



Estimating gamma for regulatory purposes

REPORT FOR AURIZON NETWORK

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1 Executive summary

- 1 Frontier Economics has been engaged by Aurizon Network Pty Ltd (Aurizon) to provide expert advice in relation to Aurizon's regulated rate of return. Part of this advice relates to estimating the value of dividend imputation tax credits, gamma (γ).
- 2 In considering imputation, the objective of the regulator is to reduce expected cash flows to the extent that this offsets, in present value terms, the market value to investors associated with imputation credits. This would allow equity investors to earn a fair return. It means that, if equity investors contribute \$1,000 to the regulated asset base, they expect to receive benefits of exactly \$1,000 consisting of:
 - a. The market value of expected cash flows – how much would investors pay for the series of expected cash flows over the asset life?; plus
 - b. The market value associated with imputation credits – how much would investors pay for the series of expected imputation credits over the asset life?
- 3 The manner in which the QCA, and other regulators, implement this objective is to make an estimate of the parameter, gamma (γ). The regulator assumes that each dollar of corporate tax paid creates a benefit for investors of gamma. The intention is that allowed prices or revenue are reduced to an amount equivalent, in present value terms, to the market value associated with imputation credits.
- 4 The reason this is a contentious issue is that, in estimating gamma, the QCA has moved away from a market value interpretation of gamma, as outlined below.
- 5 There is broad agreement that gamma should be estimated as the product of two parameters: $\text{gamma } (\gamma) = \text{Distribution rate } (F) \times \text{theta } (\theta)$.
 - a. The first parameter, the distribution rate (F), is the proportion of created imputation credits that are attached to dividends and distributed to shareholders. The QCA considers a distribution rate of 0.84 to be appropriate. In contrast, we propose a distribution rate of 0.70.
 - b. The second parameter, theta (θ), is variously defined as “the value of distributed imputation credits” or as “the utilisation rate.” The QCA sometimes uses the notation “ U ” for this parameter. The QCA considers a theta assumption of 0.56 to be appropriate, compared to our preferred estimate of 0.35.
 - c. In aggregate the QCA assumes that gamma is 0.47 (0.84×0.56), compared to our recommendation that gamma is $0.25 (0.70 \times$

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0.35). The different conclusions on gamma (0.47 versus 0.25) impact the pre-tax expected cash flow stream by around 8%.¹

The basis for the QCA's estimate for theta of 0.56, is that this represents the proportion of imputation credits that can be redeemed by investors. It is an estimate of the proportion of shares held by Australian residents, termed the *redemption rate*. By contrast, our view is that theta should be interpreted and estimated as the market value of imputation credits, for the following reasons.

- a. The regulatory approach is to reduce the return that would otherwise be paid to shareholders by the regulator's estimate of the value of imputation credits. Consequently, the return that shareholders would otherwise receive should be reduced by the *value* of the imputation credits they receive. If the return to shareholders is reduced by the *number* of credits they receive or redeem, instead of the *value* of those credits, they will be left under-compensated.
- b. The QCA's estimate for theta will only lead to equity investors earning a fair return if the proportion of shares held by Australian resident investors has a one-for-one relationship with the market value of distributed credits. This rationale is based entirely upon a set of theoretical assumptions about the expectations and preferences of investors. In contrast, the QCA estimates all other weighted average cost of capital (WACC) parameters with regard to traded market prices – risk fee rate, market risk premium, equity beta, debt premium, and leverage.
- c. The basis for the QCA's redemption rate approach is that the QCA starts with the premise that it needs to estimate the utilisation rate of credits. The QCA then determines that it is not necessarily the case that utilisation needs to be considered on a market value basis.² In Section 2, we walk through the basis for offsetting the value associated with imputation with the reduction in expected cash flows such that equity investors earn a fair

¹ If expected cash flows were a level perpetuity, the cost of equity was 7%, and the equity contribution to the regulated asset base was \$1,000 then shareholders need the aggregate of expected cash flows and annual imputation benefits of \$70. At an assumption for gamma is 0.47, pre-tax expected cash flows are \$83.23. The tax paid would be \$24.97 (at 30% corporate tax) and after-tax cash flows would be \$58.26. Investors receive imputation benefits of $0.47 \times \$24.97 = \11.74 . So in aggregate the annual benefits are $\$58.26 + \$11.74 = \$70.00$. In contrast, at gamma of 0.25, we have pre-tax expected cash flows of \$90.32 and tax paid of \$27.10. After-tax cash flows are \$63.22 and the value benefit from imputation is \$6.77. This means that, at the higher assumption for gamma, pre-tax expected cash flows fall from \$90.32 to \$83.23, a reduction of 8%.

² DBCT Draft Decision, p. 106.

return, or in other words the benefits to equity holders exactly offset the value of their investment.

- d. In any event, in attempting to estimate a weighted average utilisation rate across investors, the assumptions that the QCA imposes produce an upper bound and not a point estimate.

7 The Australian Competition Tribunal (the Tribunal) has considered the estimation of gamma in two recent decisions. In the *PLAC-Ausgrid* case,³ the Tribunal held that:

- a. The Australian regulatory framework requires a market value estimate of theta;
- b. Consistency with other WACC parameters also requires that theta be estimated on a market value basis; and
- c. The equity ownership estimate on which the QCA relies should not be interpreted as an estimate of theta, but only as an upper bound for theta.

8 In the *SAPN* case,⁴ a differently constituted Tribunal held that it was open to the Australian Energy Regulator (AER) to estimate gamma either as:

- a. The market value of imputation credits; or
- b. A theoretically derived complex weighted-average of the utilisation rates of investors. The “utilisation rate” represents the extent to which each investor is able to redeem the credits that they receive and the weighted average is taken over the wealth of each investor and the extent to which each investor is risk averse.

9 It is not yet clear which, if either, of these Tribunal decisions will survive appeal to the full Federal Court. For the reasons set out below, our view is that it is obvious that gamma must be estimated on a market value basis using the observed prices of traded securities – the same way that every other WACC parameter is estimated.

10 In our view, the best available market value estimate of theta is the 0.35 estimate of SFG (2011, 2013).⁵ The SFG estimation has been assessed by the Tribunal for its fitness for use in the regulatory setting. The Tribunal concluded that it has confidence in the SFG estimate⁶, that “No other dividend drop-off study

³ Applications by Public Interest Advocacy Service Ltd and Ausgrid Distribution [2016] ACompT 1 (26 February 2016).

⁴ Application by SA Power Networks [2016] ACompT 11 (28 October 2016).

⁵ SFG Consulting, 2013, *Updated dividend drop-off estimate of theta*, Report prepared for the Energy Networks Association, 7 June; SFG Consulting, 2011, *Dividend drop-off estimate of theta*, Report prepared for the Australian Competition Tribunal.

⁶ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

estimate has any claims to be given weight vis-à-vis the SFG report value”⁷, and that “the careful scrutiny to which SFG’s report has been subjected, and SFG’s comprehensive response, gives the Tribunal confidence in those conclusions.”⁸⁹

11 In our view, the distribution rate should be set to the standard estimate of 0.70 because:

- a. The Lally approach provides an estimate of the wrong thing – the distribution rate for multinationals with substantial foreign income rather than for the benchmark efficient entity; and
- b. The standard Australian Taxation Office (ATO) estimate is widely considered to be reliable and appropriate.

12 Thus, our view is that gamma should be set to 0.25 (the product of 0.35 and 0.7), consistent with the recent finding of the Australian Competition Tribunal in *PLAC-Ausgrid*.

⁷ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

⁸ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 22.

⁹ In its most recent decision in relation to imputation credits, the Tribunal re-stated its view that the value of imputation credits needs to be assessed with regards to estimates of market value and remitted the matter back to the Australian Energy Regulator to reach an alternative conclusion on the value of imputation credits (compared to the figure for gamma of 0.40 which the AER adopted, based upon distribution rates of 0.70 to 0.80, and estimates for theta of 0.50 to 0.57). Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] AcompT 1 (26 February 2016), paragraphs 1006 to 1120.

