Draft decision

ActewAGL distribution determination

2015–16 to 2018–19

Attachment 4: Value of imputation credits

November 2014

Note

This attachment forms part of the AER's draft decision on ActewAGL's 2015–19 distribution determination. It should be read with other parts of the draft decision.

The draft decision includes the following documents:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Value of imputation credits

Attachment 5 – Regulatory depreciation

Attachment 6 – Capital expenditure

Attachment 7 – Operating expenditure

Attachment 8 – Corporate income tax

Attachment 9 – Efficiency benefit sharing scheme

Attachment 10 – Capital expenditure sharing scheme

Attachment 11 – Service target performance incentive scheme

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Attachment 16 – Alternative control services

Attachment 17 – Negotiated services framework and criteria

Attachment 18 – Connection methodology

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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	aggregate service revenue requirement
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
CPI-X	consumer price index minus X
DRP	debt risk premium
DMIA	demand management innovation allowance
DMIS	demand management incentive scheme
distributor	distribution network service provider
DUoS	distribution use of system
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
expenditure assessment guideline	expenditure forecast assessment guideline for electricity distribution
F&A	framework and approach
MRP	market risk premium

Shortened form	Extended form
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
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
RIN	regulatory information notice
RPP	revenue pricing principles
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
WACC	weighted average cost of capital

4 Value of imputation credits

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. Imputation credits are therefore valuable to investors and are a benefit to investors in addition to any cash dividend or capital gains they receive from owning shares.

In determining a service provider's revenue allowance, the rules 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').[2] That is, the revenue allowance granted to a service provider to cover its expected tax liability must be reduced in a manner consistent with the value of imputation credits. The regulatory framework identifies that:

- A service provider should be compensated for the expected tax liability of the benchmark efficient entity.

- The benchmark efficient entity's expected payment of company tax would generate imputation credits which it could distribute to its investors.

- A service provider should not be compensated for the value of imputation credits to investors in the benchmark efficient entity.

In this attachment, we set out our draft decision on the value of imputation credits and our key reasons for this position. We also consider ActewAGL'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 ActewAGL's proposal in more detail.

4.1 Draft decision

We do not accept ActewAGL's proposed value of imputation credits of 0.25. Instead, we adopt a value of imputation credits of 0.4.

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.[3] 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.[4]

In coming to a value of imputation credits of 0.4, we have considered the multitude of evidence before us with regard to its merits. Specifically, 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'.[5] Moreover, we have regard to:

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[1]   *Income Tax Assessment Act 1997*, parts 3–6.
[2]   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) and 6A.6.4; NGR, rs. 76(c) and 87A.
[3]   See section A.1 of appendix A.
[4]   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.
[5]   These sub-parameters are discussed further in section 4.4.

- The widely accepted approach to estimating the distribution rate.

- The range of approaches relevant to estimating the utilisation rate, with due regard to the merit of each approach.

Overall, this evidence suggests that 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 for imputation credits of 0.4 from within a range of 0.3 to 0.5. Importantly, we consider that a value of imputation credits of 0.4 provides service providers with a reasonable opportunity to recover at least their efficient corporate tax costs, and that this value is consistent with the building block framework embedded in the rules.

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.

4.2 ActewAGL's proposal

ActewAGL proposed a value of imputation credits of 0.25, calculated as the product of a distribution rate of 0.7 and a utilisation rate of 0.35.[6] Its proposed distribution rate of 0.7 was consistent with the estimate adopted in the Guideline.[7] Its proposed utilisation rate of 0.35 was lower than the 0.7 in the Guideline. In proposing a different utilisation rate, ActewAGL considered that the only source of relevant evidence were studies that seek to infer from market prices the value to investors of distributed imputation credits ('implied market value studies'). Further, ActewAGL proposed that the best estimate of the utilisation rate from implied market value studies was 0.35 from a 'dividend drop off' study conducted by SFG Consulting (SFG).[8]

ActewAGL's proposed value of imputation credits of 0.25 and supporting reasons were consistent with the proposals we have received from a number of other service providers with current regulatory decisions.[9] Further, these service providers jointly commissioned a report from SFG and relied on this report extensively in their proposals. Accordingly, our analysis of ActewAGL's proposal is also applicable and consistent with our analysis of the proposals from those other service providers.

4.3 AER's assessment approach

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

- the requirements of the law and rules

- the Guideline

- our definition of the benchmark efficient entity

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[6]   ActewAGL actually referred to the utilisation rate as 'the value of distributed imputation credits to investors who receive them', and labelled this parameter the Greek letter 'theta'. The alternative labelling and interpretations of the utilisation rate are discussed in section A.7 of appendix A.

[7]   We discuss the Guideline in section 4.3.2.

[8]   ActewAGL, *Gamma, detailed proposal*, May 2014. We discuss the different types of implied market value study, including dividend drop off studies, in section A.14 of appendix A.

[9]   The service providers with current regulatory decisions that made consistent proposals on the value of imputation credits were ActewAGL, Ausgrid, Directlink, Endeavour Energy, Essential Energy, JGN and TransGrid.

- expert reports, and

- our approach to determining the value of imputation credits.

4.3.1 Requirements of the law and rules

The rules 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:[10]

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

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 rules, 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. In this context, we note the 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 consistent with our value of imputation credits.[11]

We must make our decision in a manner that will or is likely to contribute to the achievement of the national electricity/gas objective.[12] Further, when exercising a discretion in making the relevant parts of a decision, we must take into account the revenue and pricing principles.[13] The revenue and pricing principles provide, amongst other things, that 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. The revenue and pricing principles also provide that 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.[14] Therefore, the value of imputation credits we adopt must ultimately promote the achievement of the national electricity/gas objective (via its application in the estimated cost of corporate income tax building block) and must take into account the revenue and pricing principles in the law.

With reference to the language of these principles, 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, and

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[10] NER, cll. 6.5.3 and 6A.6.4; NGR, r. 87A.
[11] NER, cll. 6.5.2(d)(2) and 6A.6.2(d)(2); NGR, r. 87(4)(b).
[12] NEL, s. 16(1)(a); NGL, s. 28(1)(a).
[13] NEL, s. 16(2)(a)(i); NGL, s. 28(2)(a)(i).
[14] 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 a wide 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 achieves a balance between the opportunity for service providers to recover at least efficient costs but that is commensurate with relevant risks.

We also consider that determining a value of imputation credits in a manner consistent with the building block revenue framework embedded in the rules will contribute to the achievement of the national electricity/gas objective and the revenue and pricing principles. This is because the value of imputation credits is a component of this framework, and this framework as a whole is designed to achieve the objective and the revenue and pricing principles.

4.3.2 Rate of return guideline

In December 2013, we published the Guideline which is available on our website.[15] Within it we specified:[16]

- 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.[17] We discuss in detail in attachment 3 on the rate of return our development of the Guideline.

The Guideline is not binding on us in determining the value of imputation credits. However, should we decide to depart from the Guideline we must provide reasons for doing so.[18] Equally, it is open to service providers to propose departures from the Guideline, so long as they provide reasons.[19] We have identified in section 4.2 where the proposals we have received on the value of imputation credits have departed from the Guideline. We identify in section 4.4 the departures we have made in this draft decision from the Guideline position on the value of imputation credits.

4.3.3 Definition of benchmark efficient entity

As shown in section 4.3.1, the rules refer to a 'benchmark efficient entity'. For the benchmark efficient entity, we have adopted:

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

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[15] The requirements to make and publish the Guideline are set out in: NER, cll. 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.
[16] NER, cll. 6.5.2(n) and 6A.6.2(n); NGR, r. 87(14).
[17] NER, cll. 6.5.2(n)(2) and 6.A.6.2(n)(2); NGR, r. 87(14)(b).
[18] NER, cll. 6.2.8(c) and 6A.2.3(c); NGR, r. 87(18).
[19] NER, ss. S6.1.3(9)–(9B) and 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'.[20]

Our benchmark efficient entity includes the following sub-components as defined below.

Pure play

A pure play business is one which offers services focused in one industry or product area. In this context, it means that the benchmark efficient entity provides only regulated energy network services.

Regulated

A regulated entity for the purposes of our benchmark is one which is subject to economic regulation (that is, revenue price cap regulation) under the National Electricity Rules and/or the National Gas Rules (the rules).

Energy network business

Energy network refers to a gas distribution, gas transmission, electricity distribution or electricity transmission business.

Operating within Australia

The benchmark efficient entity should be operating within Australia as 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. 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   Expert reports

During the development of the Guideline, we commissioned expert advice on the value of imputation credits from Associate Professor Martin Lally of the Victoria University of Wellington.[21]

To assist us in making this draft decision on the value of imputation credits proposed by the service providers, we commissioned further expert advice from Associate Professor John Handley of the University of Melbourne.[22] We have also had regard to, among other things:

- The May 2014 report from SFG that was jointly commissioned by the service providers and submitted to us with their proposals.[23]

- A March 2014 report by Associate Professor Lally that was commissioned by the Queensland Competition Authority.[24]

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[20]   AER, *Better regulation: rate of return guideline*, December 2013, p. 7.
[21]   M. Lally, *The estimation of gamma*, 23 November 2013.
[22]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014.
[23]   SFG, *An appropriate regulatory estimate of gamma*, May 2014.
[24]   M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

- 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.[25] 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.[26]

- A June 2013 report on the distribution rate by NERA Economic Consulting (NERA) that was commissioned by the Energy Networks Association.[27]

We took into account the reports from Lally, Hathaway and NERA in the Guideline. We consider the other reports for the first time in this decision.

4.3.5 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.[28] Our approach to determining the value of imputation credits is guided by:

- The requirements of the rules—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.[29]

- Relevant academic literature—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.[30] 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), and

  - the utilisation value to investors in the market per dollar of imputation credits distributed (the utilisation rate).[31]

Consistent with this literature, we determine the value of imputation credits as the product of these two parameters.

- A wide range of relevant evidence—while there is a widely accepted approach to estimating 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').

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

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

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

[28] See sections A.1 and A.2 of appendix A.

[29] See section A.4 of appendix A.

[30] See section A.5 of appendix A.

[31] See section A.5 of appendix A.

- The reported value of credits utilised by investors in Australian Taxation Office (ATO) statistics ('tax statistics').

- Studies that seek to infer from market prices the value to investors of distributed imputation credits ('implied market value studies').

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 (listed equity only).[32] 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, and

  - relevance of different estimation techniques, particularly for the utilisation rate.

4.4 Reasons for draft decision

In determining the value of imputation credits, we have considered the wide range of evidence before us with regard to its merits. 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.[33] The equity ownership approach was Lally's second preference after his recommendation for a utilisation rate of 1.[34]

- It is within the 'preferred' range for the value of imputation credits (0.4 to 0.5) in Handley's recent advice.[35]

- 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

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[32] 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. See section A.8.1 of appendix A for more discussion.

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

[34] M. Lally, *The estimation of gamma*, 23 November 2013, p. 4. Lally's recommendation of a utilisation rate of 1 is based on his consideration that, because we use a domestic 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).

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

espoused by experts, and was recognised by Handley and McKenzie and Partington.[36] The imprecision of determining the value of imputation credits was emphasised by Handley.[37]

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 draft decision we consider that:

▪ We may have regard to evidence from all equity and/or listed equity only. Some experts advocate use of evidence on only listed companies and their investors because this is considered to be more reflective of the benchmark efficient entity and its investors, or because this is consistent with the use of evidence from only listed companies when estimating the market risk premium. However, there is no consensus on this point. We discuss the issue further in section A.8.1 of appendix A. We did not consider this issue in the Guideline.

▪ It would be inappropriate to pair an estimate of the utilisation rate from listed equity only with an estimate of the distribution rate from all equity (and vice versa). There is a relationship between definitions and estimates of the distribution rate and utilisation rate that should be recognised when estimating the value of imputation credits. In the Guideline, we estimated the distribution and utilisation rates independently, and did not recognise this relationship. We discuss this relationship further in section A.8.2 of appendix A.

