

741 NERA, *Imputation credits and equity prices and returns, A report for the Energy Networks Association*, October 2013, p. 22.

742 P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, p. 490.

743 K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013, pp. 24 and 27.

744 K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *Accounting and Finance,* Vol. 55, 2015, pp. 241–277.

745 NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, pp. 21, 23.

Authors	Pre-2000 results	Post-2000 results	Notes
Simultaneous share trades			
Chu and Partington (2008)[746]	N/A (1996)		Combined drop off of 1.29. With dividends at full value, this is a utilisation rate of 0.68.
Walker and Partington (1999)[747]	0.88–0.96 (1995–1997)		
Chu and Partington (2001)[748]	N/A (1991–1999)		Combined drop off of 1.5. With dividends at full value, this is a utilisation rate above 1.

Source: As specified in table.

In relation to the 2015 study by Siau et al, this is an academic journal published version of the early study by Siau et al already considered by us. The 2015 paper has relatively minor editorial changes and gives us no cause to change our views.[749]

In relation to the 2015 study by NERA, this is an update of the 2013 study by NERA using one extra year's data. The results are somewhat similar to the 2013 study and we consider the results do not provide compelling evidence on the value of imputation credits, particularly given the large negative estimate for the value of imputation credits.[750] While NERA has responded to the criticism effectively stating the results may indicate there is something wrong with the SLCAPM[751], this does not resolve the issue of the reliability of the theta estimate for use in the SLCAPM.[752] As outlined by Ainsworth, Partington and Warren (2015) the negative value on imputation credits is implausible and the sign on the coefficient probably flags issues with the empirical method.[753]

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746 H. Chu and G. Partington, 'The market valuation of cash dividends: The case of the CRA bonus issue, *International review of finance*, Vol. 8(2), June 2008, pp. 1–20.

747 S. Walker and G. Partington, 'The value of dividends: Evidence from cum-dividend trading in the ex-dividend period', *Accounting and Finance*, vol. 39(3), November 1999, p. 293.

748 H. Chu and G. Partington, 'The value of dividends: evidence from a new method', *Paper presented at the Accounting Association of Australia and New Zealand Annual Conference, Wellington,* 2001, p. 2.

749 The earlier working paper, although substantively the same as the 2015 paper, remains referenced in this decision because this was the paper considered by us in making our decisions released in April and June 2015.

750 NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p vii; M. Lally, *The estimation of gamma*, 23 November 2013, p. 25.

751 NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p vii.

752 Concerns around the reliability of the estimates of the return on equity from the Black CAPM are discussed in the rate of return attachment to this final decision.

753 A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015.

A.15.3 Comparison with other market-based estimation approaches

The majority of service providers have submitted that the use of implied market value studies to estimate the value of imputation credits is consistent with the approach to estimating other rate of return parameters.[754] We disagree. As we set our prior decisions, we consider that the use of market prices to estimate the value of imputation credits is fundamentally different to using market prices to estimate other rate of return parameters. This is further discussed in section A.8.2, which shows our approach is internally consistent.

For example, bonds are separately and (generally) regularly traded, and we can observe the market price that arises from this trading. As correctly noted by Gray (for SFG), '…when estimating the cost of debt the AER uses traded bond prices which reflect the value of those bonds to investors…'.[755] By contrast, imputation credits are not separately traded. Therefore, no market price exists for imputation credits in the same manner as that for separately traded assets.

Further, when returns are calculated on bonds for the cost of debt, and capital gains/loss for the return on equity, these returns are post (company) tax (pre-personal tax) returns. However, imputation credits and dividends market values derived from drop off studies are influenced by differential personal tax resulting in these values being neither pre nor post personal tax values. Lally notes that differential personal taxes on different types of income should affect the pre personal tax costs of debt and equity but they should not affect the estimate of theta. [756] This is further discussed in detail in section A.8.2 and an example is provided to demonstrate the impact below.

We also noted in the decisions released in 2014 and April and June 2015 that, because no market price exists for imputation credits in the same manner as that for separately traded assets, dividend drop off studies must infer using ex-dividend price changes and econometric techniques the value attributed to imputation credits by investors. This is in contrast to simply observing or measuring the value attributed to imputation credits by investors via prices resulting from market transactions in imputation credits. Gray (for both SFG and Frontier) noted that we apply econometric techniques (that is, regression analysis) to observed market prices when estimating

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[754] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 288, 300; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 13; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 117; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-85; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 87; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 365; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 93; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 359; APNT, *Access Arrangement Revised Proposal to Draft Decision*, January 2016, p. 93; AusNet Transmission, *Transmission Revenue Proposal Review 2017-2022, Revised Revenue Proposal*, 21 September 2016, p. 204.

[755] SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 79.

[756] M. Lally, *Gamma and the ACT Decision*, May 2016, p. 15.

beta.[757] This is correct, but beta is not a measure of the value attributed to an asset by investors; for example, Gray's definition of beta (for SFG) is 'the risk of the asset or firm in question relative to the average firm or asset'.[758]

A number of service providers also submitted, consistent with advice from Gray (for SFG), that we do not seek to adjust other rate of return parameters for personal costs.[759] They consider that the value of imputation credits will reflect transaction costs that are associated with redeeming imputation credits.[760]

However, this consideration did not change Handley's view—which we accept—that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis:[761]

> In other words, the per dollar value of an imputation credit γ gamma should be measured prior to any personal tax on the credit and prior to any personal costs associated with the receipt of the credit. This approach is also consistent with the standard approach to calculating a return in a classical tax system – you take the observed capital gain and the observed dividend without making any adjustment for personal taxes or personal costs associated with trading the share or receiving the dividend.

That is, we take the observed distribution of $1 of dividends to yield $1 of value to investors. We do not take it to yield $1 of value minus personal taxes and personal costs associated with that dividend. Similarly, we take a $1 change in stock prices (capital gain) to yield $1 of value to investors. We do not take it to yield $1 of value minus personal taxes and personal costs associated with that capital gain.

To explain how personal taxes influence market price/returns in the dividend drop off studies we present a simple example below. Dividend drop off studies work on a no arbitrage argument. In perfect capital with no transaction cost, no differential tax on dividends relative to capital gains and no risk, the theory of no arbitrage predicts an ex-

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757 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 78; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 36.

758 SFG, *Equity beta*, 12 May 2014, para. 15.

759 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 52.

760 AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 294, 300; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 7; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 116; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-85; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 86; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 364; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 93; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 358.

761 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

dividend drop-off being equal to the face value of the dividend. A representative investor should be indifferent between the two following strategies:[762]

- Selling their stock the day before the shareholder is entitled to receive the dividend at the cum-dividend price ($P_{cum\text{-}div}$). In this scenario the shareholder receives only the proceeds from the sale of the shares.
- Selling their stock when the shareholder is entitled to receive the dividend at the ex-dividend price ($P_{ex\text{-}div}$). In this scenario the shareholder receives both the dividend (D) and proceeds from the sale of the shares.

An investor should be indifferent between the two strategies given that if one strategy is more profitable then arbitrage opportunities will exist. However, arbitrage opportunities will be eliminated as the buying pressure on the more profitable strategy combined with the selling pressure on less profitable strategy will result in an equilibrium outcome, where the two strategies yield the same return. Note that investors care about their post-personal tax return and not their pre-personal tax return. What is important to investors is the return they get after paying their taxes and not what they receive before taxes.