2 Background and context

2.1 Imputation credits, equity value and cash flows

13 The consideration of imputation credits in setting regulated cash flows, and the regulated rate of return, has always been contentious. One reason for the ongoing debate over the relevance of imputation credits is ambiguity amongst participants – regulators, regulated entities, users, and advisors – over the impact of the imputation system on equity value and cash flows. So at the outset it is important to establish some clarity on this issue.

14 Let's step outside of regulation for a moment. In addition, for the moment assume there is no imputation system. The market value of equity for a given firm will be set according to the present value of after-tax expected cash flows that flow to equity holders. We could write this as shown below.¹⁰

Market value of equity = Sum of the present value of expected cash flows to equity holders

$$= \frac{\text{Expected cash flow}_1}{(1 + \text{cost of equity})^1} + \frac{\text{Expected cash flow}_2}{(1 + \text{cost of equity})^2} + \dots + \frac{\text{Expected cash flow}_n}{(1 + \text{cost of equity})^n}$$

15 Now consider once dividend imputation is introduced. The change in the tax system means that Australian resident investors receive a tax credit for company tax already paid. This means that the firm distributes tax credits to equity holders and some of these tax credits are used to lower the tax paid by equity holders.

16 As a consequence of this change, one of two things could happen to the market value of equity.

- a. **Market value of equity could increase.** Some equity investors will have more cash each year than they otherwise would have in the absence of dividend imputation. This additional cash could flow through to an increase in the market value of equity because the investors who benefit from imputation credits bid up the price of equity; OR
- b. **Market value of equity could stay the same.** Not all equity holders benefit from credits. Some investors might be willing to pay more for the shares, but this could mean that non-resident investors simply sell at the higher prices, pushing down the market value of equity to its pre-imputation level.

17 The reason the market value of equity could stay the same is that all investors in the shares have alternatives available to them. The non-resident investors can buy shares in Australian companies and overseas companies, so it is questionable as

¹⁰ The equation is presented for a firm with a life of n years which could correspond to any asset life.

to whether they will pay higher prices for Australian stocks merely because some resident investors are willing to pay more. The resident investors can buy stocks in overseas companies, and are unlikely to hold entirely Australian companies in their portfolio because this portfolio is not very well diversified.

18 If the market value of equity could either increase or stay the same, we can write a new equation for the market value of equity. The market value of equity now reflects the present value of expected cash flows, plus whatever increase in market value is associated with imputation credits.

Market value of equity

$$\begin{aligned} &= \text{Sum of the present value of expected cash flows to equity holders} \\ &\quad + \text{Increase in value associated with imputation credits} \end{aligned}$$

19 As a simple example, suppose a firm was expected to generate \$70 in after-tax cash flows to equity holders each year forever, and the cost of equity was 7% per year. The market value of equity, excluding the introduction of imputation would be \$1,000.¹¹

20 Now suppose that, subsequent to the imputation system being introduced, the market value of equity increases by 10% to \$1,100. The additional \$100 of market value occurs because the willingness of resident investors to pay more for the shares (because of the tax break) outweighs the selling of non-resident investors (who do not benefit from the tax break and sell at higher prices to seek opportunities elsewhere).

2.2 Application to the regulated entity

21 Now consider a regulated entity. Regulators, including the QCA, recognise the potential for imputation credits to lead to an increase in the market value of equity. They then recognise that, if imputation credits do in fact lead to an increase in market value of equity, and this is ignored in setting allowed cash flows, equity investors will earn abnormal, positive returns compared to the risk of the investment.

22 In the context of the example presented immediately above, suppose that the equity portion of the regulated asset base (RAB) was set to \$1,000, and the regulator allows expected cash flows of \$70 per year. Investors would actually receive a benefit of \$1,100 in present value terms because of \$100 increase in the market value associated with imputation credits.

23 To offset the increase in value associated with imputation credits, the regulator will reduce the expected cash flows of the regulated entity by an equivalent

¹¹ The present value of a perpetual stream of constant expected cash flows is simply the expected cash flows divided by the discount rate. So the market value of equity would be $\$70 \div 0.07 = \$1,000$.

amount. In the context of the example, the regulator will put in place an allowed series of prices of revenue stream such that the present value of expected cash flows will be reduced to \$900. This means that, in return for contributing \$1,000 of equity, the equity holders receive an equivalent value, comprising \$900 in present value of expected cash flows plus \$100 as the value of imputation credits.

In Table 1 we illustrate the concept and example presented above, in three stages. In Stage 1 (no imputation) the market value of equity is \$1,000. In Stage 2 (imputation) market value of equity increases by \$100 to \$1,100. In Stage 3 (regulation) the regulator offsets the imputation benefit by lowering expected cash flows such that equity holders receive a benefit worth \$1,000.¹²

Table 1. Imputation and market value of equity

Situation	Market value of equity (\$)	Present value of expected cash flows (\$)	Value of credits (\$)
1. No imputation	1000	1000	0
2. Imputation credits increase the value of shares	↑1100	1000	↑100
3. Regulator reduces cash flows to account for the value of credits	↓1000	↓900	100

2.3 Role of gamma in the regulatory process

In Sub-sections 2.1 and 2.2 we introduced two general principles.

- a. The imputation system could lead to an increase in the market value of equity, if market prices respond more to the willingness of Australian residents to pay for imputation credits compared to non-residents' selling of shares at higher prices.
- b. Under regulation, if the imputation system does lead to increased equity value then allowed cash flows should be offset by a corresponding amount.

Now we need to move beyond the general principle to specifics. How can a regulator determine how much to reduce the expected cash flows of the regulated entity? What would be the fair allowance for the benefits of imputation,

¹² Note that in an actual situation there would not be \$100 of credit value offset by exactly \$100 in lower expected cash flows because the cash flow reduction feeds through to less taxes and therefore less value benefit from taxes. This feedback is accounted for in the more detailed example shown in Table 2.

such that equity holders earned a return that was appropriate compensation for risk?

27 The questions posed immediately above are entirely consistent with the repeated statement of the QCA that its objective is to satisfy the $NPV = 0$ principle. This means that the benefits received by investors – via cash flows and credits – should, in present value terms, equal the regulated asset base. Our point is that if credits are set according to something different to market value, then the $NPV = 0$ principle is violated.

28 The way this is done by the QCA is via the gamma (γ) parameter. The QCA reduces the expected cash flows of a regulated entity by the product of gamma and an allowance for corporate tax, with the most recent estimate for gamma being 0.47.¹³

29 Continuing the example above, suppose that in the absence of regulation the pre-tax profits of the regulated entity were \$100, the corporate tax rate is 30% and after-tax profits align with after-tax cash flows. So we still have after-tax cash flows in the example of \$70.

30 The QCA is of the view, as represented via its gamma parameter of 0.47, that the one dollar of corporate tax paid in present value terms increases the value of equity by \$0.47. In our example, in the absence of regulation, the market value of equity would increase by \$201. This occurs because \$30 of corporate tax is paid each year, the product of \$30 and the gamma parameter of 0.47 is \$14.10, and in present value terms the \$14.10 of annual benefits is worth \$201.¹⁴

31 This \$201 benefit to equity holders is illustrated in the second line of Table 2. It shows that, without a reduction in expected cash flows, shareholders would receive \$201 of benefits above what the QCA considers fair, given the risk of the investment.

¹³ Market Parameters Decision, pp. iii, 24, 29, 101

¹⁴ That is, $\$14.10 \div 0.07 = \201.43 .