Recognising these considerations, table 4.1 and table 4.2 show estimates of the value of imputation credits that arise from internally consistent evidence from all equity and listed equity only, respectively. These individual sources of evidence allow us to present estimates to two decimal places. However, as discussed above, 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 4.1   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	0.55 to 0.7	0.7	0.39 to 0.49
Tax statistics	0.43	0.7	0.3

Source: AER analysis.

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[36]   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.
[37]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 32.

Table 4.2   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	0.4 to 0.6	0.8	0.32 to 0.48
Implied market value studies	0 to 1	0.8	0 to 0.8
SFG dividend drop off study[a]	*0.35 (0.4)*[b]		*0.28 (0.32)*[b]

Source: AER analysis.
(a):   The service providers' proposals rely on this study from within the class of implied market value studies.
(b):   Following the adjustment proposed by Handley and Lally. This adjustment is discussed further in section 4.4.2.

Overall, the evidence suggests that a reasonable estimate of the value of imputation credits is within the range 0.3 to 0.5.[38] From within this range, we choose a value of 0.4. This is because:

▪ The equity ownership approach, on which we have placed the most reliance, suggests a value between 0.4 and 0.5 when applied to all equity and between 0.3 and 0.5 when applied to listed equity only. Therefore, the balance of evidence from the equity ownership approach suggests a value between 0.4 and 0.5.

▪ The evidence from tax statistics suggests the value could be lower than 0.4. Therefore we choose a value at the lower end of the range suggested by the balance of evidence from the equity ownership approach (that is, 0.4).

▪ A value of 0.4 is also reasonable in light of the evidence from implied market value studies which produces results both higher and lower than this value, and the lesser degree of reliance we have placed upon these studies.

The reasons for the relative levels of reliance that we place on different types of evidence are set out in this attachment and appendix A.

We therefore do not accept the service providers' proposed value of imputation credits of 0.25, calculated as the product of a distribution rate of 0.7 and a utilisation rate of 0.35. Specifically, we do not accept the service providers' proposed estimate of the utilisation rate of 0.35. This is because:

▪ We do not consider it reasonable to rely exclusively on the results of a single study from within the class of implied market value studies (that is, SFG's dividend drop off study). McKenzie and Partington's report for the Queensland Resources Council suggested that it is reasonable to have regard to implied market value studies other than SFG's.[39]

▪ We do not consider it reasonable to rely exclusively on the implied market value studies class of evidence. Handley and Lally advised that other classes of evidence are more relevant.[40]

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

[39]   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.

[40]   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 4.4.2.

McKenzie and Partington's report for the Queensland Resources Council suggested that it is reasonable to have regard to other classes of evidence.[41]

Even if the two points above are disregarded, and an estimate of the utilisation rate of 0.35 from SFG's study was used, we still 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.[42] We accept their approach.

▪ This is an estimate of the utilisation rate of investors in listed equity only, and therefore it should be paired with an estimate of the distribution rate from listed equity only (that is, 0.8).

Therefore, we consider that even if the service providers' proposed utilisation rate is used, it yields a value of imputation credits of (0.4 x 0.8) 0.32 rather than 0.25. However, with regard to discussion above, our preferred value of imputation credits is still higher than 0.32.

In the following sections, we describe the sources of the estimates in table 4.1 and table 4.2, and we present our assessment of the underlying evidence.

4.4.1 The distribution rate

We define the distribution rate as the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.[43] We use a 0.8 estimate of the distribution rate in combination with estimates of the utilisation rate from listed equity only, and a 0.7 estimate of the distribution rate with estimates of the utilisation rate from all equity.

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').[44] Using this approach, NERA estimated a distribution rate across all equity of 0.7 for the period 1987 to 2011.[45] Hathaway found a similar estimate for the period 2004 to 2011.[46]

We use the cumulative payout ratio approach because it:

▪ is simple and intuitive

▪ uses long-term, published data, and

▪ is supported by the service providers, SFG, Handley and McKenzie and Partington.[47]

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41 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.

42 We discuss the adjustment advised by Handley and Lally in section 4.4.2.

43 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.

44 We discuss the cumulative payout approach and alternative approaches to estimating the distribution rate in section A.9 of appendix A.

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

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

47 SFG, *An appropriate regulatory estimate of gamma*, 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

Also using this approach, Handley estimated a distribution rate across listed equity only of 0.8 for the period 1987 to 2011.[48] A distribution rate across listed equity only was not presented in the Guideline. However, as set out above, we now consider that:

- It is open to us to have regard to evidence from all equity and/or listed equity only.

- It would be inconsistent to pair an estimate of the utilisation rate from listed equity only with an estimate of the distribution rate from all equity (and vice versa).

4.4.2 The utilisation rate

We define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed. 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.[49] 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 get a refund. We discuss our interpretation and definition of the utilisation rate further in sections A.5 and A.7 of appendix A.

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

- significant reliance upon the equity ownership approach

- some reliance upon tax statistics, and

- less reliance upon implied market value studies.

The results from those classes of evidence on which we place reliance are summarised in table 4.1 and table 4.2.

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.[50] We discuss each approach in the sections below.[51] We depart from the Guideline by not relying upon the 'conceptual goalposts approach'. We discuss this approach and our revised consideration of it in section A.16 of appendix A.

Responses to key issues raised by stakeholders

The issues raised by the service providers in relation to the utilisation rate are addressed in the relevant sections below and in various sections of appendix A.

G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 31.

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

[49] 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.7.1 of appendix A.

[50] 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.

[51] 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.10 of appendix A.

There were two material comments on the value of imputation credits in submissions from consumer representatives to the current set of regulatory decisions:

- The Public Interest Advocacy Centre submitted that the Australian Competition Tribunal's decision in 2011 to rely on an estimate of the utilisation rate from SFG's dividend drop off study should not be viewed as permanently determinative.[52] We agree with these comments in light of the Australian Competition Tribunal's finding that:[53]

  > Further, the Tribunal notes that estimation of a parameter such as [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.

- The Energy Markets Reform Forum submitted that an appropriate estimate of the value of imputation credits should not be considered in isolation from other rate of return parameters.[54] We agree that the reasonableness of the overall rate of return is of primary importance and we have taken into account the interrelationships that exist between rate of return parameters.

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. 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.[55]

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, and

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

We have regard also to the limitations of this approach, but we do not consider them significant. We discuss these limitations in section A.11 of appendix A.

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

- 0.55 and 0.70, if all equity is considered.

- 0.40 and 0.60, if only listed equity is considered.

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[52] 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.
[53] Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, 12 May 2011, para. 45.
[54] EMRF, *NSW electricity distribution revenue reset, Applications by Ausgrid, Endeavour Energy and Essential Energy, A response*, July 2014, p. 38.
[55] Specifically, we use data from Australian National Accounts: Financial Accounts (ABS cat. 5232.0).

This broadly accords with Handley's advice on the equity ownership approach, noting that Handley's report uses the March 2014 release of the relevant data whereas we have subsequently used the September 2014 release.[56]

However, this differs from the Guideline, in which 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.11 of appendix A.

Responses to key issues raised by stakeholders

The service providers submitted that the equity ownership approach, and other measures of the utilisation or redemption of imputation credits, do not reflect a number of factors which affect investors' valuation of imputation credits.[57] We have received advice from Handley on these factors, and our responses are set out in detail in section A.7.2 of appendix A. In summary, we consider that such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate.

The service providers also submitted that rates of domestic ownership in Australian entities are in fact lower than what is stated in the Guideline.[58] The service providers refer to SFG's analysis of this issue.[59] We address SFG's analysis in section A.12 of appendix A, and consider that the figures presented in section A.11 of appendix A reflect the most up-to-date data available on domestic ownership in Australian equity. In summary, the difference is because the service providers referred to the proportion of domestic ownership data on listed equity only, whereas in the Guideline we used data from all equity. In this decision, we rely on the proportion of domestic ownership using data from both listed equity only and all equity.

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).[60] 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 amount of credits utilised divided by the reported amount of credits distributed is a reasonable 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

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[56] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 36.

[57] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, pp. 13–14; Directlink, *Directlink submission on gamma*, May 2014, p. 15; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, pp. 13–14. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 14–15; JGN, *Gamma proposal*, June 2014, pp. 17–18; and TransGrid, *TransGrid's approach to gamma*, May 2014, pp. 19–20.

[58] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 16; Directlink, *Directlink submission on gamma*, May 2014, p. 17; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 16. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 16–17; JGN, *Gamma proposal*, June 2014, pp. 20–21; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 22.

[59] SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 402–413.

[60] These statistics are available at: https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/. Accessed 17 November 2014.

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.[61] Lally considered that the tax statistics approach lacks precision, and he did not prefer it to the equity ownership approach.[62] However, Lally still preferred tax statistics to implied market value studies which he considered to be even more problematic.

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:

- 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.[63]

- They do not provide estimates of the utilisation rate for investors in listed equity only. Handley and SFG both suggested that evidence from listed equity is more relevant to the benchmark efficient entity.[64]

- 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'.[65]

With regard to Hathaway's analysis, we consider that tax statistics support an estimate of the utilisation rate between 0.4 and 0.6.[66] However, our estimate of the distribution rate implies 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,[67] and

- consistent with our preferred estimates of the distribution rate.

This leads us to a range of 0.4 to 0.6, with an estimate of 0.43 being reasonable because this is consistent with our estimate of the distribution rate across all equity of 0.7. We discuss our revised consideration of tax statistics in more detail in section A.13 of appendix A.

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[61] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.
[62] M. Lally, *The estimation of gamma*, 23 November 2013, p. 4.
[63] 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 public funds declared by the Treasurer to be a developing country relief fund and exempt institutions that are eligible for a refund under a law other than the income tax law (for example, the Future Fund Board of Guardians). See: https://www.ato.gov.au/Business/Imputation/In-detail/Refunding-franking-credits/Refund-of-franking-credits---FAQs/?page=6. Accessed 17 November 2014.
[64] We discuss this issue further in section A.8.1 of appendix A.
[65] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, paras. 9 and 99–100.
[66] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.
[67] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

Responses to key issues raised by stakeholders

The service providers submitted that tax statistics, and other measures of the utilisation or redemption of imputation credits, do not reflect a number of factors which affect investors' valuation of imputation credits.[68] We have received advice from Handley on these factors, and our responses are set out in detail in section A.7.2 of appendix A. In summary, we consider that such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate.

The service providers also submitted that no weight should be placed on estimates of the utilisation rate from tax statistics because of significant unresolved problems identified with the data.[69] In support of this, the service providers refer to the issues identified by Hathaway. We are mindful of these data concerns, and this is reflected in the level of reliance that we place upon this class of evidence. However, we also note Hathaway's finding 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'.[70] Moreover, Hathaway stated that:[71]

> The only reasonably reliable estimate that I can obtain from the taxation statistics is the [distribution rate], which is obtained from the [franking account balance] data.

We therefore consider that a distribution rate of around 0.7 and a utilisation rate of 0.43 are reasonable estimates but are subject to residual data concerns that should be acknowledged.

Further, as noted above, the level of reliance that we have placed upon tax statistics is supported by expert advice from Handley and Lally.

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 before and after a dividend is distributed. 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.14.1 of appendix A.

Although we consider that implied market value studies provide evidence relevant to the utilisation rate, we also consider that these studies can be subject to a number of limitations. Handley considered that dividend drop off studies are the most relevant class of implied market value study, but that they are less important to estimating the utilisation rate than the equity ownership approach

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[68] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, pp. 13–14; Directlink, *Directlink submission on gamma*, May 2014, p. 15; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, pp. 13–14. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 14–15; JGN, *Gamma proposal*, June 2014, pp. 17–18; and TransGrid, *TransGrid's approach to gamma*, May 2014, pp. 19–20.

[69] 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.

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

[71] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 104.

and tax statistics.[72] Lally identified a number of issues with using market prices to estimate the utilisation rate, and did not prefer this approach to the equity ownership approach.[73]

The limitations of implied market value studies include:

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

▪ The results of these studies can reflect factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate.