Where income and capital gains are taxed at the same rate, the investor should be indifferent between receiving the cum-dividend price or the ex-dividend price plus the dividend. That is,

$$P_{cum\text{-}div} = P_{ex\text{-}div} + D$$

More generally, the results of market studies are influenced by personal taxes and need to be interpreted in light of this. For our regulatory purposes the efficient costs that are imposed on the benchmark efficient firm is what matters. That is, the pre personal taxes and personal costs impact. Market parameter estimates that are influenced by personal tax and personal cost factors which do not correctly reflect the efficient post-company tax costs faced by the benchmark efficient entity are not appropriate estimates under our post tax regulatory framework.

To demonstrate assume an investor faces the following investment scenario:

- (P_{cost}) Purchased share in 2010 for $10
- ($P_{cum\text{-}div}$) Current cum dividend price in 2016 is $20
- (D) 2016 dividend is $1 assume fully unfranked
- ($P_{ex\text{-}div}$) Ex-dividend price in 2016 is $19 (calculated as cum-div price minus dividend)

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[762] In equation (2) in Elton and Gruber (1970) if tax on ordinary income and capital gains tax are the same ($t_o = t_c$) then $P_A = P_B + D$. See: Edwin J. Elton and Martin J. Gruber, 'Marginal Stockholder Tax Rates and the Clientele effect' The Review of Economics and Statistics, Vol. 52, No.1 (Feb 1970), p. 69.

- (MTR) Investors marginal tax rate = 47 %
- ($CGT_{discount}$) capital gains discount (0.5 when shares held for more than 12 months, otherwise 1)
- For the time being it will be assumed that there is one type of investor in the economy, however, this assumption will be relaxed.

Under this scenario ex-dividend and cum-dividend returns are equal on a pre-personal tax basis:

$$P_{cum\text{-}div} = P_{ex\text{-}div} + D$$

$$20 = 19 + 1$$

However, investors care about their post personal tax return and not their pre-personal tax returns. As a result, the investors post personal tax return if they sell cum-dividend is:

$$\text{Post Tax return} = P_{cum\text{-}div} - \text{Personal Tax (CGT)}$$

$$\text{Personal Tax (CGT)} = (P_{cum\text{-}div} - P_{cost}) * MTR * CGT_{discount}$$

$$\text{Personal Tax Capital Gain} = (20-10) * 0.5 * 0.47$$

$$\text{Personal Tax Capital Gain} = 2.35$$

$$\text{Post Tax return} = 20 - 2.35 = 17.65$$

The investors post personal tax return if they sell ex-dividend is:

$$\text{Post Tax return} = P_{ex\text{-}div} + D - \text{Personal Tax (CGT)} - \text{Personal Tax (Dividend)}$$

$$\text{Personal Tax (CGT)} = (19-10) * 0.5 * 0.47 = 2.115$$

$$\text{Personal Tax (Dividend)} = 1 * 0.47 = 0.47$$

$$\text{Total Tax} = 2.115 + 0.47 = 2.585$$

$$\text{Post Tax return} = P_{ex\text{-}div} + D - \text{Personal Tax (CGT)} - \text{Personal Tax (Dividend)}$$

$$\text{Post Tax return} = 19 + 1 - 2.115 - 0.47 = 17.415$$

As is evident on a post personal tax basis the investor is better off by selling cum-dividend ($17.65) in contrast to selling ex-dividend ($17.415). Such a situation cannot exist in practice as arbitrage opportunities would exist. These arbitrage opportunities would increase supply for cum-dividend pushing down the cum-dividend price and increased demand for ex-dividend would push the ex-dividend price up.

For no arbitrage opportunities to exist the post personal tax return must be the same cum dividend and ex-dividend, ignoring market volatility between cum-dividend price and ex-dividend price for simplicity. Therefore:

$$\text{Post Tax return cum div} = \text{Post Tax return ex div}$$

$$P_{cum\text{-}div} - \text{Personal Tax (CGT)} = P_{ex\text{-}div} + D - \text{Personal Tax (CGT)} - \text{Personal Tax (Dividend)}$$

$$P_{cum\text{-}div} - (P_{cum\text{-}div} - P_{cost})^* CGT_{discount}^*MTR = P_{ex\text{-}div} + D - (P_{ex\text{-}div} - P_{cost})^* CGT_{discount}^*MTR - D^*MTR$$

This is the equilibrium condition.

Let: $P_{ex\text{-}div} = P_{cum\text{-}div} - xD$ where x is the market value of dividends implied by the dividend drop off studies. In this example, x is the dividend drop off ratio. Also for simplicity, assume the arbitrage opportunities only influence the ex-dividend price and not the cum-dividend price. With this assumption the equilibrium condition is as:

$$P_{cum\text{-}div} - (P_{cum\text{-}div} - P_{cost})^* CGT_{discount}^*MTR = P_{cum\text{-}div} - xD + D - (P_{cum\text{-}div} - xD - P_{cost})^* CGT_{discount}^*MTR - D^*MTR$$

Substituting in all the parameters into the formula and solving for D we get the following:

$$20 - (20 - 10)^* 0.5^*0.47 = 20 - x + 1 - (20 - x - 10) * 0.5 * 0.47 - 0.47$$

$$17.65 = 21 - x - (10 - x) * 0.235 - 0.47$$

$$X = 0.6928$$

As a result, for arbitrage opportunities to not exist the dollar face value dividend must be worth 69 cents in the dividend drop off study. In such a situation the following market prices will persist in the market:

- $P_{cum\text{-}div}$: $20
- D: Face value = $1, as per dividend drop off $0.6928
- $P_{ex\text{-}div}$: $19.3072[763]

With these arbitrage free market parameters the investors post personal tax return is as follows:

$$\text{Post Tax return cum div} = P_{cum\text{-}div} - \text{Personal Tax (CGT)}$$

$$\text{Post Tax return cum div} = 20 - 0.5 * 0.47 * (20\text{-}10)$$

$$\text{Post Tax return cum div} = 20 - 2.35 = 17.65$$

$$\text{Post Tax return ex div} = P_{ex\text{-}div} + D - \text{Personal Tax (CGT)} - \text{Personal Tax (Dividend)}$$

$$\text{Post Tax return ex div} = 19.3072 + 1 - ((19.3072 - 10)*0.47*0.5) - 1*0.47$$

$$\text{Post Tax return ex div} = 17.65$$

As evident from above, the post-personal tax return cum dividend is equal to the post-personal tax return ex dividend. I.e. no arbitrage opportunities exist and the investor is indifferent between selling their share the day before they are entitled to receive the dividend and the next day when they are entitled to the dividend. This is ignoring the market volatility that may exist between the cum-div price and the ex-div price.