Table 2. QCA application to imputation and the market value of equity (at gamma = 0.47)

Situation	Market value of equity (\$)	Present value of expected cash flows (\$)	Value of credits (\$)
1. No imputation	1000	1000	0.00
2. Imputation credits increase the value of shares	↑1201	1000	↑201
3. Regulator reduces cash flows to account for the value of credits	↓1000	↓832	168
4. Regulator reduces cash flows by more than the value of the credits	↓922	↓832	89

32 So in response, the QCA reduces expected cash flows such that, in aggregate equity holders receive \$1,000 of benefits from their contribution of \$1,000 to the regulated asset base. In this example, pre-tax expected cash flows would be reduced to \$83.23 per year. This means that corporate tax would be \$24.97¹⁵ and after-tax cash flows would be \$58.26.¹⁶ So we have:

- a. Present value of after-tax cash flows = $\$58.26 \div 0.07 = \832
- b. Present value of imputation benefit = $\$24.97 \times 0.47 \div 0.07 = \$11.74 \div 0.07 = \$168$.

33 There is a fourth situation to consider, as shown in the final row of the table. What if the market value of a dollar of tax paid of 0.25 (rather than 0.47) but the regulator sets the revenue stream on the basis that credits are worth 0.47. In this situation, the present value of expected cash flows plus the imputation benefits are worth less than \$1000. Investors will only receive credits worth \$89¹⁷, the expected cash flows are still worth \$832 and so in aggregate the value of the equity holders' investment is less than \$1000, at \$922.

34 In summary, according to the QCA's estimate for gamma of 0.47:

- a. The present value of expected cash flows that equity holders receive from the investment are reduced by \$168 (17%) because the regulator considers that investors receive an offsetting benefit of \$168 from imputation credits.

¹⁵ $\$83.23 \times 0.30 = \24.97 .

¹⁶ $\$83.23 - \$24.97 = \$58.26$.

¹⁷ The pre-tax profit is \$83.23 and the tax paid is \$24.97. If the tax paid is only worth 25 cents in the dollar then the value of the tax benefits in perpetuity is $\$24.97 \div 0.07 = \89.18 .

- b. The annual after-tax cash flows that shareholders would otherwise receive from the firm (\$70.00) is reduced by \$11.74 (17%) to \$58.26. The regulator considers that the firm receives an annual benefit from imputation credits (\$11.74) which is worth \$168 in present value terms and that this represents a fair return for risk.
- c. If investors actually value imputation credits at 25 cents in the dollar, rather than 47 cents in the dollar, the equity holders' investment declines in value by $\$7.85 - 8\% \text{ of the investment}$ – and so the $\text{NPV} = 0$ principle is violated.

2.4 Estimate for gamma and market value associated with imputation

³⁵ In Sub-section 2.3 we explained the relationship between a regulator's estimate of gamma and the market value associated with imputation. The key point is that the regulator reduces the present value of expected cash flows to offset an estimate of the market value associated with imputation. The way the regulator achieves this objective is to assume that a dollar of corporate taxes is worth gamma.

³⁶ The reason for our report is that we disagree with the QCA's estimate for gamma of 0.47. Why? Because the basis for the QCA's estimate for gamma is **not** based upon an estimate of the market value associated with imputation. Rather, the basis for the QCA's estimate of gamma is based upon the proportion of shares owned by Australian resident investors. Specifically, the QCA computes the product of 0.56 and 0.84 to arrive at 0.47.¹⁸

- a. The figure of 0.56 is referred to by the QCA as the utilisation rate. It is an estimate of the proportion of distributed credits that could be redeemed by Australian resident investors – the *redemption rate*. This parameter is often referred to as theta (θ).
- b. The figure of 0.84 is the QCA's estimate of the distribution rate, the proportion of imputation credits created that are distributed to investors via dividends. It is based upon data from the largest 20 Australian-listed firms by market capitalisation. This parameter is often assigned the symbol, F .

¹⁸ In theory, gamma is a firm-specific parameter, rather than being a market-wide parameter. However, empirical methods and datasets used to estimate gamma are only sufficiently precise to draw reasonable conclusions on the value associated with imputation credits for all firms in the market. Hence, each regulators in Australia uses the same assumption for gamma regardless of which particular firm the regulator is considering. However, there is a divergence of opinion across regulators as to the most reliable estimate for gamma as a market-wide parameter estimate.

37 We disagree with the QCA's use of both figures (0.56 and 0.84) to compute gamma. But the issue considered in the current Sub-section is the QCA's use of the redemption rate to compute gamma. In using the figure of 0.56, the QCA is making the assumption that the proportion of shares held by Australian residents has a one-for-one correspondence with the market value associated with imputation. The QCA is making that assumption that, if 80% of shares were held by Australian residents then a distributed credit would be worth \$0.80, and if 20% of shares were held by Australian residents then a distributed credit would be worth \$0.20.

38 The reason we question the QCA's gamma estimate is that the rationale behind the figure of 0.56 – a one-for-one correspondence between redemption and market value – is made by assumption. As we discuss in detail in a subsequent section of the report, it is possible to make a set of assumptions about the characteristics of investors and how they might behave in order to justify the figure of 0.56. But making theoretical assumptions about investors characteristics, in order to make an empirical estimate, is something that the QCA invokes which is unique to gamma.

39 When estimating every other parameter in the allowed return – the risk free rate, equity beta, market risk premium, debt premium, and leverage – the QCA makes reference to traded market prices. This is not the case with the QCA's estimate for gamma. Instead, the QCA has decided that, in order to arrive at an estimate for gamma, it is preferable to assume that the value of credits corresponds to the proportion held by Australian residents.

40 Our view is that we already have a market-based estimate for the gamma that has been relied upon by the Australian Competition Tribunal (the Tribunal). The Tribunal has determined that the best estimate for gamma is 0.25, computed as the product of 0.35 and 0.70.

- a. The figure of 0.35 is an estimate of the value of a distributed credit, computed with reference to changes in share prices around the ex-dividend date. This *dividend drop-off* study compares the price of a share including and excluding the entitlement to an imputation credit. Hence, it is a direct estimate of the different prices investors will pay for a share with and without a credit.¹⁹

¹⁹ We can also estimate the value of a distributed credit with reference to the traded prices of shares and derivatives that do not entitle the holder to dividends, namely low exercise price options and individual share futures contracts. This type of study results in lower estimates for the value of a distributed credit than dividend drop-off studies. However, in this report, we only consider the dividend drop-off evidence, which was the basis for the gamma estimate of the Tribunal.

- b. The figure of 0.70 is an estimate of the distribution rate based upon data reported by the Australian Taxation Office (ATO) for all listed firms.

41 The key point is that, to achieve the objective of offsetting the market value associated with imputation we need to reduce the present value of expected cash flows by the same amount.

- a. The figure of 0.35 for theta represents a direct estimate of credit value resulting from trading of shares, but is not used by the QCA because of potential for estimation error. Estimation error is a feature of every other parameter estimate and the estimation error associated with the figure of 0.35 is explicitly considered in the dividend drop-off study itself.
- b. The figure of 0.56 for theta represents the proportion of shares held by Australian residents, but is used by the QCA under the assumption that this translates on a one-for-one basis to value.

2.5 Summary to the contextual issue

42 In summary, the disagreement between the view of the QCA and us over the appropriate assumption for gamma (0.47 versus 0.25) is as follows.

2.5.1 Two parameters to be estimated

43 There is broad agreement that gamma should be estimated as the product of two parameters: $\gamma = F \times \theta$.

- a. The first parameter, F , is the distribution rate – the proportion of created imputation credits that are attached to dividends and distributed to shareholders. The QCA uses the notation IC/Tax for this parameter.
- b. The second parameter is variously defined as “the value of distributed imputation credits” or as “the utilisation rate.” The QCA sometimes uses the notation “ U ” for this parameter. While there is dispute about how each component of gamma should be interpreted and estimated, there is broad agreement that gamma is to be estimated as the product of these two components.²⁰

2.5.2 Two different interpretations of theta

44 There is broad agreement that two different interpretations of the second parameter, theta (θ), have been proposed:

²⁰ QCA Market Parameters Decision, p. 25; DBCT Draft Decision, p. 98.