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

▪ These studies can be data intensive and employ complex and sometimes problematic estimation methodologies.

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

The limitations of dividend drop off studies are discussed in more detail in section A.15 of appendix A.

The available implied market value studies produce estimates for the utilisation rate between 0 and 1, with some studies even producing estimates outside this range. We summarise the available studies and their results in section A.14.2 of appendix A. Opinion on the merits of the various studies differs:

▪ SFG considered that implied market value studies should be relied upon exclusively when estimating the utilisation rate. Moreover, it considered that dividend drop off studies should be preferred to alternative market studies, and that there is no reasonable basis for adopting an estimate from dividend drop off analysis above the 0.35 estimate from its study.[74]

▪ The Economic Regulation Authority of Western Australia (ERA), which at present relies exclusively on dividend drop off studies when estimating the utilisation rate, conducted its own dividend drop off study and concluded that a reasonable estimate is between 0.35 and 0.55.[75]

▪ 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.[76]

▪ 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.[77]

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[72] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.
[73] M. Lally, *The estimation of gamma*, 23 November 2013, p. 4.
[74] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 185.
[75] Economic Regulation Authority, *Explanatory statement for the rate of return guidelines*, 13 December 2013, para. 921.
[76] M. Lally, *The estimation of gamma*, 23 November 2013, pp. 20–30.
[77] M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 34.

In light of these differing views and the range of estimates, we consider that implied market value studies provide limited guidance. However, we note that the estimates of the utilisation rate from the equity ownership approach and tax statistics sit within the broad range of estimates from this class of evidence. This provides a degree of support for estimates from the equity ownership approach and tax statistics.

Our assessment of implied market value studies differs to that in the Guideline. 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, with regard mainly to the view of McKenzie and Partington that there is no obvious manner by which the results of implied market value studies should be filtered, we no longer propose to do so.[78]

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 we use investors are assumed to value a dollar of dividends at one dollar. However, the results of implied market value studies can reflect certain factors that cause an investor to value a dollar of dividends at less than one dollar (such as personal tax circumstances). Moreover, any such factors will also affect investors' valuation of imputation credits. Handley and Lally advised that the desired estimate of the utilisation rate should exclude the effect of these factors. 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.[79] 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. This interpretation issue applies to other implied market value studies where investors' estimated valuation of dividends is less than one dollar. This includes the ERA study. Given a coefficient on dividends in that study of 0.88, the adjusted range of estimates for the utilisation rate is 0.4 to 0.63.[80] McKenzie and Partington's average estimate of 0.53 will also be higher when the adjustment is applied to the results from the studies to which they have regard.

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[78] We became aware of McKenzie and Partington's report following the publication of the Guideline and we have considered it in making this decision.

[79] 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.

[80] D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', ERA working paper, April 2013.

Responses to key issues raised by stakeholders

The service providers submitted that the only source of evidence that can be used to derive a point estimate of the utilisation rate is market value evidence.[81] We disagree. There is no consensus that only market value evidence is relevant. Moreover, the views of Handley, Lally and McKenzie and Partington, which have already been discussed, support the wider range of evidence to which we have regard.

The service providers also submitted that not all dividend drop off studies should be given equal weight. Instead, the service providers submitted that the choice of relevant study must take into account:[82]

- the time period covered (specifically, data should come from the period since 2000, when the change in tax law entitled eligible investors to a refund of credits that exceeded their tax liability), and

- the robustness of the methodology and the data relied upon.

These are reasonable filters to apply, and we applied similar filters when considering the results of dividend drop off studies for the purposes of the Guideline. However, we now consider that:

- Studies that use pre-2000 data need not be strictly disregarded. This is because results from these studies can be interpreted with due regard to this limitation; specifically, one can consider that the results from these studies indicate a value of distributed credits that it is almost certainly lower than it would have been were investors at the time entitled to a refund of excess credits.

- The reports by Lally and McKenzie and Partington provide no indication that a consensus exists as to the best method by which the value of distributed imputation credits can be inferred from market prices.[83]

SFG has addressed Lally's view that estimates of the utilisation rate from implied market value studies should be adjusted by investors' estimated valuation of dividends.[84] In its discussion, SFG noted that dividend drop off estimates of the value of distributed credits reflect the combined effect of three categories of reasons why imputation credits are likely to have a value less than their face value:[85]

> a) Reasons that also apply to dividends (e.g., the possible effects of personal taxes);
>
> b) The fact that not all credits will be utilised; and
>
> c) Other reasons (e.g., there is a time delay in receiving them, there are administrative costs in redeeming them and there are portfolio diversification costs in acquiring them).

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[81] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.5; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 23; Directlink, *Directlink submission on gamma*, May 2014, p. 25; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 23. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 22; JGN, *Gamma proposal*, June 2014, p. 27; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 30.

[82] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.4; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 19; Directlink, *Directlink submission on gamma*, May 2014, p. 20; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 19. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 19; JGN, *Gamma proposal*, June 2014, p. 24; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 25.

[83] M. Lally, *The estimation of gamma*, 23 November 2013, pp. 20–30; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, pp. 35–38; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 32–35.

[84] SFG, *An appropriate regulatory estimate of gamma*, May 2014, pp. 35–36.

[85] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 174.

Handley reviewed this response from SFG. As discussed in section A.7.1 of appendix A, Handley advised that:[86]

> …ideally we want the value of credits before administrative costs, personal taxes and diversification costs.

Thus SFG has identified that the results of dividend drop off estimates reflect some factors that are not relevant to the utilisation rate. Moreover, it is Handley and Lally's advice that to the extent such estimates can be adjusted for these factors (because we can observe the effect they are having on estimates of the value of dividends), then this adjustment should be made.

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[86] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

A   Value of imputation credits: Detailed analysis

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

All service providers with current regulatory decisions (ActewAGL, Ausgrid, Directlink, Endeavour Energy, Essential Energy, JGN and TransGrid), with the exception of TasNetworks, proposed a value of imputation credits of 0.25. The reasons submitted by those service providers were largely the same and the service providers jointly commissioned a report from SFG and relied on that report extensively in their proposals. Accordingly, our analysis in this appendix is applicable and consistent with our analysis of the proposals from those other service providers.

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 4.3 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.

Table 4.3   Summary of expert views on the value of imputation credits

Expert	Distribution rate	Utilisation rate	Value of imputation credits
Lally (2013, 2014)[87]	**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
McKenzie and Partington (2013)[88]	**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)[89]	**0.8**, using cumulative payout ratio approach over listed equity	**0.5 to 0.6**, with regard to (in order of importance) equity	**0.4 to 0.5**

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

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

only	ownership approach, tax statistics and dividend drop off studies		
CEG (2014)[90]	**0.7**, using cumulative payout ratio approach over all equity	**0.35**, based on SFG's dividend drop off study	**0.25**
SFG (2014)[91]	**0.7**, using cumulative payout ratio approach over all equity	**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 widely accepted. We describe this approach in section A.9.1. However, Handley considers that this approach should be applied to listed equity only, and this produces a higher estimate of the distribution rate of 0.8. Lally considers that the best estimate of the distribution rate is 0.84, 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.

- Only CEG and SFG 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. 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 0.84.

Conceptually, the value of imputation credits must be between 0 and 1. Accordingly the range of recommended estimates from 0.25 to 0.84, which spans most of the possible range for the value of imputation credits, highlights the lack of consensus among experts. Our draft decision value of imputation credits of 0.4 sits within the range recommended by experts.

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 4.4 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.

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[89]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014.
[90]   CEG, *WACC estimates: A report for NSW DNSPs*, May 2014.
[91]   SFG, *An appropriate regulatory estimate of gamma*, May 2014.

Table 4.4   Australian regulators' approaches to the value of imputation credits

Regulator	Form of adoption	Year	Distribution rate	Utilisation rate	Value of imputation credits
ESC[92]	Price review, greater metropolitan water businesses, final decision	2013	N/A	N/A	**0.5**, based on 2011 guidance[93]
QCA[94]	Cost of capital market parameters, final decision	2014	**0.84**, using the financial statements of 20 largest ASX-listed companies	**0.56**, based primarily on the domestic ownership share of listed equity	**0.47**
ACCC[95]	Fixed line services (telecommunications), final access decision	2011	N/A	N/A	**0.45**, chosen from within the range of possible estimates and with regard to a wide range of evidence, including industry specific factors
ERA[96]	Review of rate of return estimation for rail networks, draft determination	2014	**0.7**, using cumulative payout ratio approach	**0.35 to 0.55**, using SFG and ERA dividend drop off studies	**0.3**, chosen from within the range of 0.25 to 0.385
IPART[97]	Review of imputation credits, final decision	2012	**0.7**, using cumulative payout ratio approach	**0.35**, using SFG dividend drop off study	**0.25**

Source: As specified in table.

As noted above, 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 draft decision value of imputation credits of 0.4 sits within the range adopted by regulators.

A.3   Previous Australian Competition Tribunal considerations

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

▪   Energex Limited

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[92]   Essential Services Commission, *Price Review 2013: Greater Metropolitan Water Businesses, Final decision*, June 2013.
[93]   Essential Services Commission, *2013 Water Price Review, Guidance on Water Plans*, October 2011, p. 66.
[94]   Queensland Competition Authority, *Cost of capital: Market parameters*, August 2014.
[95]   Australian Competition and Consumer Commission, *Inquiry to make final access determinations for declared fixed line services—Final report*, July 2011.
[96]   Economic Regulation Authority, *Review of the method for estimating the weighted average cost of capital for the freight and urban railway networks, Draft determination*, 5 June 2014.
[97]   Independent Pricing and Regulatory Tribunal, *Review of imputation credits (gamma), Research—Final decision*, March 2012.

- DBNGP (WA) Transmission Pty Ltd, and

- WA Gas Networks Pty Ltd.

Although the Australian Competition Tribunal came to views in these proceedings on an appropriate estimate and the merits of different evidence, the Australian Competition 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 Energex

In our 2009 industry wide review of rate of return parameters (the 2009 WACC review), we adopted a gamma of 0.65.[98] In 2009, we applied this value in the Queensland and South Australian electricity distribution determinations which were the first set of determinations following the review. Energex and Ergon successfully sought review of this decision by the Australian Competition Tribunal. The Australian Competition Tribunal set the distribution rate to 0.7 and initiated a dividend drop off study from SFG to estimate the utilisation rate. The Australian Competition 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 Australian Competition Tribunal expressed views on the important factors in its decisions. This included areas where the Australian Competition Tribunal felt its understanding was incomplete, as summarised in table 4.5 below. We have carefully considered these views.

Table 4.5 **Australian Competition Tribunal's observations on imputation credits in Energex matter**

Issue	Australian Competition 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	In developing the Guideline, we re-evaluated the conceptual framework for the value of imputation credits. In making this draft decision, we have built on this re-evaluation and received further advice from Handley. We discuss the role of the value of imputation credits and the underlying conceptual framework in sections A.4 and A.5.

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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)."[99]

The distribution rate (payout ratio)	"…there is [was] no empirical evidence currently available supporting a distribution ratio higher than 0.70."[100]	As discussed in section 4.4.1 of attachment 4 and section A.9 of this appendix, we consider that the approach used to estimate a distribution rate of 0.7 across all equity can be applied to listed equity only to produce a distribution rate of 0.8. Lally also finds a distribution rate of 0.84 over the largest 20 ASX-listed companies.
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."[101] "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	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. See our discussion of Handley's comments in section A.6.1. We discuss the use of tax statistics more broadly in section 4.4.2 of attachment 4 and section A.13 of this appendix.

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

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

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

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 opportunity, and perhaps cause, to investigate further. It has not sought to do so in these proceedings."[102]

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."[103]	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.15.2. Moreover, both Handley and Lally advised that other approaches to estimating the utilisation rate should be preferred (see section 4.4.2 of attachment 4). Handley and Lally also advised that, without adjustment, dividend drop off studies produce downwards-biased estimates of the utilisation rate.
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."[104]	Consistent with this comment, we have not sought to apply the Tribunal's previous considerations in this draft decision. Instead, we adopt a value of imputation credits that is based on our assessment of the merits of the evidence before us.