As a result, the investor's pre-personal tax return is:

- $20 if they sold on the cum-dividend date
- $20.3072 ($19.3072 + $1) if they sold on the ex-dividend date

The investor's post-personal tax return is:

- $17.65 ($20 - $2.35) if they sold on the cum-dividend date
- $17.65 ($20.3072 - $2.6572) if they sold on the ex-dividend date

On a pre-personal tax basis, the investor values the dividend at $1. On a post-personal tax basis, the investor values the dividend at $0.53 ($1 - $1*0.47). The $0.6928 dividend value that is derived from dividend drop off studies is neither a pre-personal or post-personal value of the dividend. It is the difference between the cum-dividend and ex-dividend price, which is determined by the face value of the dividend and the

[763] Defined as 20 minus 0.6928.

relative difference in in the tax level on ordinary income (of which dividends are classed) and on capital gains. It is driven by investor's preference for capital gains over dividend income, as capital gains are taxed at a concessional rate relative to dividends assuming the shares are held for more than 12 months.

As will be shown below, only when dividends and capital gains are taxed at the same rate will the dividend drop off studies yield a value of the dividend on a correct pre-personal tax basis (i.e. not impacted by differential personal taxes on dividends and capital gains). This supported by Lally. [764]

For regulatory purposes what matters is the investor's pre-personal tax value of dividends which is $1, which is equal to the cost of the dividend imposed on the firm (i.e. the post company tax cost). The AER uses the full face value of dividends in its estimation of the MRP (i.e. it assumes $1 of distributed dividend income has a post company tax value of $1 to investors). The AER does not use the market value of dividends from dividend drop off studies to estimate the MRP. To do so would be incorrect given this value is influenced by differential personal taxes on dividends and capital gains.[765]

Earlier an assumption was made that the investor's tax rate was 47 per cent and that investor purchased the share more than 12 months ago which allowed them to receive a 50 per cent discount on capital gains tax. We will now relax these assumptions and see how it changes the market value of the dividends in the dividend drop off study. As shown above, for post personal tax return to be equal between cum-dividend and ex-dividend the following condition must hold:

$$P_{cum\text{-}div} - (P_{cum\text{-}div} - P_{cost})* CGT_{discount}*MTR = P_{cum\text{-}div} - xD + D - (P_{cum\text{-}div} - xD - P_{cost})* CGT_{discount}*MTR - D*MTR$$

Solving for X the formula simplifies to:

$$X = \frac{1 - MTR}{1 - CGT_{discount} * MTR}$$

This is consistent with the formula in the Elton and Gruber (1970) paper which defined ex-dividend behaviour as:[766]

764 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 6-7.

765 We also note distributed dividends are directly observable.

766 Edwin J. Elton and Martin J. Gruber, 'Marginal Stockholder Tax Rates and the Clientele effect', *The Review of Economics and Statistics*, Vol. 52, No.1 (Feb 1970), pp. 68-74, pin point ref: 69.

$$\frac{P_{cum-div} - P_{ex-div}}{D} = \frac{1 - t_0}{1 - t_c}$$

Where t_0 is the tax rate of ordinary income and t_0 is the capital gains tax rate.

Further, Lally generalises the dividend relationship to the following:[767]

$$\Delta P = \delta D + \delta\theta(IC) + \varepsilon$$

Where δ reflects the effect of the personal tax differential, risk, transaction costs and other frictions and ε reflects noise in the data.[768]

Using different values for MTR (0%, 15%, 21%, 34.5%. 39% 47%) and CGT discount (50% if shares held for more than 12 months and 100% if shares held for less than 12 months)[769] the market value for the dividend in the dividend drop off study changes. As seen in the table below a lower tax rate results in a higher market value of dividend in the dividend drop off studies. This is due to the differential taxes being smaller at a lower MTR.

The table also shows that when the stocks are held for less than 12 months and the CGT is taxed at the MTR rate rather than 50 per cent of the MTR, the dividends are worth one dollar in a dividend drop of study. This is because when the stocks are held for less than 12 months capital gains are taxed at the same rate as dividends. The same is also true for the 0 per cent tax rate when stocks are held for more than 12 months. In this situation dividend tax and capital gains tax is consistent at 0 per cent.

As noted above, the difference between the cum-dividend price and ex-dividend price is driven by differential personal taxes on dividends and capital gains. Hence, only when dividends and capital gains are taxed at the same rate, the drop off just represents the face value of the dividend. This is the value that is required for regulatory purposes and is the post company tax (pre-personal tax) value.

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767 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 24.

768 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 24.

769 In practice super funds have a CGT discount of 0.33 and not 0.5. However, in order to not complicate the analysis we do not introduce an additional CGT discount rate.

Table 4-21 Dividend drop off ratio with varying tax rates

		CGT	
		50%	100%
Tax Rate	0%	1	1
	15%	0.9189	1
	21%	0.8827	1
	34.50%	0.7915	1
	39%	0.7578	1
	47%	0.6928	1

The example shows why estimates of the value of dividends (and imputation credits) from market based studies are influenced by personal tax factors and this is not appropriate in our regulatory context. Adjustment for the impact of differential personal taxation of income and capital gains must be made to the estimates from dividend drop off studies to ensure their consistency with our post tax framework.

As is evident above, different investors have a different dividend drop off ratio and this is determined by many factors such as:

- Investor marginal income tax rate
- Whether the investor held the share for more than 12 months
- Whether the investor is super fund or not
- Whether the investor is foreign and how foreign income is taxed at their home country.

What determines the dividend drop off price in the market is based on who the marginal investors are around the ex-dividend dates. For instance, if only local investors with a marginal tax rate of 39% are trading around the ex-dividend date then the dividend drop off should be 0.7578 cents per dollar of face value of dividends. If there is a mixture of investors trading around the ex-dividend date then the drop off price will be determined by supply and demand on those days. In real capital markets with multiple types of investors facing differential tax rates and where those investors may or may not be able to utilise franking credits, the resulting equilibrium is much more complex.[770]

[770] Edwin J. Elton and Martin J. Gruber, 'Marginal Stockholder Tax Rates and the Clientele effect', *The Review of Economics and Statistics*, Vol. 52, No.1 (Feb 1970), p. 6.

In the analysis above we focused on the impact on cash (unfranked) dividends and ignored the effect of imputation credits. This was a simplifying assumption which should not distract from the fact that imputation credits are similarly impacted in market based studies by differential personal tax. The simple analysis can be extended to cover franked dividends.[771] Overall personal tax is levied on the grossed up dividend which is the face value of the cash dividend plus the face value of the attached imputation credit that can be utilised, both of which are taxed as ordinary income.

Furthermore, the marginal investor's valuation is not relevant for the purposes of calculating the taxation building block. What is required is what proportion of the company tax is a prepayment of the investor's personal tax. For the taxation building block what matters is the value to all investors in aggregate and not the marginal investors that trade around the cum-dividend and ex-dividend dates. This would suggest that dividends drop off studies are not the best method for determining the gamma adjustment to the taxation building block.

In the recent Ausgrid Tribunal decision, the Ausgrid Tribunal considered we were being inconsistent with our approach as other allowed rate of return parameters were determined by market prices which are influenced by personal taxes. We do not agree. Other allowed rate of return parameters in the cost of equity and cost of debt are not influence by personal tax factors in a manner that results in estimates not being a genuine expected post tax returns.

For instance, the returns derived from equity prices is a post company tax (pre-personal tax) return that is subject to capital gains tax when it is sold by an investor. This contrast to the cash dividends and imputation credits estimates from market based dividend drop off studies which are neither pre nor post-personal tax estimates of the value to investors.