- a. a *market value* interpretation; and
- b. a *redemption proportion* interpretation.

45 There is broad agreement that:

- a. If the *market value* interpretation is adopted, we should use estimation methods that are designed to estimate the market value from the market prices of traded securities; and
- b. If the *redemption proportion* interpretation is adopted, we should use estimation methods that are designed to estimate the proportion of credits that are (or are likely to be) redeemed.²¹

46 There is broad agreement that estimates of the market value of credits are materially lower than estimates of the proportion of credits that might be redeemed (for example, redemption rate of 0.56 versus the market value estimate of 0.35).

47 There is broad agreement that the distribution rate should be estimated as the ratio of distributed credits to created credits for the benchmark efficient entity.²²

2.5.3 Points to be determined

48 There are two key points to be determined:

- a. Whether theta (θ) should be interpreted as the value that credits have to investors (as in the extent to which credits are impounded into the stock price) or as the proportion of credits that can be redeemed.

The reason we consider the value interpretation to be relevant is that, as shown in this section, the whole basis for considering imputation is to offset the market value associated with imputation with a reduction in expected cash flows that is equal in present value terms.

- b. Whether the distribution rate (F) for the benchmark efficient entity should be estimated with regard to 20 of the largest listed companies or a broader set of companies.

The reason we consider a broad set of companies should be used to estimate the distribution rate is that the largest 20 listed companies generate a higher proportion of earnings from offshore. As the amount of credits created declines (because of lower corporate tax paid in Australia) the proportion of credits distributed increases. So relying upon

²¹ QCA Market Parameters Decision, p. 100; DBCT Draft Decision, p. 106.

²² QCA Market Parameters Decision, p. 89; DBCT Draft Decision, p. 105.

the 20 largest listed companies leads to a distribution rate that is inflated. This rationale is explained in a subsequent section.

3 Interpretation of theta

Background and context

49 Prior to 2013, all regulators (including the QCA and the Australian Energy Regulator, AER) had always interpreted gamma as the market value of imputation tax credits. This led regulators to estimate gamma from the market prices of traded securities – the same way they estimate all other WACC parameters such as the risk-free rate, equity beta, and the market risk premium.

50 In its December 2013 Guideline, the AER announced that it had conducted a “conceptual re-evaluation”²³ of gamma and that it intended to redefine gamma in terms of the proportion of imputation tax credits that might be redeemed. Thus, the AER proposed that it would no longer seek to estimate the value of credits to investors, but would instead estimate the proportion of those credits that investors may be able to redeem.

51 In its 2014 Market Parameters Decision, the QCA followed suit in redefining what it considers gamma to mean. This also led the QCA to change its estimation approach – instead of estimating the value of credits to investors using market prices (the same way it estimates all other WACC parameters) the QCA now relies on estimates of the proportion of credits that are available for redemption.

52 In summary, the QCA has followed the AER in redefining theta to be the redemption proportion and adopting the AER’s approach for estimating the redemption proportion.

53 Thus, the key question that decision-makers and courts have now been confronted with is whether theta should be interpreted as the value of distributed imputation credits (in which case estimates would be based on market prices, like other WACC parameters) or as the proportion of credits that are available for redemption (in which case estimates of the redemption proportion would be required).

Reasons for adopting the “value” interpretation

54 In our view, the reason that the “value” interpretation is correct flows directly from a consideration of the way gamma is used in the regulatory process. As set out in Section 2, the basis for the regulatory allowance for imputation credits is to reduce the expected cash flows that would otherwise be paid to shareholders by the regulator’s estimate of the value of imputation credits. If the return to shareholders is reduced by the *number* of credits they receive or redeem, instead of the *value* they obtain from those credits, they will be left under-compensated.

²³ AER, 2013, *Rate of Return Guideline*, Explanatory Statement, p. 160.

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The value interpretation is also perfectly consistent with the framework of Lally (2015 QCA). In his Equation (1), Lally shows that what is relevant is the extent to which imputation credits are capitalised into the stock price:

$$S_0 = \frac{Y_1 - TAX_1 + IC_1 U + S_1}{1 + R_f + \phi\beta_e}$$

where:

S_0 is the current stock price;

S_1 is the stock price at the end of the period;

$Y_1 - TAX_1$ is the after-tax profit that is available to be paid out as a dividend;

$R_f + \phi\beta_e$ is the required return on equity from the Capital Asset Pricing Model (CAPM);

IC_1 is the face amount of credits created; and

U is the extent to which the credits are capitalised into the stock price, more commonly denoted as theta, θ .

56

The Lally formula can be rewritten using the more common notation as follows:

$$S_0 = \frac{DIV_1 + \theta \times IC_1 + S_1}{1 + R_e}.$$

57

In this equation, theta (θ) represents the extent to which imputation credits are capitalised into the stock price – the extent to which investors value imputation credits by bidding up the stock price in relation to them. Part of the stock price is the present value of the extent to which investors value imputation credits.

58

Moreover, the Lally formula above shows that theta can be estimated from market data – stock prices and dividends. We develop this point further below.

February 2016 decision of the Australian Competition Tribunal: PIAC-Ausgrid²⁴

59

The specific issue of whether theta should be interpreted as the *value* that distributed credits have to investors or as the *proportion* of credits that might be redeemed was the subject of a recent merits review appeal brought by the NSW electricity networks. In the *PIAC-Ausgrid* case, the Australian Competition Tribunal rejected the AER's "conceptual re-evaluation" (on which the QCA continues to rely) and held that gamma must be interpreted as the value of credits to investors and not as the proportion that can be redeemed:

²⁴ Applications by Public Interest Advocacy Service Ltd and Ausgrid Distribution [2016] ACompT 1 (26 February 2016).

We consider that, by placing most reliance on the equity ownership approach and effectively defining the utilisation rate as the proportion of distributed imputation credits available for redemption, the AER has adopted a conceptual approach to gamma that redefines it as the value of imputation credits that are available for redemption. This is inconsistent with the concept of gamma in the Officer Framework for the WACC.²⁵

...the Tribunal does not accept the AER's approach that imputation credits are valued at their claimable amount or face value (as it said in the Final Decisions: the measure is what can be claimed). The value is not what can be claimed or utilised.²⁶

60 Thus, the Tribunal decided that the AER had estimated the wrong thing – a redemption proportion instead of a value – and directed the AER to re-make its decision with a gamma of 0.25 instead of the 0.4 figure that the AER had proposed. The 0.25 estimate is a value estimate based on market prices, and is the estimate that had been used prior to the AER's "re-evaluation."

61 The QCA's most recent statement in relation to gamma is the DBCT Draft Decision, which continues to estimate theta as the proportion of credits that are available to be redeemed. Like the AER, the QCA relies primarily on the "equity ownership" approach to estimate the proportion of credits that might be redeemed. This involves simply estimating the proportion of Australian equity that is owned by resident investors. The equity ownership approach was singled out for special criticism by the Tribunal:

The AER's equity ownership and tax statistics approaches consequently make no attempt to assess the value of imputation credits to shareholders...The Tribunal considers these approaches to be inconsistent with a proper interpretation of the Officer Framework.²⁷

The Tribunal considers that the equity ownership approach overstates the redemption rate. We agree with the Network Applicants' submission that "even on the AER's own definition of theta (focussing on potential utilisation by eligible investors), equity ownership rates are above the true maximum possible figure for theta".²⁸

62 The Tribunal also noted that the AER's (and consequently the QCA's) approach to estimating theta was inconsistent with the approach to estimating all other WACC parameters. All other parameters are estimated as market values using the prices of traded securities:

²⁵ PIAC-Ausgrid, Paragraph 1100.