Source: As specified in table.

During the Guideline process, service providers frequently proposed a value of imputation credits of 0.25 and referenced the Australian Competition Tribunal decision in support of this. However, the last quote from the Australian Competition Tribunal demonstrates that it did not intend for its decision to be permanently determinative. In the Guideline, we also made this point. Service providers with current proposals no longer refer to the Australian Competition Tribunal's decision as if it were precedent, but those service providers propose a value of imputation credits, and reasons for that value, which are consistent with the Australian Competition Tribunal decision.

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

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

On a specific issue considered in the Australian Competition Tribunal decision, SFG submitted that:[105]

> The Tribunal has ruled that redemption rates cannot be used to estimate the value of a distributed credit;

However, based on the Australian Competition Tribunal's observations in table 4.5, we disagree with SFG's characterisation of the Australian Competition Tribunal's decision. It does not appear to us that the Australian Competition Tribunal sought to draw any conclusions about redemption rate (tax statistics) studies or any other estimation approach beyond the material advanced to it during the review. In contrast, the Australian Competition Tribunal directly observed that it was unable to reach any conclusions about the future use of tax statistics.[106] More generally, the Australian Competition Tribunal acknowledged the limitations of the material before it, and highlighted the need for further analysis of the conceptual task and evidence available to estimate the value of imputation credits.

A.3.2 DBNGP and WA Gas Networks

In 2012, Dampier to Bunbury Natural Gas Pipeline (DBNGP) sought Australian Competition Tribunal review of the ERA's decision to adopt a value of imputation credits of 0.25. In upholding the ERA's value, the Australian Competition Tribunal again emphasised the lack of consensus on an appropriate value:[107]

> 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.
>
> …
>
> 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.

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[105]   SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 16(b).
[106]   Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, para. 34.
[107]   Australian Competition Tribunal, *Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14*, July 2012.

The Australian Competition Tribunal made similar comments in the earlier WA Gas Networks matter.[108]

A.4 The role of the value of imputation credits in the regulatory framework

To explain the role of the value of imputation credits in the rules, we must consider:

- the 'building block' revenue framework in the rules, and

- the construction of the tax building block.

A.4.1 The building block framework

Under the rules, we are required to use a building block framework to estimate the revenue for service providers. The building block framework sets out how to estimate the various revenue streams/costs (that is, 'building blocks') that make up a total revenue allowance.[109] The function of this building block revenue estimate is to determine the allowed revenue for each regulatory year and, in turn, the relevant period, that a service provider requires to:

- Fund its operating expenses.

- 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. Handley described this consideration as follows:[110]

> 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.

A.4.2 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.

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108   Australian Competition Tribunal, *Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12*, June 2012, paras. 119 and 125.
109   NER, cll. 6.4.3 and 6A.5.4; NGR, r. 76.
110   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5.

The rules specify that we must estimate a nominal vanilla rate of return.[111] 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, it is the (pre-personal tax) value of imputation credits to investors in the benchmark efficient entity that is relevant.

A.5 The conceptual framework for the value of imputation credits

With regard to the discussion of the tax building block in section A.4.2, 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 pre-personal tax value of imputation credits to those investors that we seek to estimate. The question is then how to interpret and estimate the value of imputation credits. Our approach to interpreting and estimating the value of imputation credits is guided in the first instance by the conceptual framework developed by Officer.[112] 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'.[113]

- Handley advised that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the rules.[114]

- The rules 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.[115]

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[111] NER, cll. 6.5.2 and 6A.6.2; NGR, r. 87.
[112] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.
[113] R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.
[114] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.
[115] NER, cll. 6.5.2 and 6A.6.2; NGR, r. 87.

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:[116]

> 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 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. As is evident from the above discussion, this interpretation is consistent with the Officer framework and is supported by advice from Handley.

The Officer framework assumes that 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 cash flows necessarily paid out.[117] 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:[118]

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

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'), which in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market.

- ψ (psi) is the utilisation value of a retained credit to investors in the market.

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[116] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 9.
[117] This is evident in companies having positive franking account balances in aggregate.
[118] 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.

Handley advised that this characterisation of the utilisation rate is consistent with that in other relevant literature:[119]

> 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:[120]

> 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 their tax (or receive a refund). In this decision, consistent with Handley's advice, we define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed. However, we consider that the definitions used in the Guideline and in this decision are equivalent. This is because, 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. Once these factors are excluded, 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.[121] We discuss Handley's advice on this matter further in section A.7.1.

We do not include the value of retained credits when determining the value of imputation credits. This is because we recognise that investors can only use imputation credits to reduce tax or receive a refund once the credits have been distributed. Moreover, our approach to estimating the distribution rate (see section A.9) reflects the historical evidence that a proportion of credits is never paid out.[122] It follows that we estimate the value of imputation credits as the product of the distribution rate and the utilisation rate only.

A.6 SFG's comments on the conceptual framework

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 SFG's view. SFG's advice on the conceptual framework was largely adopted by the service providers in their proposals.

SFG's May 2014 report for the service providers contended that:

▪ The advice and evidence cited in the Guideline does not support the interpretation of the utilisation rate in the Guideline.

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[119] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 20.
[120] M. Lally, *The estimation of gamma*, 23 November 2013, p. 11.
[121] 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.
[122] This is not to assert that distribution rates might not rise in the future such that the retained stock of credits is eventually distributed.

- Officer unambiguously 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.

We disagree with these contentions and our responses are set out below.

A.6.1 SFG's comments on the evidence and advice cited in the Guideline

We disagree with SFG's statement that:[123]

> None of the proposed reasons for the conceptual redefinition of theta that are set out in the Guideline materials are valid, or supported by advice or evidence:

We respond to each point raised by SFG in turn below.

The AEMC rule change

In 2012, the AEMC changed the description of the parameter represented by gamma in the tax building block from 'the assumed utilisation of imputation credits' to 'the value of imputation credits'. We have traced the point at which the AEMC made this change to the draft rules during the 2012 network regulation rule change process.[124] The AEMC's rule determination documents are extrinsic material for the purposes of interpreting the rules.[125] However, neither the AEMC's draft nor final rule determination documents for the 2012 network regulation rule change process explain why the AEMC changed the description of gamma. Moreover, we have approached AEMC staff, who did not provide any further insight into this matter.

SFG interpreted the change in wording as follows:[126]

> The AEMC Rule change (which now specifically defines gamma to be "the value of imputation credits") does not support the new conceptual definition. It seems clear that the intention of the AEMC was simply to tidy up the Rule to properly reflect the longstanding regulatory practice of adopting a market value interpretation of theta and gamma. The Rule change is quite inconsistent with the notion that the longstanding value interpretation should be replaced by a different interpretation;

We disagree. The AEMC has not expressed the intention behind the change in wording therefore the intention behind the change is not clear. Overall, we consider no meaning or significance can or should be drawn by the AEMC's rephrasing of the description of gamma. This raises the question of how the value of imputation credits should be interpreted. The law states that the law is to be interpreted in a manner that best achieves the law's purpose, which is the national electricity/gas objective.[127] We note that the value of imputation credits is a component of the building block framework, which itself is underpinned by a conceptual framework. We have therefore interpreted (and consequently estimated) the value of imputation credits consistent with the building block framework and its underlying conceptual framework.

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[123] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 341(b).
[124] The documentation relevant to the rule change is available at: http://www.aemc.gov.au/Rule-Changes/Economic-Regulation-of-Network-Service-Providers. The new description first appears in the draft rules for electricity and gas, respectively. For electricity, available at: http://www.aemc.gov.au/getattachment/fdac2adf-701f-41b3-895e-5c857b8cfc2b/Draft-Rule-☐"-Electricity.aspx. For gas, available at: http://www.aemc.gov.au/getattachment/e59ed84d-ec91-4ca9-a24e-8ab600051009/Draft-Rule-☐"-Gas.aspx. All accessed 17 November 2014.
[125] NEL, sch. 2, cl. 8; NGL, sch. 2, cl. 8.
[126] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 341(b)(i).
[127] NEL, sch. 2, cl. 7; NGL, sch. 2, cl. 7.

McKenzie and Partington (2013)

SFG stated that McKenzie and Partington's advice to the Queensland Resources Council in 2013 did not support the approach to estimating the utilisation rate in the Guideline.[128] We disagree. McKenzie and Partington's remarks suggest that the approach in the draft Guideline (which is broadly maintained in this draft decision) is reasonable:[129]

> [The AER in its draft guideline] proposes to employ the utilisation rate as a part of its determination of theta, but the estimate of theta is triangulated across several sources of evidence. These sources include the extent to which shares are held by Australian residents who can utilise the credits, the estimates of utilisation from taxation statistics, the evidence from studies of market value (including ex-dividend studies) and other supporting evidence that suggests investors place a positive value on franking credits (although this latter evidence does not provide an estimate of the magnitude of that value). In the light of this evidence, the AER concludes, that an appropriate estimate of the value of theta is 0.7. In our opinion they make a reasonable case for this theta estimate.

Further, they go on to state that they have 'several problems' with an estimate of gamma that relies on SFG's dividend drop off study.[130]

Handley (2008)

SFG referred to previous comments by Handley which suggested that tax statistics could not be used to produce a point estimate of the utilisation rate.[131] However, in his recent advice to us Handley clarified his earlier remarks and confirmed that tax statistics can produce a point estimate:[132]

> I wish to make one point for clarification in relation to the use of taxation statistics. I have previously suggested that estimates of utilisation rates from taxation statistics can be interpreted as a reasonable upper bound estimate of the value of theta. The purpose for including the "upper bound" part was simply to convey the fact that the ultimate source of value of a distributed franking credit is the amount of personal tax saved as a result of redeeming the credit – something which is given by taxation statistics data. In other words, value can only be realized by "redeeming" the credit at the ATO. Unfortunately the "upper bound" part has inadvertently been misinterpreted as suggesting that taxation statistic estimates of theta cannot be used as point estimates of theta.
>
> …
>
> To be clear, taxation statistics (like other methodologies) can be used to derive reasonable albeit imprecise point estimates of theta. The previously used "upper bound" terminology in no way invalidates its interpretation or use as a point estimate.

Further, Handley's recent advice supported both the approach employed and the estimate of the value of imputation credits adopted in this draft decision.

Officer (1994)

SFG concluded that the formulas in Officer unambiguously show that gamma represents the extent to which imputation credits are capitalised into the stock price.[133] We disagree, and our assessment of the relevant formulas is presented in section A.6.2.

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[128]   SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 309.
[129]   M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 32.
[130]   M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 33.
[131]   SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 341(b)(iii).
[132]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 39.
[133]   SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 320–327.

Hathaway and Officer (2004)

In the Guideline we quoted a passage from Hathaway and Officer's 2004 paper in support of what was described in the Guideline as the 'cash flow interpretation' of the value of imputation credits.[134] With reference to the full text of the paragraph from which the passage was taken, SFG stated that we had misconstrued the point being made by Hathaway and Officer.[135] We disagree. The intention of the relevant part of the Guideline was to identify that the quoted passage supported the 'cash flow interpretation'. SFG did not state whether or not it agreed that the quoted passage supports the cash flow interpretation.

We disagree also with SFG's statement that:[136]

> …the primary purpose of the Hathaway and Officer (2004) study was to present the results of a dividend drop-off analysis, which is clearly relevant only to the standard *value* interpretation of theta. Hathaway and Officer also present some statistics relating to redemption rates, but that analysis has been retracted by Hathaway who has since stated that it should not be relied upon.

Firstly, Hathaway and Officer did not state that the purpose of their report was to present the results of a dividend drop-off analysis. The first section in the report after the introduction is entitled 'Redemption Value of Credits (ATO Data)', and contains extensive analysis of ATO statistics. The dividend drop-off analysis in the report follows the redemption rate analysis, and a similar number of pages are devoted to it.