When calculating the MRP using historical data we use the face value of capital gains and dividends and not market value implied by dividend drop off studies. Likewise when calculating the MRP in the dividend growth model we discount the dividends at face value and not the value implied in the dividend drop off studies.

Similarly, the bond returns derived from bond market price are a post company tax (pre-personal tax) returns. When we or a third party service provider calculates the yield to maturity on bonds and government securities, the face value of coupons and the face value of the principal are used in the calculations.

The above examples demonstrate why we consider its approach to estimating gamma is consistent with how it estimates the rate of return parameters when estimating in the allowed rate of return for the benchmark efficient entity. This is further discussed in section A.8.2.

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[771] Ainsworth A, K Fong, D Gallagher, and G Partington (2015),'Institutional Trading around the ex-dividend day', *Australian Journal of Management*, January, pp. 1-25.

The above example shows that if market based dividend drop off studies are to be used to estimate the utilisation value, adjustments have to be made for the impact of personal tax and personal cost factors. However, for reasons outlined above this is not ideal. For estimating the taxation building block we want to know what proportion of corporate tax is a pre-payment of personal tax (as this is the direct value investors will get from the reduction in their tax bill payable to the government, or via a rebate from the government). We consider this is currently best estimated using the equity ownership approach.

The analysis above ignored the impact of personal transaction costs but they similarly impact the share price drop ratio as differential personal taxes. As outlined above, local shareholders that have held shares for more than 12 months prefer a dollar of capital gains over a dollar of unfranked dividends on a pre-personal tax basis. This is due to capital gains being more valuable as they are taxed at a concessional tax rate relative to unfranked dividends. Similarly, investors value the cash flow that has lower personal transaction costs more than the cash flow that has higher personal transaction costs. For example, investor on personal cost basis might value dividends more than capital gains. This is due to investor having to pay brokerage fees in order to realise a capital gains while dividends are distributed without brokerage costs. However, personal transaction costs are not relevant in our regulatory context as they are not costs impost on the regulated business (i.e. they are irrelevant to the post tax return under the Officer WACC framework).

The analysis above is based around dividend drop off studies but is equally applicable to alternative market value studies.

A.15.4 Adjustment of estimates from implied market value studies

Although not proposing this approach, a number of service providers submitted that estimates of the utilisation rate from implied market value studies can be adjusted to make them consistent with the before-personal-tax and before-personal-costs value of imputation credits.[772] However, the service providers do not propose this adjustment as they consider it to be unnecessary and inappropriate.[773]

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[772] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 13; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 117, 126-127; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-94; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87, 95; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365, 373-374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94, 102-103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 359, 367-368.

[773] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 307; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 13; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 117, 126-127; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-94; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87, 95; CitiPower, *Revised Regulatory Proposal*

We do not consider that the relevant adjustment—proposed by Handley and Lally and discussed in section **Error! Reference source not found.**—will fully account for the otential effect of personal taxes and costs. This is because the proposed adjustment seeks to remove from the estimates of investors' valuation of dividends and imputation credits the effect of factors that suggest that investors' valuation of $1 of dividends is less than $1. However, according to Gray (for SFG), there are:[774]

> …costs that reasonable, efficient investors would incur in relation to imputation credits, which do not apply to dividends or capital gains.

Thus, Gray's view (for SFG) appears to be that there are factors which affect investors' valuation of imputation credits (as reflected in share prices) which do not affect investors' valuation of dividends.[775] Therefore, it does not appear that the proposed adjustment—which only addresses factors which affect both dividends and imputation credits—would exclude the effect of the factors identified by SFG as affecting just imputation credits.

As outlined above in section A.15.3, the adjustment for the impact of differential personal taxes is equivalent for dividends and imputation credits. Therefore, if market value studies are to be used to estimate the utilisation value then at a minimum the adjustment proposed by Lally and Handley should be used.

Lally considered that the coefficient on imputation credits in dividend drop off studies is not θ but $\delta\theta$. Therefore the estimated value of imputation credits in the dividend drop off study must be divided by the estimate value of the cash dividend.[776]

Frontier submits that if the coefficient on the dividend is less than one, then the total revenue should be increased and not decreased as is the case with the AER's proposed adjustment.[777] This is due to shareholders requiring a higher compensation for them valuing dividend at less than face value. However, Lally does not agree with this proposition.[778] Lally considers that if dividend drop off studies produce an estimate of cash dividends of less than one this implies that shareholders do not value dividends as highly as capital gain and this does not suggest that revenue should be increased.[779] The result is an artefact of personal costs, almost certainly differential

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2016-2020; January 2016, pp. 365, 373-374; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94, 102-103; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 359, 367-368; APNT, *Access Arrangement Revised Proposal to Draft Decision*, January 2016, p. 94; Frontier Economics, *Issues in the estimation of gamma*, September 2016, paras. 91-93.

774 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 50.

775 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 65.

776 M. Lally, *Gamma and the ACT Decision*, May 2016, p. 24; M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 21-22.

777 Frontier Economics, *Issues in the estimation of gamma*, September 2016, p. 23.

778 M. Lally, *Issues in the estimation of gamma*, April 2017, p. 21.

779 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 21-22, 26.

taxation on dividends and capital gains biasing the dividend drop off results. The effect of differential taxation is demonstrated in section A.15.3 above.

A.15.5 Limitations of SFG's dividend drop off study

A number of service providers submitted that 'several of the general limitations [of implied market value studies identified] do not apply to the SFG study'.[780] Namely, the service providers consider that the SFG dividend drop off study does not produce nonsensical results and is not subject to problematic estimation methodologies.[781] The service providers consider we have not assessed the SFG study as a standalone basis, rather they consider we assess it together with all drop off studies.[782] We do not agree and below we set out the limitations that we consider apply generally to implied market value studies and consider whether these apply to SFG's dividend drop off study on a standalone basis. We conclude that there is reasonable evidence to suggest that several of the limitations do apply to SFG's dividend drop off study. There appears to be no information in the proposals lodged in 2016 or in Gray's June 2016 report (for Frontier),[783] to warrant us changing our view on any of the material below set out in our decisions released in October and November 2015.

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

We accept that this limitation does not apply to SFG's study. Its estimate of the utilisation rate is 0.35.

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[780] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 301, 303, 306; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 13-16; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 117-118, 125-126; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-87, 7-93; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87-88, 94; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365-366, 372; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94-95, 102; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360, 366.

[781] Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 13-16; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 117; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-86; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 87; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, pp. 365-366; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 94; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360.

[782] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 286, 303; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 20; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 125; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-93; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 94; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 372; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 101; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 366.

[783] Frontier Economics, *The appropriate use of tax statistics when estimating gamma*, January 2016.

The results of these studies can reflect factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate.

Both Handley and Lally advised that the results from SFG's dividend drop off study reflect these factors.[784] A number of service providers themselves also acknowledged this elsewhere in their proposals:[785]

> …even if the AER's definition of theta were to be adopted, there is a relatively simple adjustment that can be made to estimates from market value studies to address this concern. As explained by Associate Professor Handley, this involves 'grossing up' the theta estimate from a market value study to reflect the effect of personal taxes and personal costs.