²⁶ PIAC-Ausgrid, Paragraph 1081.

²⁷ PIAC-Ausgrid, Paragraph 1095.

²⁸ PIAC-Ausgrid, Paragraph 1093.

Moreover, the AER's reasoning ignores the fact that other parameters in the WACC calculations are market values.²⁹

...the Tribunal considers the use of market studies to estimate the value of imputation credits is consistent with the methods used to calculate other parameters of the costs of debt and equity from market data.³⁰

Consequently, placing significant weight on market value studies is, in the Tribunal's view, consistent with evidence relied on by the AER to calculate the rate of return on capital.³¹

63 The Tribunal's conclusion is clear:

...the AER has adopted a conceptual approach to gamma that redefines it as the value of imputation credits that are available for redemption. This is inconsistent with the concept of gamma in the Officer Framework for the WACC.³²

64 The Tribunal is also clear about the fact that it is not enough to simply look at the *number* of credits that might be redeemed – it is also necessary to determine the *value* to investors of the credits that they redeem:

...it is necessary to consider both the eligibility of investors to redeem imputation credits and the extent to which investors determine the worth of imputation credits to them.³³

October 2016 decision of the Australian Competition Tribunal: SAPN³⁴

65 The Australian Competition Tribunal sits as three members – a Federal Court judge and two expert members. There was no overlap between the *PLAC-Ausgrid* and *SAPN* Tribunals. The *SAPN* Tribunal held that, as an administrative body, it was not bound to follow the *PLAC-Ausgrid* decision on gamma:

It was also contended by SAPN that this Tribunal should follow the *Ausgrid* decision, or alternatively, treat it as highly persuasive. Undoubtedly, each differently constituted Tribunal should consider the importance of consistency between Tribunal decisions, but this is not the sole determinative factor nor is consistency an unqualified value. Consistency may lead to arbitrariness of decision-making, and may not produce the correct legal and just result in the particular case before the Tribunal. Each Tribunal, considering the application before it, and dealing with the relevant parties, must in accordance with the law, the issues before it, and the evidence, consider and determine the matters raised before the Tribunal.³⁵

66 The SAPN Tribunal then noted that there were two competing interpretations:

²⁹ PIAC-Ausgrid, Paragraph 1073.

³⁰ PIAC-Ausgrid, Paragraph 1097.

³¹ PIAC-Ausgrid, Paragraph 1098.

³² PIAC-Ausgrid, Paragraph 1100.

³³ PIAC-Ausgrid, Paragraph 1061.

³⁴ Applications by SA Power Networks [2016] ACompT 11 (28 October 2016).

³⁵ SAPN, Paragraph 111.

- a. That gamma should be estimated as the market value of imputation credits. The Tribunal called this the “marginal investor” interpretation; and
- b. That gamma should be estimated as the proportion of credits that could be redeemed. The Tribunal called this the “average investor” or “utilisation” interpretation.

67 Whereas the *PLAC-Ausgrid* Tribunal considered the two approaches in some detail and ruled conclusively that the market value interpretation must be adopted, the *SAPN* Tribunal did not undertake that task. The *SAPN* Tribunal held that it is not the role of the Tribunal to make a determination about which of the two approaches is the correct or best approach, but rather that, because submissions had been made in relation to both approaches, it was up to the AER to exercise its judgment in selecting which approach it would adopt:

The Tribunal notes that...different theoretical models, all of which are simplifications of reality, with different strengths and weaknesses, and with different degrees of support among experts, may suggest differing approaches. Judgement about the weight to be given to alternative approaches would then be required, with resulting consequences for judgements about the subsequent issues.³⁶

and:

Consequently, the Tribunal is of the view that the AER did not err, nor was unreasonable, in giving most weight to the “utilisation” approach. It considered the range of alternative approaches, recognised the diversity of views of experts on their merits (both theoretical and empirical), and made a judgement call.³⁷

68 Thus, it would seem that the *SAPN* Tribunal decision is of little assistance to the QCA in determining which of the two interpretations of gamma (the market value of imputation credits or the proportion of credits that might be redeemed) should be adopted – because, unlike the *PLAC-Ausgrid* Tribunal, the *SAPN* Tribunal did not address that question.

69 Moreover, our view is that there was no reasonable basis for the *SAPN* Tribunal to find that it was open to the AER to exercise its “judgment call” in favour of the “utilisation” approach – the same approach that has been adopted by the QCA. We explain below the reasons for our view that there is no reasonable basis for setting gamma on the basis of the number of credits that might be redeemed rather than the value of those credits to investors.

³⁶ SAPN, Paragraph 138.

³⁷ SAPN, Paragraph 159.

Relevance of the PIAC-Ausgrid Tribunal's decision

70 The QCA considers the *PIAC-Ausgrid* Tribunal's ruling in two paragraphs of the DBCT Draft Decision.³⁸ The QCA concludes that the Tribunal Decision should have no effect on its own analysis or conclusions because:

...the Tribunal's reasoning was based on a 'market value' definition of the utilisation rate³⁹

whereas the QCA adopts a different interpretation:

...our definition of the utilisation rate is the value-weighted average over the utilisation rates of imputation credits of all investors in the market.⁴⁰

71 This reasoning may lead readers to infer that the *PIAC-Ausgrid* Tribunal embarked on one task (estimating the market value of imputation credits) whereas the QCA is performing a different task (estimation of the proportion of credits that might be redeemed). However, any suggestion that the Tribunal was addressing a different question, and is therefore of limited relevance, would be quite misleading. Rather, as set out above, the Tribunal specifically considered the question of which of the two tasks is the appropriate one in the regulatory context. The Tribunal concluded that the AER (and consequently the QCA) has performed the wrong task – they have estimated the wrong thing. Whereas the regulatory framework requires an estimate of the value that investors place on imputation credits, the AER (and QCA) have estimated something else.

72 In summary, the key question that regulators and courts must now decide is whether theta should be interpreted as representing the *value* that financial market investors place on imputation credits or as the *proportion* of credits that are available for redemption. This is precisely the central question that was addressed by the Tribunal in *PIAC-Ausgrid*.

73 In its DBCT Draft Decision, the QCA states that:

We have considered the Tribunal's decision in relation to gamma and found there is nothing in the Tribunal's reasoning that demonstrates that our approach to estimating gamma is inappropriate.⁴¹

74 In our view, this conclusion is without foundation. The Tribunal considered, in great detail, the AER's (and consequently the QCA's) approach to estimating gamma and concluded that it is wrong.

75 In its DBCT Final Decision, the QCA notes that there are some inconsistencies between the *PIAC-Ausgrid* and *SAPN* decisions and that it is not clear which, if either, will survive appeals to the full Federal Court. The QCA also states that it

³⁸ DBCT Draft Decision, p. 108.

³⁹ DBCT Draft Decision, p. 108.

⁴⁰ DBCT Draft Decision, p. 108.

⁴¹ DBCT Draft Decision, p. 108.

has adopted the “utilisation” approach based on its own analysis.⁴² This sub-section explains why we consider the *PLAC-Ausgrid* analysis to be relevant to the QCA’s task in relation to gamma. The following sub-section explains why we consider that there is no reasonable basis for the “utilisation” approach to gamma.