Secondly, Hathaway's retraction of the ATO data analysis is based on issues of data quality and not on any conceptual consideration that tax statistics cannot be used to estimate the value of imputation credits:[137]

> I would caution anyone, including the AER, against relying on those parts of my earlier reports which focussed on ATO statistics. The data was then not as clear as it is today. I had to rely on separate analyses of ATO tax data and the ATO financial data. As I am now aware with the new data, there is an extremely large discrepancy between these two subsets of data. The missing link was the data on the flows of credits between companies which is now visible after the changes of 1 July 2002. I would recommend that the AER do not rely on that earlier report.

A.6.2 SFG's comments on the Officer framework

SFG's report contains the following conclusions in regard to the value of imputation credits:

- The formulas in Officer unambiguously show that the value of imputation credits (gamma) represents the extent to which imputation credits are capitalised into the stock price.[138]

- The value of imputation credits is estimated as the product of the distribution rate and the extent to which a distributed credit is reflected in the share price (which SFG labelled 'theta').[139]

- The only appropriate way to estimate theta is via the empirical analysis of observed market prices.[140]

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[134] AER, *Better regulation: Explanatory statement rate of return guideline, Appendices*, December 2013, p. 143.
[135] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 341(b)(v).
[136] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 333.
[137] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 12.
[138] SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 320–327.
[139] SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 11–12.
[140] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 27.

However, SFG omitted a parameter in its derivation of gamma from the formulas in Officer. Once corrected, the relevant formula does not support SFG's interpretation. Instead, the corrected formula supports our view, which is in turn supported by advice from Handley and Lally, that gamma in the Officer framework represents the proportion of company tax that is returned to investors through the utilisation of imputation credits (see section A.5). Moreover, the corrected formula does not suggest to us that the value of imputation credits must be estimated using evidence from market prices alone.

Our review of SFG's analysis of the formulas is set out below.

SFG's analysis began with the expression:[141]

$$E = \frac{X_O - X_D - TAX + \gamma IC}{r_e}$$

where:

- E is the value of equity

- X_O is operating income

- X_D is the debtholders' share of operating income

- TAX is corporate tax paid

- IC is imputation credits generated, and

- r_e is the return on equity.

SFG stated that this expression:[142]

> …unambiguously shows that gamma represents the extent to which imputation credits are capitalised into the stock price.

SFG then stated that the value of equity in the absence of imputation credits would be:[143]

$$E_{ex-IC} = \frac{X_O - X_D - TAX}{r_e}$$

and subtracted this expression from the expression for E (which SFG renamed $E_{with-IC}$) to isolate gamma:[144]

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

SFG concluded from this expression that:

> Gamma then represents the increase in the *value* of equity due to imputation credits, expressed as a proportion of the face value of imputation credits.

Moreover, given the statements from SFG quoted above, SFG appeared to suggest that gamma represents the increase in the stock price due to imputation credits, expressed as a proportion of the face value of imputation credits.

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[141] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 324.
[142] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 325.
[143] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 325.
[144] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 326.

However, the expression for gamma presented by SFG omits a parameter. When one subtracts:

$$E_{ex-IC} = \frac{X_O - X_D - TAX}{r_e}$$

from:

$$E_{with-IC} = \frac{X_O - X_D - TAX + \gamma IC}{r_e}$$

the resulting expression is actually:

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

That is, SFG's expression omits the return on equity from the numerator. To understand the significance of this omission, recall from section A.5 that the Officer framework is a perpetuity framework and consider the general expression for the present value of a perpetuity:[145]

$$Present\ value = \frac{Cash\ flow\ per\ period}{Discount\ rate\ per\ period}$$

Rearranging this expression, it is true also that:

$$Present\ value \times Discount\ rate\ per\ period = Cash\ flow\ per\ period$$

Relating the present value expression to the formulas in Officer, we note that:

- $E_{with-IC}$ and E_{ex-IC} are present values, and

- r_e is the discount rate per period.

Therefore, because a present value multiplied by a discount rate equals a cash flow, we can say that:

- $r_e \times E_{with-IC}$ is the cash flow per period to investors from equity with imputation credits, and

- $r_e \times E_{ex-IC}$ is the cash flow per period to investors from equity without imputation credits.

Recall that the corrected expression for gamma is:

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

The numerator in the corrected expression for gamma is the difference between:

- the cash flow per period to investors from equity with imputation credits, and

- the cash flow per period to investors from equity without imputation credits.

Therefore, the numerator is equal to the cash flow per period to investors from imputation credits alone. That is:

$$\gamma = \frac{r_e \times E_{with-IC} - r_e \times E_{ex-IC}}{IC} = \frac{Cash\ flow\ to\ investors\ from\ imputation\ credits}{IC}$$

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[145]   G. Peirson, R. Brown, S. Easton and P. Howard, *Business Finance*, 8th Edition, 2002, p. 72.

Moreover, note that IC (the amount of imputation credits generated) is equal to TAX (corporate tax paid) in this expression because a company generates one dollar of imputation credit for each dollar of corporate tax paid and the Officer framework assumes all imputation credits are paid out. Therefore:

$$\gamma = \frac{Cash\ flow\ to\ investors\ from\ imputation\ credits}{TAX} = \frac{Cash\ flow\ to\ investors\ from\ imputation\ credits}{Corporate\ tax\ paid}$$

The cash flow to investors from imputation credits is the reduction in tax or refund they receive through utilising imputation credits. Therefore, this expression accords with our interpretation of gamma as the proportion of company tax returned to investors through the utilisation of imputation credits.

A.6.3 SFG's comments on the Monkhouse framework

As discussed in section A.5, we consider that:

- The Officer framework provides the basis for the value of imputation credits adjustment in the rules.

- 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 the utilisation rate (which is represented by the Greek letter theta).

SFG provided a discussion of the class of CAPM employed by Monkhouse (and related literature).[146] SFG 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:[147]

> This is not a closed system because it is not the case that the *m* investors collectively own all of the *n* assets and nothing else. Consequently, no market clearing equilibrium can be derived and it will not be the case that an equilibrium exists in which the value of imputation credits capitalised into the stock price is equal to the weighted-average of the utilisation rates over the *m* investors.
>
> In the context of these equilibrium models, if foreign investors are included, foreign assets must also be included. Alternatively, if foreign assets are not included, foreign investors must be assumed away. If neither of these assumptions is made, no equilibrium model will apply and the weighted-average utilisation rate cannot be used as an estimate of theta.

However, Handley disagreed with SFG's assessment, and advised that our interpretation of theta as the weighted average of the utilisation rates of investors remains reasonable:[148]

> SFG's comments are based on a faulty premise – that the *m* investors can own no other assets. This is an assumption of SFG but is not an assumption of the CAPM. In the current context, it is not assumed that investors in the domestic market hold no other assets but rather it is assumed that investors in the domestic market price domestic assets in isolation of any other assets they may or may not hold. For this purpose, investors in the domestic market consist of domestic investors to the extent that they hold domestic assets and foreign investors to the extent that they hold domestic assets – this is the set of *n* assets and the set of *m* investors who hold those *n* assets. Foreign assets held by these domestic investors, foreign assets held by these foreign investors and foreign assets held by other foreign investors are outside the model. If one disagrees with this notion of segmentation, then the solution is to bring other assets and investors into the model – for example, use an international CAPM which prices domestic

146   SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 342–358.
147   SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 354–355.
148   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 23.

assets relative to an international benchmark rather than relative to a domestic benchmark. SFG's conclusion that no equilibrium can exist is therefore invalid.

We use the same definition of the relevant market when estimating both the value of imputation credits and the return on equity. This accords with the rules, which require an estimate of the allowed rate of return that is consistent with the value of imputation credits.[149] As noted in the quote above from Handley, we could alternatively define the market as the international market. Using this market definition would likely result in a lower value of imputation credits, and therefore a higher revenue allowance, because investors that value imputation credits (eligible, domestic investors) make up a small proportion of the global set of investors. However, using an international market definition would also likely lead to a lower return on equity and therefore lower revenue allowance.[150] The net result of these countervailing effects on the revenue allowance is unclear. In any case, we consider that our use of a consistent market definition across our determination of the value of imputation credits and return on equity is important.

A.7 Further issues relating to the utilisation rate

As discussed in section A.5, and in section 4.4.2 of attachment 4, 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.5, 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. 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.

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, and

- contrast our position with that of the service providers, including with reference to factors they considered should be reflected in the utilisation rate.

A.7.1 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.[151] Once these factors are excluded, 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:[152]

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[149] NER, cll. 6.5.2(d)(2) and 6A.6.2(d)(2); NGR, r. 87(4)(b).
[150] Lally discussed why key components of the return on equity, the market risk premium and equity beta, would be expected to be lower in an international CAPM compared to a domestic CAPM: M. Lally, *The estimation of gamma*, 23 November 2013, section 3.9.
[151] Although the term 'personal' is used, we note that classes of investors other than persons can value imputation credits (for example, superannuation funds and charities). Therefore, a more appropriate characterisation might be 'before-investor-tax' and 'before-investor-costs'.
[152] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5.

> 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:[153]

> 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.

The service providers did not address in their proposals these aspects of the building block framework and their implications for interpreting and estimating the utilisation rate (which the service providers defined as 'the value of distributed imputation credits to investors who receive them' and which they labelled 'theta'). As stated above, we consider that 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. However, the service providers' interpretation does not appear to be consistent with this definition, and this is best seen with reference to the assessment in section A.7.2 of some of the factors that the service providers consider should be reflected in an estimate of 'theta'.

A.7.2 Factors affecting investors' valuation of imputation credits

The service providers submitted that the equity ownership approach, and other measures of the utilisation or redemption of imputation credits (such as tax statistics), do not reflect a number of factors which affect investors' valuation of imputation credits.[154] In support of this, they presented figure 4-1 to illustrate the effect of these factors.

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[153] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

[154] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, pp. 13–14; Directlink, *Directlink submission on gamma*, May 2014, p. 15; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, pp. 13–14. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 14–15; JGN, *Gamma proposal*, June 2014, pp. 17–18; and TransGrid, *TransGrid's approach to gamma*, May 2014, pp. 19–20.

Figure 4-1   Illustrative impact on value of imputation credits – numbers
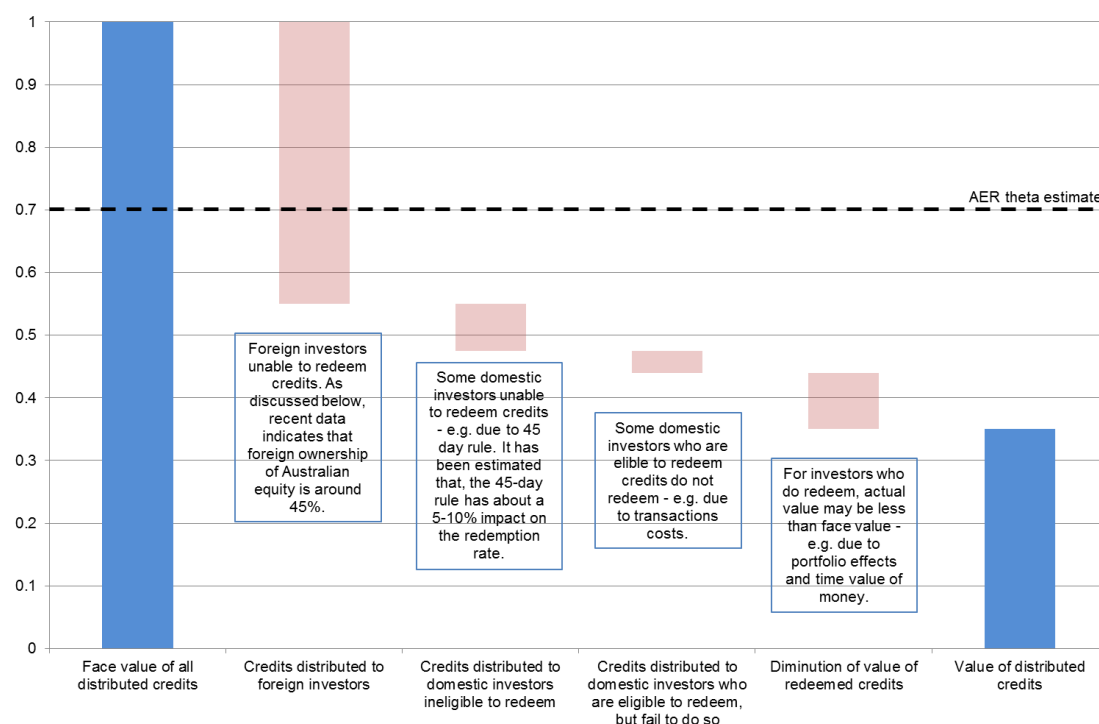
Source: Service providers' proposals.