Therefore, we conclude that this limitation does apply to SFG's study.

In section A.15.3 we have also provided a worked example of how personal taxes influence market value of dividend and imputation credits in market studies.

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

Gray's response to this point (for SFG) was:[786]

> The AER has previously argued that the increased trading volume that occurs around ex-dividend dates could potentially affect the estimates. I have previously responded to this point in great detail, explaining why, if anything, this additional trading would have the effect of increasing the estimate of theta.
>
> I have previously addressed this issue at pp. 31-32 of SFG (2014 Gamma) and at ENA (2013), Section 7.9, pp.119-123.

The ENA (2013) report referred to by Gray (for SFG) was a response to our draft rate of return Guideline. Lally reviewed our draft Guideline and the ENA response. His conclusion was:[787]

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784 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 43–44; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 16; M. Lally, *The estimation of gamma*, 23 November 2013, p. 21.

785 ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 11; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; and JGN, *Gamma - response to the draft decision*, February 2015, p. 10.

786 SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 185(c); Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 16.

787 M. Lally, *The estimation of gamma*, 23 November 2013, p. 20.

> The AER's third approach to estimating [the utilisation rate] involves estimates derived from market prices (AER, 2013, pp. 133–134, 239–247). The AER does not consider that these estimates are useful for a number of reasons.
>
> …
>
> I concur with all of these concerns, and I have additional concerns about these studies or their interpretation.

Regarding the particular limitation at hand, Lally noted:[788]

> Tenthly, although the utilisation rate is a value-weighted average over all investors in the market, the use of market prices will produce an estimate that reflects the tax position, transactions costs and motives of those investors who transact at the relevant times (such as tax arbitrageurs) and these investors may be quite unrepresentative of the entire market.

And on the effect of trading around the ex-dividend date, Lally noted:[789]

> In respect of tax arbitrage around dividend ex-days, the ENA (2013, section 7.9) argues that this would lead to [the utilisation rate] being overestimated by such studies (because these arbitrageurs would tend to drive up the prices of shares with large imputation credits prior to ex-day in the course of buying them, and then depress them shortly afterwards in the course of selling them). This point would be plausible if tax considerations fully explained ex-dividend day results. However, as described above, this is not the case.

Thus, Lally appeared unconvinced by the ENA's views and provided no indication that SFG's study (or any implied market value study) should necessarily be deemed free of this limitation.

Handley also appeared unconvinced by the views of Gray (for SFG) in his 2014 report on this limitation, noting in his September 2014 report:[790]

> …there remains a residual concern as to whether the composition of investors around the ex-dividend date is reflective of the composition of (long term) investors in the benchmark market who supply capital to firms (including to the benchmark efficient entity) and therefore whether the implied value of imputation credits around ex-dividend dates is representative of the value of imputation credits to the market as a whole.

Handley reiterated this view in his April 2015 report.[791]

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788 M. Lally, *The estimation of gamma*, 23 November 2013, p. 26.

789 M. Lally, *The estimation of gamma*, 23 November 2013, p. 29.

790 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44.

791 J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 18.

Finally, we note the South Australian Centre for Economic Studies recommended disregarding evidence from all dividend drop off studies due to this limitation entirely:[792]

> The studies included by SFG consulting in their review of estimates for theta all appear to be of good quality and are undertaken in a manner which reflects the current best practice in the literature.
>
> However, purchase of stocks in any given period is dominated by a relatively small share of equity holders who engage in active trading equities. Overall ownership of equities, however, is dominated by those who trade infrequently. As such there is no reason to believe that the value placed on franking credits by active traders of equities is the same as that placed on franking credits by those who trade infrequently.
>
> On the third point, listed firms are also only part of the stock of Australian equity. Data from the ABS's 'Australian National Accounts: Financial Accounts' indicates that as at June 2014 unlisted shares comprised 44.5 per cent of the total value of shares in private firms (rising to 49.7 per cent if equity in government non-financial corporations is included).
>
> Due to the unrepresentative nature of both traders in stock, and the ownership of listed stock, we believe that dropped dividend studies cannot be assumed to be informative about the value placed by median investor in the 'benchmark efficient entity'. As such, **we recommend that estimates derived from dropped dividend studies be disregarded**.

We consider that there is sufficient evidence in the expert views quoted above to suggest that SFG's dividend drop off study is subject to this limitation.

In their most recent report, Frontier submits that McKenzie and Partington support that tax-induced trading around ex-dividend days would "inflate' the estimate of the utilisation rate.[793] Lally does not agree and considers that Frontier is misrepresenting what McKenzie and Partington said in their report: [794]

> … the statements quoted by Frontier represent a summary from McKenzie and Partington of only two of the many papers examined by them. Subsequently, in expressing their own views, McKenzie and Partington (2011, page 10) state that "Arbitrageurs can be engaged in both dividend avoidance (e.g.: foreign investors with lower franking credit values) and dividend capture (e.g.: domestic investors with higher franking credit values)." The latter of these activities would raise the estimate of the utilization rate but the former would have the reverse effect. McKenzie and Partington (2011, page 11) also state that "..if short-term traders did determine prices, then the observed price drop would underestimate the value of dividends and franking credits…" due to the effect of

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[792] SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, p. 17.

[793] Frontier Economics, *Issues in the estimation of gamma*, September 2016, pp. 4, 17-18.

[794] M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13-14.

transactions costs. McKenzie and Partington (2011, page 13) also summarise results from various papers that examine contemporaneous trades on cum and ex-dividend shares, which suggests that the dividend drop-off studies give "downward biased estimates of dividends and franking credit value."

In his latest report, Lally demonstrates tax-induced trading around the ex-dividend date can bias the utilisation rate in either direction and there is no apparent means of determining whether overall there will be an over or under estimation.[795] In his simple example, Lally demonstrates the if the actual utilisation value is 0.5 dividend drop off studies can produce a utilisation value in the range of 0 to 1.[796]

In section A.15.3 it was outlined the dividend drop off ratio in market studies varies depending on the investor's marginal tax rate. Low (high) marginal tax rate investors have a higher (lower) dividend drop off ratio all else equal. The dividend drop off ratio that prevails in the market is determined by the marginal investor that trades around the ex-dividend date, marginal tax rate. However, the marginal investor dividend drop off ratio is not relevant for estimating gamma in the regulatory context for two reasons:

- The purpose of gamma is to deduct the proportion of company tax is a pre-payment of personal tax from the allowed regulated revenues. In order to determine this proportion the analysis has to focus on the aggregate investors and not the marginal investors that trade around the ex-dividend date.
- This dividend drop off ratio is neither a pre-personal nor a post-persona tax measure of dividends and imputation credits. It is just the change in the stock price between the cum and ex-dividend date which is determined by the size of the dividend, imputation credits and influenced by differential personal taxation of dividend/imputation credit and capital gains. This is further discussed in section A.15.3.

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

We consider the idea that the SFG dividend drop off study is data intensive is evident in pages 4 to 14 of the 2011 version of that study and section 3 of the updated 2013 version.[797]

Regarding whether the SFG study employs a complex and potentially problematic estimation methodology, we have regard to the views on dividend drop off studies expressed by academics and other regulators. A wide selection of these views is set

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795 M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 14-16, 25-26.