Rationale for the QCA’s approach to estimating theta

Overview

In its DBCT Draft Decision, the QCA clearly states the reason for the approach that it currently adopts to estimating theta:

We do not accept the contention that the utilisation rate [theta] should be defined as a market-value concept. Rigorous derivations of the Officer CAPM unambiguously define the utilisation rate as the weighted average of the utilisation rates of individual investors (i.e. the extent to which imputation credits can be redeemed with the ATO).⁴³

Lally (2016 QCA) disagrees with the *PLAC-Ausgrid* Tribunal’s view that market value of credits is the relevant concept. His rationale is that the market value interpretation does not apply to the Officer (1994) model, because in Lally’s interpretation of that paper theta was not a market value concept and in the Officer model there were no foreign investors.⁴⁴

On this point, we return to the first section of this report, and note that the exercise is not to discern what a theoretical model of investor preferences says that credits should be worth; nor is the concern to interpret whether one past paper (Officer, 1994) was based upon the consideration of the market value of credits at their market value or face value. The relevant question remains, what allowance should we set for the benefits of imputation such that investors – via cash and credits – receive something equal in value to their investment?

The models to which the QCA refers develop a complex weighted-average that requires information about the total wealth of each investor in the economy and about the extent to which each investor is averse to risk. Suppose for a moment that it was possible to obtain that information and to compute the complex weighted-average, and that the result was higher than the market value of credits to investors. In that case, the QCA approach would be to announce to investors that, even though the investors valued the credits at \$X, their returns would be reduced by more than \$X because that is what the QCA has estimated the theoretical weighted average to be – that if the investors had behaved in accordance with the theoretical assumptions they would have placed a higher

⁴² DBCT Final Decision, p. 121.

⁴³ DBCT Draft Decision, p. 106.

⁴⁴ Lally (2016 QCA), pp. 39-40.

value on the credits, in which case the reduction in the allowed return would have been fair.

80 In our view, the QCA should use the actual value of credits in the real-world market, not some theoretical construct. Such an approach would be consistent with the QCA's approach to every other WACC parameter. For example, under the CAPM, the composition of the market portfolio also depends on the same complex weighted-average that is a function of the wealth and risk-aversion of the investors in the market. But the required return on the market is not estimated by making assumptions about which investors have how much wealth or what level of risk-aversion. Rather, it is estimated with regard to real-world stock returns. This is perfectly appropriate because those real-world stock returns reflect the outcome of trading between investors, and consequently, the effect that wealth and risk-aversion has had on that trading and on each investor's assessment of the value of each stock to them.

81 The same applies when estimating the risk-free rate. We don't make assumptions about the personal circumstances and characteristics of different investors and how that might affect their motivation to trade in government bonds. Rather, we simply use bond prices observed in the real world – where those prices fully reflect the aggregate motivation to trade of all investors in the market.

82 The Tribunal made precisely this point in *PIAC-Ausgrid*:

The Tribunal accepts the Network Applicants' submission that the return on equity is derived from the market prices of government bonds (the risk-free rate) and from the market prices of shares (beta and MRP). The cost of debt is calculated by reference to bond yields. Bond yields are derived directly from the traded market prices of bonds. Further, we accept the Network Applicants' submission that these market prices reflect every consideration that investors make in determining the worth of shares to them and that the bond prices, and the yields that are derived from them, reflect every consideration that investors make in determining the worth of the asset to them, including "personal costs".⁴⁵ Consequently, placing significant weight on market value studies is, in the Tribunal's view, consistent with evidence relied on by the AER to calculate the rate of return on capital.⁴⁶

83 Another point to note is that, under the theoretical models that the QCA relies upon, there is a correspondence between the complex weighted-average and the market value. Under these models, it is the complex weighted-average that is capitalised into the stock price. Thus, an estimate of the market value of credits would also be an estimate of the complex weighted-average. That is precisely the approach that the QCA adopts for all other WACC parameters and the approach that the QCA applied to theta prior to 2014. However, for theta, the QCA now

⁴⁵ The AER had used the term "personal costs" to summarise the various reasons why investors would not value credits that they redeemed at the full face amount.

⁴⁶ PIAC-Ausgrid, Paragraph 1098.

seeks to employ the approach of directly estimating the complex weighted-average – as proposed by the AER.

84 Direct estimation of the complex weighted-average is impossible, because data on investor wealth and risk-aversion is unavailable. Thus, additional simplifying assumptions are required. The additional assumptions that the AER and QCA have made include:

- a. Every credit that is redeemed has a value (to the investor who redeems it) equal to the full face amount;
- b. All investors are equally risk-averse; and
- c. All investors (domestic and foreign) have no wealth other than that which they invest in Australia.⁴⁷

85 These assumptions are implausible, and relaxing them would result in a lower estimate of the complex weighted-average. That is, an estimate of the complex weighted-average that is based on these assumptions (which the AER and QCA employ) will be an upper bound for the true figure. Again, the Tribunal has recently reached precisely the same conclusion:

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

Summary of problems with the basis of the “utilisation” approach

86 The issues relating to the use of theoretical models to support the “utilisation” or “weighted average investor” approach can be summarised as follows:

- a. Under the assumptions of some asset pricing models, the equilibrium prices of assets are set by the complex weighted average (“representative”) investor.
 - i. The complex weighted average result is mathematically derived from a set of assumptions about how investors trade off risk against return.

⁴⁷ This assumption could be replaced by the equally implausible assumption that investors make their Australian investments completely independent of any investments that they hold outside of Australia – that they pay no regard at all to the correlation between the returns on domestic and foreign assets. As well as being implausible and inconsistent with common sense, this assumption directly contradicts the very basis of the CAPM because it suggests that investors do not maximise utility over their investment portfolios.

- ii. Under all variations of the CAPM, investors consider risk in the context of their whole portfolio rather than by considering each asset individually. For example, an investor might not want so many ANZ shares if they already have substantial investments in the other three big banks.
 - iii. The equilibrium price is derived by equating demand for an asset across the market with the supply of shares available in the market. That is, there must be a single market within which equilibrium is derived by equating the demand for assets (from investors) with the supply of assets. No equilibrium can be derived if investors have access to investments outside the market or if assets inside the market can be purchased by investors from outside the market.
- b. The representative agent asset pricing models simply do not work in the case where there are two markets – a domestic market with some domestic investors and some domestic assets and a foreign market with foreign investors and foreign assets. All of these models derive the equilibrium price by equating demand and supply across the market.
- i. The SAPN Tribunal noted the inability of these models to accommodate this feature of the real-world market.⁴⁸
 - ii. Lally has advised the AER and QCA that this problem can be overcome by simply assuming away all foreign investors. In this case we would have only domestic investors and this is the basis for Lally advising that theta should be set to 1.
 - iii. Handley has advised the AER that this problem can be overcome by assuming that either:
 - 1. Foreign investors have no wealth other than that which they invest in Australia; or
 - 2. Foreign investors make their Australian investment decisions independent of the rest of their portfolios, which is inconsistent with the very basis of the CAPM.
 - iv. Lally has advised the AER and QCA that Handley is wrong about this and that if a theoretical modelling

⁴⁸ SAPN, Paragraph 151.

approach is to be used there must be a single market otherwise no equilibrium can be derived. Such a single market could be obtained by assuming away all foreign investors and assets so that demand from domestic investors could be equated with the supply of domestic assets. Alternatively, an integrated world market could be used as the basis for the equilibrium.⁴⁹

- c. That is, the real world is too complex for the representative investor models to cope with. It is not even clear from these models which investors and how much of their wealth should be included in the complex weighted average. This leads Handley (and the AER and QCA) to add some additional simplifying assumptions which are clearly unreasonable and unsupported.
- d. If the assumptions of the theoretical asset pricing models held perfectly in reality, the observed market value of imputation credits would be equal to the complex weighted-average utilisation rate. However, as set out above, the real-world complexity is beyond the capability of the models – they are simply not up to the task unless they are buttressed by such wildly unrealistic assumptions (e.g., that Australian asset prices are unaffected by foreign investment) as to render them useless.
- e. By contrast, observed share prices reflect the actual outworking of the complex interactions between investors, which is apparently too complex to be captured by simple economic models. The use of market prices recognises that the practical realities are too complex to be accurately captured by simple economic models. Rather than assume away the complexities, our view is that the better approach is to estimate theta from market prices that embed the outworking of all of those complexities.