This chart appears to be an attempt to reconcile the utilisation or redemption value of imputation credits with the estimates derived from SFG's dividend drop off study. This is because, after adjusting the face value of distributed credits for a number of factors, it results in a value of approximately 0.35, which is SFG's dividend drop off estimate.

We address each of these factors in turn below. In summary, we consider that such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate. Accordingly, we consider that the evidence does not support the illustrative impact of some of these factors as indicated by figure 4-1.

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).[155] However, this rule does not apply if the investor's total credit entitlement is below $5,000.

The service providers stated:[156]

> 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:[157]

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[155]   See: https://www.ato.gov.au/Individuals/Investing/In-detail/Investing-in-shares/You-and-your-shares-2013-14/?page=11. Accessed 17 November 2014.

[156]   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.

[157]   J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.

> 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 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, the ultimate source of the estimate is Handley and Maheswaran's 2008 paper. However, 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'.[158]

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).

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).[159] 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)). 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 4.6 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.[160] This suggests that the 45-day holding rule is not having a material effect.

Table 4.6   Imputation credits received and utilised, 2004–2011 – $ billions

	Individuals	Superannuation funds

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158   J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.
159   See: https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/. Accessed 17 November 2014.
160   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 4.4.2 of attachment 4.

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.

Based on these considerations, we conclude that the 45-day holding rule does not appear to have a material effect on the utilisation rate.

Transactions costs

The service providers submitted that the redemption of imputation credits may involve transactions costs, such as requirements to keep records and follow administrative processes.[161] The service providers also submitted that these transactions costs may dissuade some investors from redeeming (utilising) imputation credits.

We first note that the service providers' suggestion is slightly different to remarks made by SFG on this topic in its advice to the service providers. SFG stated:[162]

> There are administrative costs involved in the redemption of imputation credits. The investor must maintain records of all credits that are received and redeem them by preparing the necessary schedules for the investor's tax return. This involves time and expenses such as accountant fees. By contrast, when an investor buys shares, they provide bank account details and all dividends are automatically transferred into that account without any action required of the investor. That is, it is more costly to convert imputation credits into value;

SFG did not suggest that transactions costs dissuade investors from redemption, and that it is for this reason they should be recognised when estimating the investors' valuation of imputation credits. Instead, SFG appeared to suggest that it is the transactions costs themselves that need to be accounted for. However, Handley advised that we specifically do not want to take account of these costs:[163]

> 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.

Returning to the service providers' submission, they provide no evidence to support their suggestion that transactions costs dissuade redemption. However, one can consider conceptually whether transactions costs are likely to dissuade a material number of investors from redeeming imputation credits. Our considerations on this are as follows:

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[161]   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.
[162]   SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 65(c).
[163]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

- 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.[164]

- 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. It does not appear that any costs that are incremental to these, if any, and related specifically to redeeming imputation credits would be material enough to dissuade an investor from redemption. 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.[165]

Based on these considerations, we conclude that transactions costs should not be adjusted for in estimating the utilisation rate. And even if an adjustment were to be made, it would have an immaterial effect on the utilisation rate.

Time value of money

The 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.[166] In response, we note that:

- The rules do not indicate that the value of imputation credits should reflect the time delay between the distribution of an imputation credit and the time at which it is redeemed.

- 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. Interest rates on two year Commonwealth Government bonds over 2014 suggest that the appropriate discount rate would be likely less than 3 per cent. Therefore, the magnitude of the adjustment would be quite small.

Handley agreed with the immateriality of any required adjustment for time delay, and noted that time delay:[167]

> …is relevant to implied market value studies and tax statistics studies but should be immaterial in most cases and therefore require no adjustment.

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[164] See: https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/. Accessed 17 November 2014.

[165] 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 17 November 2014. 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.

[166] 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. 15; JGN, *Gamma proposal*, June 2014, p. 18; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 19.

[167] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

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

The service providers submitted that, to the extent that an investor reduces the value of their overall portfolio simply to increase the extent to which they can redeem imputation credits, this lost value will be reflected in a lower valuation of the credits.[168] SFG's advice to the service providers on this topic referred to the 'cost of losing diversification'.[169] However, as discussed in section A.7, 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 pre-personal-tax and pre-personal-costs basis. Therefore, we conclude that it is reasonable to not adjust any of our estimates of the utilisation rate for portfolio effects.

A.8 Estimation approach considerations

Our approach to determining the value of imputation credits involves two considerations that were not proposed in the Guideline. We discuss each below.

A.8.1 Evidence from all equity or listed equity only

When determining the value of imputation credits, we have regard to evidence from all companies and their investors (all equity) and just listed companies and their investors (listed equity only). There is no consensus on which should be the preferred approach.

We have had regard to experts' comments on the issue. Lally made some comments in support of considering all equity:[170]

> 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.

However, SFG and Handley suggested that evidence from listed equity is more relevant. SFG stated:[171]

> 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 estimated with reference to exchange-listed businesses because they are more reflective of the efficient benchmark entity.

And Handley stated:[172]

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168 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. 15; JGN, *Gamma proposal*, June 2014, p. 18; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 20.
169 SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 65(e).
170 M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 34.
171 SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 412.

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.

A.8.2 Relationship between the distribution rate and the utilisation rate

In the Guideline, we did not recognise the relationship between definitions and estimates of the distribution rate and the utilisation rate. 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. For consistency in estimating the value of imputation credits, it follows that a corresponding estimate of the utilisation rate should reflect the utilisation of that same set of investors.

We consider that this relationship should be recognised when determining estimates of the value of imputation credits. We therefore consider that estimates of the utilisation rate determined with regard to investors in listed equity only should be paired with estimates of the distribution rate that are also determined with regard to listed equity only. Similarly, 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 all equity.

A.9 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.[173] Hathaway found a similar estimate for the period 2004 to 2011.[174] Also using this approach, Handley estimated a distribution rate across listed equity only of 0.8 for the period 1987 to 2011.[175]

In this section we describe the cumulative payout ratio approach and alternative approaches to estimating the distribution rate.

A.9.1 The cumulative payout ratio approach

The cumulative payout ratio approach is applied as follows. It starts with the total value of imputation credits that are in firms' franking account balances, reflecting the cumulative additions and subtractions of imputation credits since a particular point in time. Then, subtracting this from total company tax paid over the same time period 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.

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[172] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 28.

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

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

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

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.[176] 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 listed equity only using this approach is broadly reinforced by evidence from the financial statements of the largest listed companies.

A.9.2 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.[177] However, neither advocates the use of this estimate. NERA considered:[178]

> 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:[179]

> 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 0.84.[180] We consider that this broadly reinforces Handley's cumulative payout ratio estimate across listed equity only of 0.8.

A.10 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 4.4.2 of attachment 4, with supporting evidence provided 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 4.7). Assessment against these criteria broadly supports our main assessment of the approaches.

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176   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 17 November 2014. 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.

177   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.

178   NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 11.

179   N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 99.

180   M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 30.

Table 4.7   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, will 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 debt quantitative models are excluded because they are not applicable.

A.11 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.[181]

Our position on the equity ownership approach to estimating the utilisation rate is set out in section 4.4.2 of attachment 4. In this section, we provide further detail on our application of the approach. We also compare our assessment of the approach in this draft decision with our assessment in the Guideline.

We place significant reliance on the equity ownership approach for the reasons set out in section 4.4.2 of attachment 4. We have regard also to 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.7.2, 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.[182]

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

- 0.55 and 0.7, if all equity is considered, and

- 0.4 and 0.6, 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.[183]

- 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.[184] The data underlying this graph also came from the National Accounts.

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[181] Specifically, we use data from Australian National Accounts: Financial Accounts (ABS cat. 5232.0).
[182] 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.
[183] 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 17 November 2014.

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 listed equity only, consistent with the approach set out in section A.8.1.

Figure 4-2 shows the domestic ownership share of Australian equity on an end-quarter basis between June 1988 and June 2014. Although somewhat variable from quarter to quarter, the share has declined from above 80 per cent in 1988 to around 70 per cent in recent years. The domestic ownership share has been calculated as one minus the share of Australian equity held by the 'rest of world', with unlisted equity issued by 'rest of world' excluded. This calculation methodology is consistent with that employed by the ABS in its 2007 feature article.

**Figure 4-2   Domestic ownership share of listed and unlisted Australian equity**
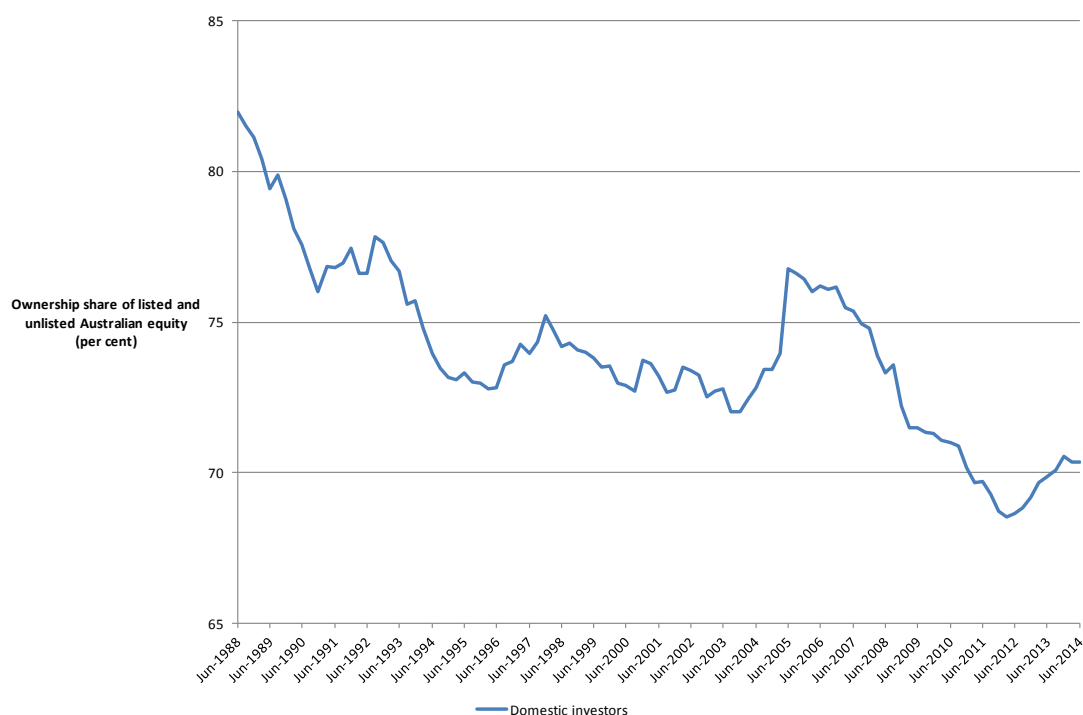
Source: Australian National Accounts: Financial Accounts (ABS cat. 5232.0), tables 32 and 33.

We have considered also the domestic ownership share of just listed equity. Figure 4-3 shows the domestic ownership share of just listed Australian equity. This share has not exhibited a strong trend over time, and has varied mainly between 50 and 65 per cent.[185] Since 2009, the share has tended to remain within the slightly narrower range of 50 to 60 per cent.

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[184]   N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, figure 5.
[185]   The exception to this being the period between March 1990 and June 1992 where the share dropped below 0.5, and as low as 0.39 in December 1990.