796 In his example Lally shows that for a dividend of 4 dollars and an imputation credit of $2, the net effect of all these transaction costs could produce an expected price drop of anywhere in the range of $4 to $6. See: M. Lally, *Issues in the estimation of gamma*, April 2017, pp. 14-16.

797 SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7,* 21 March 2011; SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

out in section A.15.6 below. All but one of these views were expressed subsequent to SFG's dividend drop off study. It is not clear why experts would continue to canvass the methodological issues associated with dividend drop off studies in general if SFG's dividend drop off study overcame these issues. This notwithstanding, we also have regard to the Energex Tribunal's acceptance of the results from SFG's dividend drop off study in 2011.

Therefore, we consider that there is evidence both for and against the idea that this limitation applies to SFG's dividend drop off study.

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.

First, we note that it is strictly incorrect to say that the value of the combined package of dividends and imputation credits can be 'observed'. The service providers support this by quoting Gray that empirical evidence provides a very clear and consistent view of the combined value of credit and dividend.[798] This is because this value is actually estimated based on assumptions about what the ex-dividend price change represents. In any case, because imputation credits are only ever distributed with franked dividends, all dividend drop off studies must make this allocation/separation. Therefore this limitation applies to SFG's dividend drop off study.

A.15.6 The views of academics and other regulators on dividend drop off studies

A number of academics and regulators have recognised the limitations of dividend drop off studies. Moreover, many of these concerns continue to be expressed even after the first version of SFG's dividend drop off study in 2011 (which was relied upon by the Energex Tribunal), and the 2016 update of that study (which was relied upon in service providers' current proposals).[799] The comments of academics and other regulators support the lesser reliance we place on SFG's dividend drop off study in estimating the utilisation rate.

Some academics have identified a number of practical and methodological issues:

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[798] AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, p. 303; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, p. 16; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 120; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-89; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 90; CitiPower, *Revised Regulatory Proposal 2016-2020*; January 2016, p. 368; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 97; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, p. 362.

[799] SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7,* 21 March 2011; Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, para. 38; SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

- Cannavan, Finn and Gray (2004):[800]

  > …it is unlikely that the traditional ex-dividend day drop-off methodology will be able to separately identify the value of cash dividends and imputation credits.

- Siau, Sault and Warren (2013):[801]

  > Despite a large number of studies, the market value of imputation credits remains broadly disputed (see, for example, Gray and Hall, 2006; Lally, 2008; Partington and Truong, 2008; Gray, 2008). The majority of empirical studies have drawn inferences by focusing on the pricing of dividend distributions. This includes analysis of stock price declines around ex-dividend dates ('ex-dividend drop-off studies'); and comparative pricing of instruments that differ only in their dividend and imputation entitlements. These studies are subject to a number of issues, such as imprecise estimates that may be influenced by the presence of short-term traders arbitraging dividends and limited samples in the case of comparative studies.
  >
  > …
  >
  > The variability of estimates joins with issues over design to cast some doubt over estimates for the market value of imputation credits arising from drop-off studies. A key methodological issue is that price movements around ex-dividend events encapsulate not only the tax differential effect, but may also reflect the presence of traders seeking to arbitrage dividends and noise associated with trading activity around ex-dividend dates. Drop-off ratios can be distorted by the need to compensate traders for transaction costs (Eades, Hess, and Kim ,1984); Lakonishok and Vermaelen, 1986; Karpoff and Walkling, 1988, 1990; Bali and Francis, 2011); or the risk involved (Fedenia and Grammatikos, 1993; Grammatikos, 1989; Heath and Jarrow, 1988; Michaely and Vila, 1995). Transaction costs may be substantial, and can drive the drop-off ratio below one (Kalay 1982, 1984; Boyd and Jagannathan, 1994). Market microstructure effects may also complicate estimation of market value, as discrete tick sizes can bias drop-off ratios downwards (Dubofsky, 1992; Bali and Hite, 1998).
  >
  > A further key methodological issue is the difficulty in attributing the observed drop-off value between cash dividends and imputation credits. Dempsey and Partington (2008) nominate this identification problem as a serious limitation of ex-dividend drop-off studies. Drop-off studies are afflicted by multicollinearity issues. Cannavan et al. (2004) and Bellamy and Gray (2006) reveal that imputation credits are nearly perfectly collinear with their respective cash dividends. This is exacerbated by corporate tax rates being almost constant and partially-franked dividends being the exception rather than the norm. Gray

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[800] D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, p. 175.

[801] K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013, p. 2 and pp. 8–9.

(2008) points out that the value attributed to imputation credits is conditional on the assumed value on cash dividends by design, to the extent that they are supplementary components within a single package. This notion is reinforced by evidence of offsetting variation in the value attributed to dividends and imputation credits across samples (see Bellamy and Gray, 2006; Gray, 2008).

- McKenzie and Partington (2013):[802]

  For over fifty years, academics have been trying to satisfactorily measure the market value of dividends. So far we have not reached a generally agreed consensus on the value or the method of measurement, which indicates the difficulty of the task. Thus, the basic task of measuring the package value of dividends and franking credits is a major challenge.

  It is well understood that the market value of the package of dividends and franking credits mixes together not just dividends and credits, but the effects of income and capital gains taxes, transactions costs, discounting for time and risk and possibly market microstructure effects as well. This leads to what we call the allocation problem. That is how we attribute the value consequence of these effects between the value of dividends and the value of franking credits. All methods of splitting up the package value of dividends and franking credit involve an explicit or implicit allocation. The problem with allocations is that by their nature they are arbitrary. Thus, separating out the estimated value of the franking credits is also a major challenge.

  One approach to the estimation of the value of dividends and franking credits is to measure the price drop when the stock goes ex-dividend. It is on the basis of [SFG's dividend drop off study] that theta was taken to be 0.35 and hence the value of gamma is given by 0.7 x 0.35, which rounded up furnishes a value of 0.25 or 25%.

  We have several problems with this estimate of gamma. First, given the difficulties in estimating theta, the estimate of theta and hence gamma should not be based on one study, or on one method. Rather, it should be triangulated across multiple studies and multiple methods. In particular the estimate of theta should not just be reliant on ex-dividend studies, which are afflicted with many problems. This issue is discussed extensively in McKenzie and Partington (2010). In this paper, we argue that it is very unlikely that an accurate and reliable estimate of the value of franking credits will come out of a traditional ex-dividend study due to a number of problems including the extremely noisy data (it is not unusual to have a price movement up or down of more than twenty times the dividend on the ex-dividend day). Results are also sensitive to data filtering, the choice of estimation method and whether the ex-dividend day price is measured at the open or close of trading. Biased results can also arise from market microstructure effects such as bid-ask bounce. There are also abnormal volumes and abnormal returns about the ex-dividend day, which clearly

[802] M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 33–34.

indicate that trading is abnormal about the ex-dividend date. Consequently, it is an open question whether an ex-dividend study gives a dividend and franking credit valuation that reflects the clientele of investors normally holding the stock. Finally, there are conceptual and econometric problems. For example, multicollinearity in the regression equation used to separate the value of the dividends and franking credits. Reflecting the inaccuracy of the ex-dividend method and associated regression technique, the standard errors of the estimates from the regression equations are typically quite large.