⁴⁹ See Lally, M., 2013 AER, *The estimation of gamma*, Report for the AER, 23 November, where Dr. Lally states that “Handley (2008, section 2.2) appears to believe that there is no inconsistency and believes that all CAPMs start by defining the “market”, from which the “relevant” set of investors follows. Thus, if the market is Australian equities, then the relevant set of investors includes foreigners to the extent they invest in Australian equities. I do not agree. CAPMs do not start with a definition of the “market” but a set of assumptions about investor behaviour and institutional features, and the particular assumptions imply which market portfolio and set of investors are relevant. Some versions of the CAPM (such as Officer, 1994) assume complete segmentation of equity markets, in which case the relevant investors are Australian residents and the relevant market portfolio is all Australian risky assets (assets that can be purchased by Australian residents in a world in which there is complete segmentation of risky asset markets). Other versions of the CAPM assume complete integration (such as Solnik, 1974), in which case the relevant investors are those throughout the world and the relevant market portfolio would be all risky assets throughout the world.”

Consistency with Lally advice to the QCA

87 Finally, we note that the market value estimate of theta (e.g., via dividend drop-off analysis) is perfectly consistent with the theoretical framework of Lally (2015 QCA). As set out above, Lally (2015 QCA) Equation (1) shows that what is relevant is the extent to which imputation credits are capitalised into the stock price:

$$S_0 = \frac{DIV_1 + \theta \times IC_1 + S_1}{1 + R_e}.$$

88 This formula can then be rearranged slightly as follows:

$$S_0(1 + R_e) - S_1 = DIV_1 + \theta \times IC_1.$$

89 Dividing all terms by the current stock price gives:

$$\frac{S_0(1 + R_e) - S_1}{S_0} = \frac{DIV_1}{S_0} + \theta \frac{IC_1}{S_0}.$$

90 This expression, from Lally (2015 QCA), is entirely consistent with dividend drop-off regression analysis, which is performed as follows:

$$\frac{S_0(1 + R_e) - S_1}{S_0} = \delta \frac{DIV_1}{S_0} + \theta \frac{IC_1}{S_0} + \varepsilon.$$

91 That is, Lally (2015 QCA) shows that what is relevant is the extent to which imputation credits are capitalised into the stock price. Dividend drop-off analysis specifically seeks to estimate the extent to which imputation credits are capitalised into the stock price using a regression specification that is entirely consistent with the formula set out in Lally (2015 QCA).

The interpretation of dividend drop-off evidence and other market value studies

92 In a review of the *PLAC-Ausgrid* Tribunal's decision, Lally (2016 QCA) raises a number of points of disagreement, which can be broken into four categories:

- a. The estimate of theta from dividend drop-off studies could be overstated or understated, depending upon whether investors place more or less value on dividends or capital gains.⁵⁰
- b. Estimates of imputation credit value are different in different studies, depending upon the researchers' choice of models, treatment of outliers, and compilation of the dataset.⁵¹

⁵⁰ Lally (2016 QCA) pp. 20 to 25.

⁵¹ Lally (2016 QCA), pp. 25 to 27.

- c. Share prices on dividend drop-off dates are affected by trading on the cum- and ex-dividend rates that is different to normal trading.⁵²
- d. Market-based evidence (apart from dividend drop-off analysis) also leads to varying estimates of the value of imputation credits, in part because of researchers' choice of models, treatment of outliers, and compilation of the dataset.⁵³

93 The conclusion reached by Lally (2016) is that using market prices of imputation credits is a last resort, with his preferred approaches in order being the use of a value of one (on theoretical grounds), the proportion of equity held by Australian resident investors, the redemption rate for credits.⁵⁴

94 As we have discussed in Section 2, the reason Lally's preferred approaches for estimating theta are inappropriate is that they are answers to a different question to that confronting the QCA. In setting the allowed revenue stream, the QCA is asking the following question (our words) – “Investors receive something of value from imputation credits. How much do I need to reduce the value of expected cash flows to offset the value of imputation credits?”

95 All three approaches preferred by Lally (2016 QCA) – the theoretical case that theta equals one, the proportion of stocks held by Australian residents, and the redemption rate – do not answer this question, for all the reasons discussed above.

96 This leaves us with market-based evidence, which Lally (2016 QCA) suggests is unreliable. The concerns raised by Lally over models, treatment of outliers, and composition of the dataset affect all empirical evidence upon which regulators base their decisions. Lally pays particular attention to the comparison of the dividend drop-off studies that we performed,⁵⁵ in comparison to authors from the ERA.⁵⁶

97 Lally's focus is on the variation in parameter estimates from one paper to the next.

- a. For instance, Lally notes that when the same time period is analysed using the same model, there were estimates for theta of 0.38 (SFG) and 0.37 (ERA), but estimates of a constant of 0.82 (SFG) versus 0.66 (ERA).⁵⁷

⁵² Lally (2016 QCA), pp. pp. 27 to 29.

⁵³ Lally (2016 QCA), pp. 29 to 31.

⁵⁴ Lally (2016 QCA) p. 33.

⁵⁵ SFG (2011, 2013).

⁵⁶ Vo, Gellard and Mero (2013).

⁵⁷ Lally (2016 QCA), p. 26.

- b. In another comparison of results using robust regression, Lally (2016 QCA) considers coefficients and standard errors for theta values of 0.29 and 0.08 (SFG) to be materially different from 0.35 and 0.11 (ERA).

98 There are other examples of differences in coefficient estimates resulting from different datasets and treatment of outliers. Yet the overall implication of dividend drop-off studies using data from 2000 onwards is that the value of a distributed credit is less than 0.40 (and in our view 0.35). Pointing out that different researchers come up with different figures which are less than 0.40 does not support the case that credits are worth more than 0.40.

99 Equally important is the implications for how empirical evidence is best assessed. If we are to progress towards the most reliable estimates of the cost of capital, and imputation credit value, it seems that we should evaluate the strengths and limitations of empirical evidence and reach conclusions on the basis of those strengths and limitations.

100 This comment can be extended to Lally's discussion of market-based evidence outside dividend drop-off studies.⁵⁸ Lally makes comment on studies which span different time periods, estimation techniques and datasets and notes the wide variation in estimates of market value of credits. He is particularly concerned with dispersion in market-based estimates of credit value for studies conducted in the same time period, because this dispersion is not explained by time series changes in the tax regime which could make credits more or less valuable.

101 One approach to the empirical evidence on imputation credits is to evaluate, as best as possible, the research methods and data, in order to determine which conclusions have the most relevance for decision-making. Some of the variation in value estimates across studies comes simply from noise resulting from different underlying sources of data, and sample selection decisions. And some of the value estimates across studies comes from variation in research methods, and their associated types of raw data. Yet this careful evaluation does not form part of the critique. Rather, the dispersion in value estimates is used in support of the conclusion that the QCA should measure something else other than value.

102 As a specific example, consider the research from 2000 onwards which relied upon derivative prices to estimate the value of imputation credits (SFG, 2013 Derivatives; and Cummings and Frino, 2008). This research was motivated by criticism of dividend drop-off studies, specifically the criticism that there are only a small number of ex-dividend events per year and the volume of shares traded on cum- and ex-dividend dates is larger than on other dates. The data from these

⁵⁸ For instance, studies that use prices of derivatives to estimate the market value of credits (SFG, 2013 Derivatives) who reported a figure of 0.52 and Cummings and Frino (2008) who reported a figure of 0.54.

two studies is after the change in the tax rules that allowed investors to receive cash for imputation credits.