Figure 4-3   Domestic ownership share of listed Australian equity
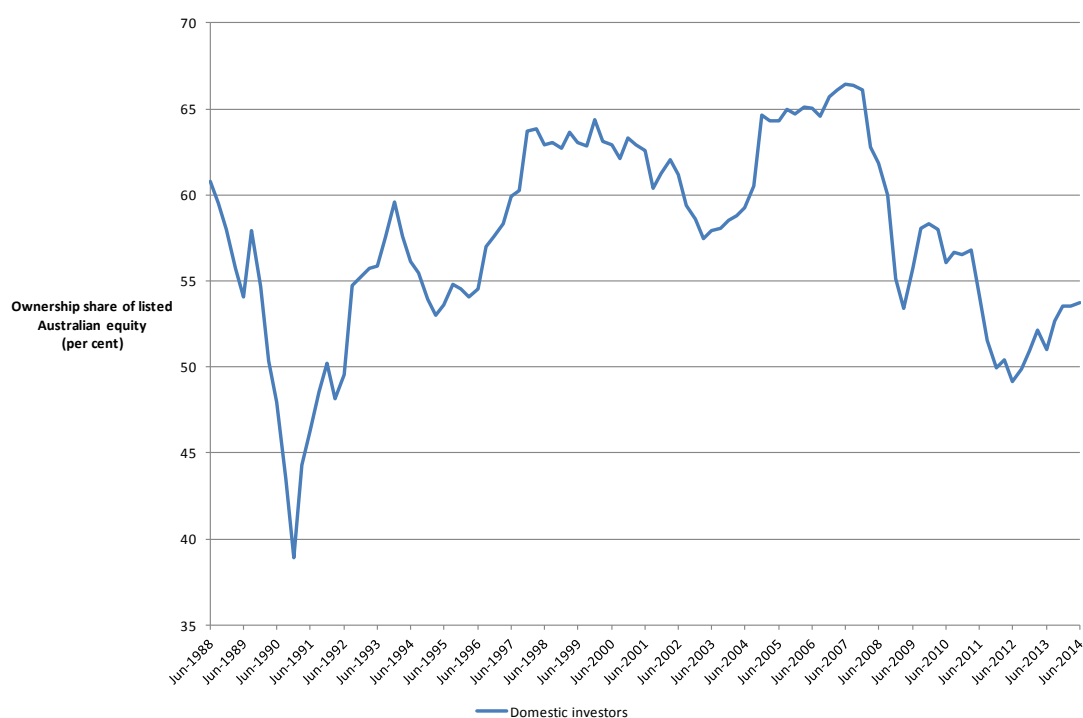
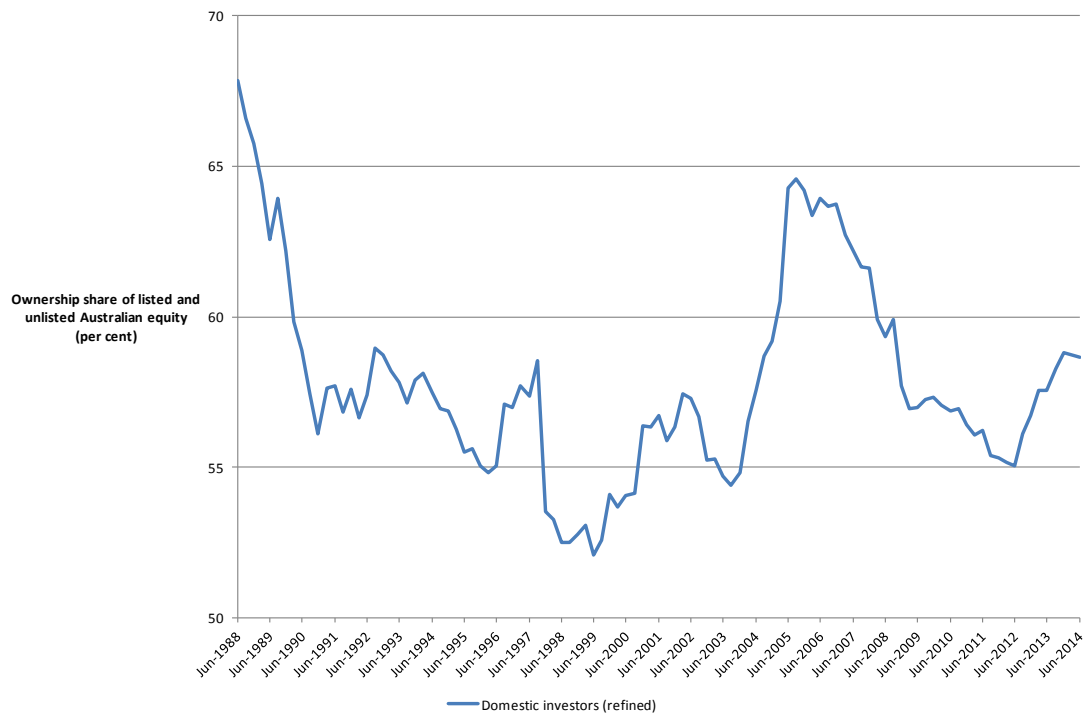Source: Australian National Accounts: Financial Accounts (ABS cat. 5232.0), table 32.

We consider that the equity ownership approach can be refined further, by filtering the National Accounts data to focus on the types of equity that are deemed to be 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', 'national public non-financial corporations' and 'state and local 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 'households', 'pension funds', 'life insurance corporations', 'state and local general government', 'national general government' and 'rest of world'.[186]

These refined estimates of the domestic ownership share are shown for all equity and just listed equity in figure 4-4 and figure 4-5 respectively. There is no strong trend in either series over time. The refined share of all equity has varied mainly between 55 and 60 per cent. The refined share of listed equity has varied mainly between 40 and 55 per cent.

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[186]   We do not consider clear the case for assuming that governments 'waste' the imputation credits they receive. The effect of the assumption is immaterial in any event, as excluding governments from the calculation only marginally increases the share.

Figure 4-4   Refined domestic ownership share of listed and unlisted Australian equity

Source: Australian National Accounts: Financial Accounts (ABS cat. 5232.0), tables 32 and 33.

Figure 4-5   Refined domestic ownership share of listed Australian equity
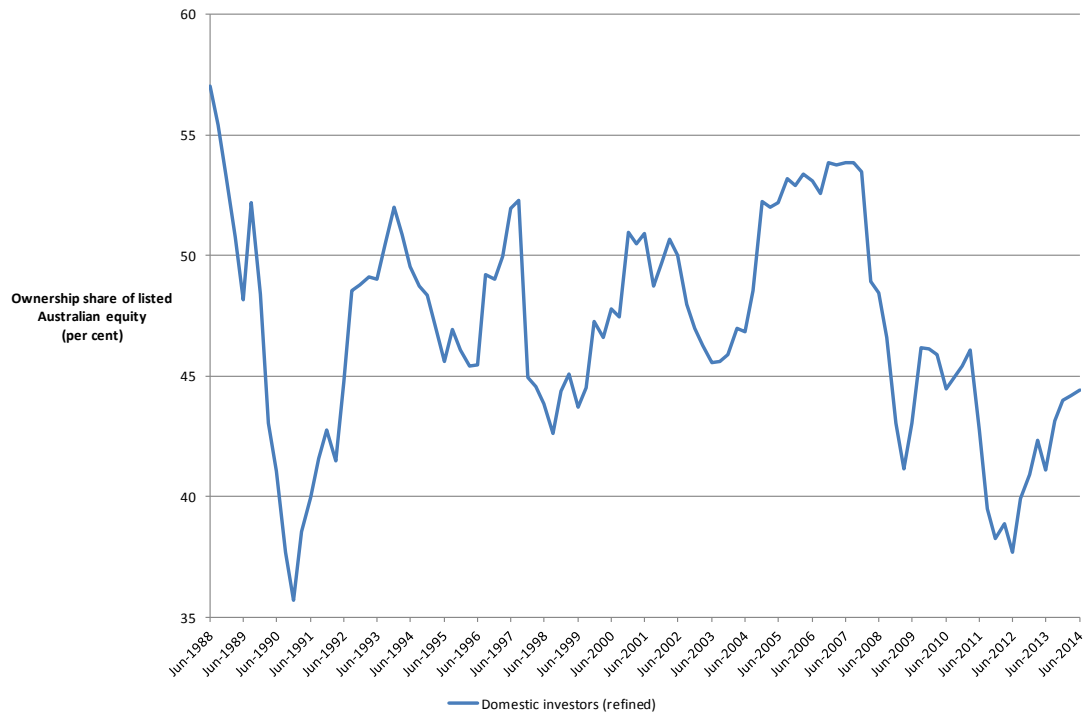
Source: Australian National Accounts: Financial Accounts (ABS cat. 5232.0), table 32.

Handley advised that all estimation approaches involve uncertainty and imprecision, including the equity ownership approach.[187] Therefore, we present ranges of estimates for the utilisation rate from the equity ownership approach across the evidence presented in figure 4-2 to figure 4-5. With reference also to the preceding discussion, we consider that a reasonable estimate for the utilisation rate from the equity ownership approach is between:

- 0.55 and 0.7, if all equity is considered, and

- 0.4 and 0.6, if only listed equity is considered.

A.12 SFG's analysis of equity ownership data

In this section we respond to key comments made by SFG on the equity ownership approach. In summary, we conclude that it is reasonable to have regard to data on the domestic ownership share from the National Accounts and that the data we rely on is the most up to date.

A.12.1 Sources of evidence on the ownership of Australian equity

SFG assessed the Guideline estimate of the domestic ownership share against three pieces of evidence, all of which use the same source of data.

SFG referred to three pieces of evidence on the domestic-foreign ownership split of Australian equities:[188]

- A graph from a 2010 Reserve Bank of Australia Bulletin article by Black and Kirkwood.[189]

- A foreign ownership series that SFG itself derived from the National Accounts.[190]

- An estimate from a 2013 report by the ASX.[191]

However, all of these estimates use data from the same source; specifically, table 32 of Australian National Accounts: Financial Accounts (ABS cat. 5232.0) (albeit from different releases of this data over time). This fact is clear in respect of:

- the foreign ownership series derived by SFG given the source for figure 9 in SFG's report, and

- the estimate from the ASX report given footnote 218 in SFG's report.

This fact is less clear for the graph in Black and Kirkwood's article because, although the ABS is recognised as a source, the specific ABS series does not appear to be identified in the article. However, we have been able to identify table 32 of ABS cat. 5232.0 as the source by graphing the 'rest of world' holdings of equity from the March 2010 release of ABS cat. 5232.0, which included data up to December 2009.

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[187] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 32 and 36.

[188] SFG, *An appropriate regulatory estimate of gamma*, May 2014, paras. 403–405.

[189] S. Black and J. Kirkwood, 'Ownership of Australian equities and corporate bonds', *Reserve Bank of Australia Bulletin*, September 2010.

[190] Specifically, table 32 of Australian National Accounts: Financial Accounts (ABS cat. 5232.0).

[191] ASX, *Australian cash equity market*, 2013.
Available at: http://www.asx.com.au/documents/resources/australian_cash_equity_market.pdf. Accessed 17 November 2014.

A.12.2 Comparison with the Guideline estimate

SFG assessed the Guideline estimate of the domestic ownership share, which was based on all equity, against estimates based on listed equity only.

SFG's analysis on pages 82 to 84 of its report suggests that the 70 per cent estimate of the domestic ownership share in the Guideline is too high when compared to the three sources of evidence identified by SFG.[192] As discussed above, the three sources identified by SFG all rely on the same table from the National Accounts. Moreover, this table relates to listed equity only, whereas the 70 per cent estimate quoted in the Guideline came from the 2007 feature article by the ABS and related to both listed and unlisted equity.

In summary, SFG appears to attempt to demonstrate that our estimate of the domestic ownership share in the Guideline was incorrect or out-dated. However, close examination of SFG's report reveals that SFG's report and the Guideline used estimates of different things. SFG's report used data on equity ownership from listed equity only. In the Guideline, we used data on equity ownership from all equity. In this draft decision, we rely on equity ownership data from both listed equity only and all equity.