- Lally (2013):[803]

> The AER's third approach to estimating *U* involves estimates derived from market prices (AER, 2013, pp. 133–134, 239–247). The AER does not consider that these estimates are useful for a number of reasons. In respect of dividend drop-off studies, these include evidence that trading activity around dividend ex-days is abnormal, that correction is required for market movements, and the sensitivity of results to data, outliers and model choices. More generally these problems include the difficulties in separating the values of franking credits and dividends in these studies, the wide range of empirical results from such studies, the possibility of bias from 'bid-ask bounce, and the exposure of such estimates to the tax circumstances and transactions costs of tax arbitrageurs. Many of these problems are manifest in high standard errors on the estimates of the coefficients.
>
> I concur with all of these concerns, and I have additional concerns about these studies or their interpretation.

Other academics have focussed on the specific issue of whether dividend drop off studies produce results that are reflective of investors in the market as a whole:

- Handley (2014):[804]

> The second issue also concerns the correct interpretation of the regression coefficient – but at a more fundamental level. Adjusting the coefficient to remove the impact of differential personal taxes and risk gives us the (after-company-before-personal-tax) value of a dollar of imputation credits but the question is value to whom? In other words, there remains a residual concern as to whether the composition of investors around the ex-dividend date is reflective of the composition of (long term) investors in the benchmark market who supply capital to firms (including to the benchmark efficient entity) and therefore whether the implied value of imputation credits around ex-dividend dates is representative of the value of imputation credits to the market as a whole.

- South Australian Centre for Economic Studies (2015):[805]

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[803] M. Lally, *The estimation of gamma*, 23 November 2013, p. 20.

[804] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44.

In order for a dividend drop-off study to provide useful evidence of the value of franking credits to a representative owner of equity three conditions need to be met:

- the studies being drawn on need to be of high quality;
- the equity holders who buy shares in the period after dividends are issued need to be representative of the whole class of equity holders; and
- the equity for which data is drawn on for the dividend drop off study needs to be representative of the overall stock of equity in the Australian economy

We would contend that only the first of these three conditions is definitely met.

The studies included by SFG consulting in their review of estimates for theta all appear to be of good quality and are undertaken in a manner which reflects the current best practice in the literature.

However, purchase of stocks in any given period is dominated by a relatively small share of equity holders who engage in active trading equities. Overall ownership of equities, however, is dominated by those who trade infrequently. As such there is no reason to believe that the value placed on franking credits by active traders of equities is the same as that placed on franking credits by those who trade infrequently.

On the third point, listed firms are also only part of the stock of Australian equity. Data from the ABS's 'Australian National Accounts: Financial Accounts' indicates that as at June 2014 unlisted shares comprised 44.5 per cent of the total value of shares in private firms (rising to 49.7 per cent if equity in government non-financial corporations is included).

Due to the unrepresentative nature of both traders in stock, and the ownership of listed stock, we believe that dropped dividend studies cannot be assumed to be informative about the value placed by median investor in the 'benchmark efficient entity'. As such, **we recommend that estimates derived from dropped dividend studies be disregarded**.

The limitations identified have been recognised by other regulators and reflected in their respective approaches to determining the utilisation rate:

- QCA (2014):[806]

  Given the concerns identified, the QCA does not prefer an estimate of 0.35 for the utilisation rate. The estimate is the result from only one study from one class of evidence, and this class of evidence suffers from serious conceptual and empirical limitations. Therefore, the QCA has assessed and given more weight to alternative approaches to estimate the utilisation rate.

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[805] SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, pp. 16–17.

[806] Queensland Competition Authority, *Cost of capital: Market parameters*, August 2014, pp. 27–28.

- The ERA, which until the publication of a revised draft Guideline in November 2014 preferred the use of dividend drop off studies, stated:[807]

> …dividend drop-off studies are known to suffer from a variety of estimation issues that result in the estimated value of theta being vulnerable to the dividend sample, parametric form of the regression equation and regression technique used. As a consequence, the Authority is of the view that it is more appropriate to use a range of dividend drop-off studies.

A.16 Revised consideration of the conceptual goalposts approach

We placed a degree of reliance upon the conceptual goalposts approach when coming to an estimate for the utilisation rate in the Guideline. However, we do not rely on the conceptual goalposts approach in this decision. This is mainly to be consistent with Handley's advice on the conceptual framework, which we have accepted in making this final decision. Further, we do not consider this to be a significant departure from the Guideline given we placed only limited reliance on the conceptual goalposts approach in the Guideline. We note we do not consider Lally's support of the conceptual goal posts approach, upon which we do not rely, supports the proposition that our conceptual analysis is confused and unsafe.[808] We also note the preference for Handley's advice over Lally's is to the benefit of the service providers as it results in a lower estimate of the value for imputation credits than would have been the case had we followed Lally's advice on this issue. Our revised consideration of the approach is set out in this section.

A.16.1 Description of the approach

The conceptual goalposts approach to informing estimates of the utilisation rate is based on a test devised by Lally to consider the 'reasonableness' of such estimates. To explain the approach, however, we must first explain some theoretical aspects of the modelling framework that we employ. The starting point for a CAPM is a given set of assets and a given set of investors who hold them.[809] In the Officer CAPM, the given set of assets is the domestic market and Lally considered that the given set of investors is domestic investors; that is, the domestic market is assumed to be 'fully segmented' from international markets.[810]

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[807] Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para. 920. As noted, the ERA has published a revised draft Guideline, which no longer prefers the use of dividend drop off studies: Economic Regulation Authority, *Review of the method for estimating the weighted average cost of capital for regulated railway networks, Revised draft decision*, 28 November 2014.

[808] SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 373.

[809] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 22.

[810] Note that the standard Sharpe–Lintner CAPM also assumes segmented capital markets. In effect, the Officer CAPM is the standard Sharpe-Lintner CAPM adjusted to incorporate imputation credits.

Lally considered it paramount to estimate the utilisation rate consistently with the underlying theoretical framework:[811]

> In my view, the most important requirements in selecting a methodology for estimating *U* [the utilisation rate] are that the estimate be consistent with the definition of *U*, as a value-weighted average over the utilisation rates of all investors who are relevant to the Officer CAPM, that the parameter estimate is likely to give rise to an estimated cost of equity from the Officer model that lies within the bounds arising from either complete segmentation or complete integration of equity markets, and that the estimate is reasonably precise.

The importance of theoretical consistency led Lally to recommend that the optimal estimate of the utilisation rate is 1, on these conceptual grounds:[812]

> In respect of *U*, there are five possible approaches to estimating it. The first of these arises from the definition of the parameter as a weighted average across all investors; coupled with ignoring foreigners (consistent with the Officer CAPM), this yields an estimate of 1 (the utilisation rate of local investors).
>
> …
>
> Using the three criteria described above, my preferred estimate is 1 from the first approach…

An alternative to the 'domestic' Officer CAPM is an international CAPM, whereby the relevant set of assets is all assets in the world and the relevant set of investors is all investors in the world; that is, the domestic market is assumed to be 'fully integrated' with international markets. Using this model would require inputs based on international benchmarks, including a utilisation rate of 0 because the proportion of global investors eligible to make use of domestic imputation credits is close to zero.

Both in the Guideline and in this final decision, we propose an approach to estimating the utilisation rate that recognises foreign investors to the extent that they invest in the Australian market. Thus, our approach sits between the alternative positions of Lally's interpretation of the Officer framework (where only domestic investors are recognised) and an international framework. This was recognised by Lally:[813]

> The AER (2013, section 8.3.1, page 120) also includes foreign investors to the extent that they invest in the Australian market, to reflect the empirical reality of their existence. However this involves use of a model (the Officer CAPM) that assumes that national markets for risky assets are segmented along with the definition for a parameter (*U*) that is inconsistent with this model.

Lally considered the overarching concern is whether the inconsistency between input parameters and model definitions might produce an unreasonable outcome. That is,

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811 M. Lally, *The estimation of gamma*, 23 November 2013, p. 3.

812 M. Lally, *The estimation of gamma*, 23 November 2013, pp. 3 and 4.

813 M. Lally, *The estimation of gamma*, 23 November 2013, p. 14.

even if the individual components are each justified in isolation, the combination might produce an overall result that is no longer reasonable:[814]

> The Officer (1994) CAPM implicitly assumes that national markets for risky assets are completely segmented, in the sense that investors are precluded from purchasing foreign risky assets. However, most estimates of *U* reflect the presence of foreign investors. Consequently the potential for economically unreasonable estimates of the cost of equity arises, i.e., values that lie outside range of those arising under complete segmentation and complete integration of national markets for risky assets. In this event the partial recognition of foreign investors would effectively constitute cherry-picking that maximises the revenue or price cap, i.e., ignoring foreign investors when it is favourable to regulated firms (choosing the CAPM) and also estimating *U* by a methodology that reflects the presence of these investors when it is also favourable to regulated firms. We therefore assess whether various estimates of *U* lead to this outcome.
>
> To do so it is necessary to consider the implications for the cost of equity of complete integration and complete segmentation of national markets for risky assets.

Lally pointed out that, while there is some uncertainty about the return on equity in a partial integration scenario, it must lie within two boundaries. At one end, there is the return on equity that would be required if the domestic market was fully segmented from international markets. At the other extreme is the return on equity if the capital market was fully integrated with international markets. To assess whether the approach in the draft Guideline passed this test, Lally estimated for the average Australian firm:[815]

- The return on equity under segmentation, using a domestic-only (segmented) CAPM populated with domestic parameters. That is, a market risk premium for a segmented Australian market, an equity beta relative to the Australian market, and a utilisation rate of 1.
- The return on equity under integration, using an international CAPM (based on Solnik, 1974) populated with global parameters. That is, using a market risk premium for an integrated (global) market, an equity beta relative to the global market and a utilisation rate of 0.
- The return on equity using a segmented (Officer) CAPM, populated with parameters that accord with our 'partially integrated' market definition. That is, a market risk premium and an equity beta that reflect the domestic market, but recognising foreign investors to the extent that they invest in the domestic (Australian) market.

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[814] M. Lally, *The estimation of gamma*, 23 November 2013, p. 38.

[815] M. Lally, *The estimation of gamma*, 23 November 2013, pp. 38–47.

Lally's aim was to ascertain what utilisation rates under the third scenario will result in a return on equity that lies between the two 'goalposts' represented by the return on equity from the first two scenarios (full segmentation and full integration). This is how Lally presented the results of this assessment:[816]

> In summary, in the face of an inconsistency between the use of the Officer model (which assumes that national equity markets are segmented) and an estimate of the utilisation rate on imputation credits that is less than 1 (which reflects the presence of foreign investors), a minimum requirement is that the results from this approach should lie within the bounds arising from complete segmentation of national equity markets and complete integration (to ensure that the cost of capital results are consistent with some scenario regarding segmentation or integration). However, estimates of *U* that are significantly less than 1 fail this test in virtually every case examined, and are therefore deficient. In effect, combining Officer's CAPM with a utilisation rate that is significantly less than 1 constitutes a defacto form of cherry-picking of parameter values and models that maximises the price or revenue cap for regulated businesses. By contrast, if the Officer model were combined with a utilisation rate on imputation credits of 1, or close to it, the test described here would be satisfied in most cases. All of this suggests that, if the Officer model is used, the only sensible estimate of the utilisation rate is at or close to 1.

This analysis contributes to Lally's conclusion that the utilisation rate should be 1 or close to it. To refine this estimate, we undertook further analysis using the approach set out by Lally. This indicated that utilisation rates between 0.8 and 1 generate a reasonable return on equity (that is, one that lies between the goalposts) in the majority of permutation scenarios. Further, when interpreting this sensitivity analysis, it is also relevant to consider whether each particular scenario has arisen from an extreme permutation—that is, if the individual parameters are all at their highest (or lowest) possible values. Such a scenario is much less likely than a permutation where most of the parameters are at their expected values. A utilisation rate of 0.6 or below generates very few return on equity results that are reasonable (between the goalposts), and these all arise at extreme permutations.

In conclusion, in the Guideline we considered that the conceptual goalposts approach supported an estimate of the utilisation rate in the range 0.8 to 1. We considered also that it suggested that a utilisation rate of 0.6 or below was unreasonable.

A.16.2 Advice received since the Guideline

In advice received since the Guideline's publication, Handley advised that he does not consider the conceptual goalposts approach to be a reasonable approach to estimating the utilisation rate:[817]

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816 M. Lally, *The estimation of gamma*, 23 November 2013, pp. 46–47.

817 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 31–32.

> I do not consider the conceptual goalpost approach to be a reasonable approach to estimation as first, it is motivated by a faulty premise – that the CAPM suggested by Officer implicitly assumes that national markets for risky assets are completely segmented in the sense that all domestic assets are held by domestic investors only and all foreign assets are held by foreign investors only – and second, that it seeks to sure up one uncertain estimate by reference to two other estimates (the "goalposts") which themselves are subject to substantial uncertainty.

Handley expanded on his first point elsewhere in his advice:[818]

> Lally (2013) adopts an unnecessarily narrow interpretation of segmentation in suggesting that foreign investors should be excluded completely. But once you choose a proxy for the market portfolio you define not only the set of assets that are relevant for pricing purposes but you also define the set of investors that are relevant for pricing purposes – in other words, it is a joint assumption. Lally's suggestion that we include the full set of *n* assets but only a subset of the of *m* investors not only contradicts the starting point of the CAPM but also does not accord with the reality that foreign investors are present in and influence the pricing of assets in the domestic market. This notion of (complete) segmentation – that only domestic assets are held by domestic investors – is an assumption of Lally but is not an assumption of the CAPM.

Thus, Handley's first point is that he does not consider the return on equity yielded by a domestic CAPM that ignores foreign investors to be a reasonable goalpost against which to assess the return on equity yielded by our approach. Handley's second point appears to accord closely with his view that estimation of the utilisation rate and the value of imputation credits is imprecise.[819]

Gray (for SFG) also raised concerns with the approach, and a number of these have been responded to by Lally.[820]

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818 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 23.

819 J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 3 and 32.

820 SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, pp. 88–93; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, pp. 31–33.