A.12.3 ABS data quality

Our regard to data from the National Accounts is not affected by the data quality concerns identified by SFG.

SFG stated that:[193]

> The Australian Bureau of Statistics has posted a data quality warning in relation to the data that has been relied upon by Lally (2103a) [sic] and the AER.

The 'data quality warning' to which SFG referred is a section from an ABS feature article from 1992.[194] It gives us no cause to stop having regard to data from the National Accounts. This is because:

- The ABS article in question is over 20 years old. We consider that the ABS has likely improved the quality of this data over time. The September 2014 release of ABS cat. 5232.0 discusses in some detail the most recent set of revisions and improvements to this data.[195]

- The data is deemed to be of publishable quality by the ABS. We therefore think it is reasonable to have regard to it, notwithstanding any residual quality issues that may exist.

- This 'data quality warning' is not repeated in the ABS feature article from 2007.

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

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[192] SFG, *An appropriate regulatory estimate of gamma*, May 2014, pp. 82–84.

[193] SFG, *An appropriate regulatory estimate of gamma*, May 2014, para. 402(b).

[194] Australian Bureau of Statistics, *Feature article - Foreign ownership of equity in Australian enterprise groups*, June 1992. Available at:
http://www.abs.gov.au/ausstats/abs@.nsf/featurearticlesbytitle/597E105CE2D16D46CA256DEF00099D17?OpenDocument. Accessed 17 November 2014.

[195] See:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/5232.0Main%20Features2Jun%202014?opendocument&tabname=Summary&prodno=5232.0&issue=Jun%202014&num=&view=. Accessed 17 November 2014.

entities (for example, charities).[196] 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 amount of credits utilised divided by the reported amount 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 4.4.2 of attachment 4. In this section, we explain how our position has changed compared to that in the Guideline.

We consider that tax statistics support an estimate of the utilisation rate between 0.4 and 0.6, although our estimate of the distribution rate implies that we should adopt a utilisation rate of around 0.43 from within this range.

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.9). 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.[197]

- 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,[198] and

- consistent with our preferred estimates of the distribution rate.

Applying these considerations, we place less reliance upon:

- 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.

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[196] These statistics are available at: https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/. Accessed 17 November 2014.
[197] 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.
[198] N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

A.14 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 4.4.2 of attachment 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 4.4.2 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 section A.15.

A.14.1 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. In theory, an investor who buys a share on the ex-dividend date will not. The difference in these prices should therefore reflect the 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 4.8 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 4.10.

Table 4.8   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).		
Vo et al (2013)[199]	2001-2012	Builds on SFG (2011), includes additional econometric permutations and sensitivity analysis.
SFG (2013a)[200]	2001-2012	Updates SFG (2011) – same author, longer data series.

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[199]   D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', ERA working paper, April 2013.
[200]   SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

SFG (2011)[201]	2001-2010	Study commissioned by the Australian Competition Tribunal.
Minney (2010)[202]	2001–2009	Partitions by firm size; sub-periods 2001–2005 and 2006–2009.
Beggs and Skeels (2006)[203]	1986-2004	Key study in the AER's 2009 review of rate of return parameters. Data calculated yearly.
Hathaway and Officer (2004)[204]	1986-2004	Study partitions by firm size, dividend yield level.
Bellamy and Gray (2004)[205]	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)[206]	1987-1993	Early study with limited data; sub-periods 1987–1990 and 1991–1993.
Brown and Clarke (1993)[207]	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 4.9 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 4.11.

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[201]   SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011.

[202]   A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, pp. 29–34.

[203]   D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, pp. 239–252.

[204]   N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004.

[205]   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.

[206]   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.

[207]   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 4.9   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)[208]	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)[209]	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)[210]	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)[211]	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)[212]	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)[213]	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)[214]	1996–2011	Compares current prices to expected future returns. Uses ASX300 index firms and consensus analyst dividend forecasts.
Simultaneous share trades – Compare simultaneous prices for shares that are/are not entitled to imputation credits.		
Chu and Partington (2008)[215]	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.

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[208]   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.

[209]   SFG, *Using market data to estimate the equilibrium value of distributed imputation tax credits, Report for the Energy Networks Association*, 3 October 2013.

[210]   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.

[211]   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.

[212]   NERA, *Imputation credits and equity prices and returns, A report for the Energy Networks Association*, October 2013.

[213]   P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, pp. 476–494.

[214]   K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', ANU working paper, 18 June 2013.

[215]   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.

Chu and Partington (2001)[216]	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)[217]	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.14.2 Estimates from implied market value studies

This section presents the results from the available implied market value studies.

Table 4.10 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 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.

Table 4.11 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 4.10   Estimates of the utilisation rate from dividend drop off studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study			
Vo et al (2013)[218]		0.35–0.55 (2001–2012)	Range derived from large number of permutations and sensitivity tests.
SFG (2013a)[219]		0.35 (2001–2012)	Author's point estimate across a number of different regression forms.
SFG (2011)[220]		0.35 (2001–2010)	

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[216]   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.

[217]   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.

[218]   D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', ERA working paper, April 2013.

[219]   SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013, p. 1.

[220]   SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011, p. 3.

Minney (2010)[221]		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)[222]	0.20 (1992–1997)	0.57 (2001–2004)	Several other pre-2000 periods are presented.
Hathaway and Officer (2004)[223]	0.49 (1986–2004)		Authors suggest that estimate has increased post-2000.
Bellamy and Gray (2004)[224]	0.36 (1995–2002)		Range of 0.0–0.60 is also presented.
Bruckner et al (1994)[225]	0.69 (1991–1993)		Also present an earlier period (1987–1990).
Brown and Clarke (1993)[226]	0.80 (1988–1991)		

Source: As specified in table.

Table 4.11   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)[227]	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)[228]		0.12 (2000–2013)	Uses individual firms.
Cannavan et al (2004)[229]	0–0.15		Uses individual firms.

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[221]   A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, p. 32.

[222]   D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, p. 247.

[223]   N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004, p. 21.

[224]   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.

[225]   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.

[226]   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.

[227]   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.

[228]   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.

Cummings and Frino (2008)[230]		0.52 (2002–2005)	Uses index.
Rate of return study			
NERA (2013b)[231]	-1.57 (1987–2000)	-1.90 (2000–2012)	Uses past returns. For the entire period, estimate is -1.50.
Lajbcygier and Wheatley (2012)[232]	-1.57 (1987–2000)	-1.68 (2000–2009)	Uses past returns. For the entire period, estimate is -1.88
Siau et al (2013)[233]		-0.29–0.30 (1996–2011)	Uses forecast returns. Note range is from negative 0.29 to positive 0.30.
Simultaneous share trades			
Chu and Partington (2008)[234]	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)[235]	0.88–0.96 (1995–1997)		
Chu and Partington (2001)[236]	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.

A.15 Limitations of dividend drop off studies

This section sets out further evidence which supports our position on the use of implied market value studies—in particular dividend drop off studies—to estimate the utilisation rate. Specifically, we consider the limitations of dividend drop off studies as evident in:

▪ A comparison of these studies with other market-based estimation approaches.

▪ The views of academics and other regulators.

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[229] 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.

[230] 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.

[231] NERA, *Imputation credits and equity prices and returns, A report for the Energy Networks Association*, October 2013, p. 22.

[232] P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, p. 490.

[233] K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', ANU working paper, 18 June 2013, pp. 24 and 27.

[234] 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.

[235] 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.

[236] 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.

A.15.1 Comparison with other market-based estimation approaches

The service providers submitted that their interpretation of the value of imputation credits is consistent with the approach taken to other elements of the return on capital. They provided the example of the return on debt, where the returns 'actually' required by investors are estimated with regard to the market prices of the relevant securities.[237] Further, they submitted that the only source of evidence capable of providing a point estimate for the value of distributed imputation credits are implied market value studies, in particular dividend drop off studies.[238]

However, we consider that using market prices to estimate the value of imputation credits is fundamentally different to using market prices to estimate the return on debt (and other rate of return parameters). This is because:

- The valuation technique employed by dividend drop off studies (and other implied market value studies) is unlike a valuation technique that simply involves observing the price of an asset in a market in which that asset is separately traded. Imputation credits are not traded separately from the dividend to which they are attached. Therefore, dividend drop off studies must infer using ex-dividend price changes and econometric techniques (rather than observe or measure) the value attributed to imputation credits by investors.

- No directly observable, widely agreed proxy for the value of imputation credits exists. While debate exists around certain technical issues in estimating other rate of return parameters, the fundamental point remains that relevant proxies exist and these can be directly observable. For example, it is widely agreed that the interest rate on government bonds is a proxy for the risk free rate. Moreover, the interest rate on government bonds is directly observable.

A.15.2 The views of academics and other regulators

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 study undertaken by SFG in 2011 (which was relied upon by the Australian Competition Tribunal in the Energex matter), and the 2013 update of that study (which was relied upon in service providers' current proposals).[239]

The comments of academics and other regulators contribute to our conclusion that:

- SFG's dividend drop off study should not be relied upon to the total exclusion of other dividend drop off studies.

- Dividend drop off studies should not be relied upon to the total exclusion of other implied market value studies.

- Implied market value studies should not be relied upon to the total exclusion of other relevant evidence.

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[237] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.2.2; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 4; Directlink, *Directlink submission on gamma*, May 2014, p. 5; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 4. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 6; JGN, *Gamma proposal*, June 2014, p. 5; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 7.

[238] ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.5; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 23; Directlink, *Directlink submission on gamma*, May 2014, p. 25; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 23. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 22; JGN, *Gamma proposal*, June 2014, p. 27; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 30.

[239] 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.

A selection of comments is reproduced below:

- Cannavan, Finn and Gray (2004):[240]

  …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):[241]

  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. Uncertainty over the issue is heightened by the work of Lajbcygier and Wheatley (2012). These authors examine a range of pricing models, and find no evidence that the existence of imputation credits is associated with lower realised returns, as might be expected if they were valued by the market. These results set up an interesting conundrum: while there are signs of some influence on pricing and return patterns around dividend events, there is no evidence that imputation credits have an impact on the level of returns achieved by investors over time.

  …

  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 (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):[242]

  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.

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[240] D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, p. 175.

[241] K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', ANU working paper, 18 June 2013, p. 2, 8–9.

[242] 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.

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 one such study by SFG 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 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, multicolliniarity 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):[243]

    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.

- QCA (2014):[244]

    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.

- Handley (2014):[245]

    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

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[243] M. Lally, *The estimation of gamma*, 23 November 2013, p. 20.
[244] Queensland Competition Authority, *Cost of capital: Market parameters*, August 2014, pp. 27–28.
[245] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44.

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.

Even the ERA, which at present prefers the use of dividend drop off studies, stated:[246]

> …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 draft decision. This is mainly to be consistent with Handley's advice on the conceptual framework, which we have accepted in making this draft 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. 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.[247] 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.[248]

Lally considered it paramount to estimate the utilisation rate consistently with the underlying theoretical framework:[249]

> 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:[250]

> 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).

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[246] Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para. 920.
[247] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 22.
[248] 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.
[249] Lally, *The estimation of gamma*, November 2013, p. 3.
[250] Lally, *The estimation of gamma*, November 2013, pp. 3 and 4.

...

> 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 draft 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:[251]

> 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, even if the individual components are each justified in isolation, the combination might produce an overall result that is no longer reasonable:[252]

> 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:[253]

- 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.

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[251]   Lally, *The estimation of gamma*, November 2013, p. 14.
[252]   Lally, *The estimation of gamma*, November 2013, p. 38.
[253]   Lally, *The estimation of gamma*, November 2013, pp. 38–47.

- 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.

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:[254]

> 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:[255]

> 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:[256]

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[254] Lally, *The estimation of gamma*, November 2013, pp. 46–47.
[255] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 31–32.
[256] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 23.

> 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.[257]

SFG also raised concerns with the approach, and a number of these have been responded to by Lally.[258]

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[257]   J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 3 and 32.

[258]   SFG, *An appropriate regulatory estimate of gamma*, 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.