103 For the post-2000 period the results from these two studies (0.12 and 0.54) span the valuation estimates from the SFG drop-off study (0.35). So we could either reconcile the evidence from three different datasets and estimation techniques, deciding which evidence is most relevance, and reach a conclusion on the value of credits; or according to the alternative view disregard market-based evidence.

104 NERA (2013) also performed a market-based study using another estimation technique and dataset, which arrives at a large negative value for credits.⁵⁹ As with the derivative studies of SFG (2013 Derivatives) and Cummings and Frino (2008) the authors were motivated by the concern that dividend drop-off studies do not examine enough share prices based upon normal trading. So they looked at more share prices as described below.

105 NERA examined (1) the relationship between realised stock returns and credit yields (credits relative to price); (2) the relationship between an estimate of the present value of dividends and credits; and (3) the relationship between earnings yields (earnings relative to price); and concluded that there is no evidence that the market actually pays higher prices for stocks that pay more credits. The evidence suggests the market pays lower prices for the stocks that pay more credits. One interpretation of this evidence, which is noted by NERA, is that it is unlikely that the value of credits is actually negative. This means that there is more to be done to determine what characteristics of the sample lead to the estimate of credits being negative – but it remains the case that looking at stock prices outside of the ex-dividend period does not lead to the conclusion that the market pays high prices for credits. The alternative interpretation reached by Lally is that we should ignore market-based evidence because researchers attempting to look at a broader suite of stock prices found that imputation credit values in their sample were negative.

106 Nowhere in Lally's critique does he ask, "With all the available evidence – different models, treatment of outliers, datasets – what is the best estimate of the market value of credits? To which evidence should I assign more or less relevance?"

107 The argument is that the results could be different if the researchers had made different choices in their research. Yet every choice made across the two studies, of course, leads to a different result and this presents scope for the notion that we should disregard market value studies. Or in other words, we should measure the very thing that would allow the QCA to determine the allowed revenue stream – how much value do investors receive from imputation credits?

⁵⁹ This study is updated by NERA (2015) and the coefficient estimate for the value of credits remains large and negative.

Conclusions in relation to theta

108 In our view, theta should be interpreted and estimated as the market value of imputation credits for the following reasons.

- a. The regulatory approach is to reduce the return that would otherwise be paid to shareholders by the regulator's estimate of the value of imputation credits. Consequently, the return that shareholders would otherwise receive should be reduced by the *value* of the imputation credits they receive. If the return to shareholders is reduced by the *number* of credits they receive or redeem, instead of the *value* of those credits, they will be left under-compensated.
- b. The QCA estimates all other WACC parameters with regard to traded market prices. For example, the MRP is estimated with regard to stock prices and the risk-free rate is estimated with regard to government bond prices. No other WACC parameter is estimated by disregarding market evidence and applying theoretical assumptions.
- c. In any event, the complex weighted-average that the QCA seeks to estimate cannot be estimated without imposing a raft of assumptions. The assumptions that the QCA imposes produce an upper bound for the complex weighted-average and not a point estimate.
- d. The *PLAC-Ausgrid* Tribunal, which specifically considered which framework should be adopted when estimating gamma, has recently decided that:
 - i. The Australian regulatory framework requires a market value estimate of theta;
 - ii. Consistency with other WACC parameters also requires that theta be estimated on a market value basis; and
 - iii. The equity ownership estimate on which the QCA relies should not be interpreted as an estimate of theta, but only as an upper bound for theta.

109 In our view, the best available market value estimate of theta is the 0.35 estimate of SFG (2011, 2013 Dividend drop-off). The SFG estimation has been assessed by the Tribunal for its fitness for use in the regulatory setting. The Tribunal concluded that it has confidence in the SFG estimate⁶⁰ and that ‘No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the

⁶⁰ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

SFG report value”⁶¹ and that “the careful scrutiny to which SFG’s report has been subjected, and SFG’s comprehensive response, gives the Tribunal confidence in those conclusions.”⁶²

⁶¹ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

⁶² Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 22.

4 The distribution rate

Background and context

110 In its Market Parameters Decision, the QCA defines the distribution rate to be:

The ratio of distributed imputation credits to company tax paid.⁶³

111 In its DBCT Draft Decision, the QCA has amended its definition to be company tax paid in Australia only.⁶⁴ Thus, the distribution rate is defined to be the proportion of created credits (which equals Australian tax paid) that are distributed to investors.

112 In the Australian regulatory setting, the long-standing approach to estimating the distribution rate is to use data from the ATO on:

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

113 It is broadly accepted that this approach produces an estimate of 0.7.⁶⁵

114 In its Market Parameters Decision, and subsequent decisions, the QCA proposes a different approach to estimating the distribution rate. The QCA relies on estimates from 20 large Australian listed companies from Lally (2014). For each of these companies, Lally estimates:

$$\frac{\text{Credits distributed}}{\text{Credits distributed} + \text{Credits not distributed}}$$

over a 13-year period, where Credits Distributed is inferred from total dividends paid and Credits Not Distributed is inferred from the change in the firm's Franking Account Balance.⁶⁶

115 The QCA adopts a distribution rate of 0.84 based on this approach.⁶⁷

The key problem with the QCA's estimation approach

116 In a report submitted by DBCTM, Frontier Economics (2015 Gamma)⁶⁸ identify a fundamental flaw in the Lally/QCA approach to estimating the distribution rate. The 20 companies in the Lally sample are predominantly very large multinationals with a material amount of foreign-sourced income. This foreign income can be used to distribute imputation credits, so that the distribution rate

⁶³ Market Parameters Decision, p. 89.

⁶⁴ DBCT Draft Decision, p. 105.

⁶⁵ The QCA notes the consistency of this estimate and the adoption of it by other regulators in its Market Parameters Decision, p. 91.

⁶⁶ Credits distributed + credits not distributed is the proxy for credits created.

⁶⁷ DBCT Draft Decision, p. 101.

⁶⁸ Frontier Economics, 2015 Gamma, *Estimating gamma*, September.

is higher than it could be for a firm that did not have access to foreign income to assist in the distribution of imputation credits. Since the firms that are regulated by the QCA are (by definition) purely domestic firms, they have no access to foreign income. Consequently, estimating the distribution rate for a firm with *no* foreign income by using a sample of 20 firms with *substantial* foreign income is inappropriate.

117 Frontier Economics (2015 Gamma)⁶⁹ explain the problem with a numerical example. Consider two firms that each earn a \$100 profit, pay \$30 tax, and then pay a dividend of \$49 (which represents 70% of the \$70 net profit after tax).

118 The first firm has no foreign income, so all of the profits and all of the tax occurs within Australia. Thus, the \$30 of corporate tax creates \$30 of imputation credits. The amount of credits that can be attached to the \$49 dividend is only \$21.⁷⁰ Consequently, the distribution rate is:

$$\frac{\text{Credits distributed}}{\text{Credits created}} = \frac{21}{30} = 70\%$$

119 The second firm is identical to the first in all respects except that 70% of its business is in Australia and 30% is offshore. This firm will pay 70% of its corporate tax to the ATO and therefore creates \$21⁷¹ of credits. It will then pay the same dividend of \$49, representing the same 70% of its net profit after tax. Like the first firm, \$21 of credits can be attached to the \$49 dividend. This represents a 100% distribution rate:

$$\frac{\text{Credits distributed}}{\text{Credits created}} = \frac{21}{21} = 100\%$$

120 The second firm is able to attach credits to dividends paid out of offshore profits, whereas the first firm has no access to such offshore profits.

121 In our view, the QCA has erred in using a sample of large multinationals with substantial offshore profits to estimate the imputation credit distribution rate. This is because the firms that the QCA regulates have no access to any such offshore profits, by definition.

Do large multinationals have higher imputation credit distribution rates?

122 The simple numerical example above demonstrates that, for any given dividend payout rate, a firm with some foreign profits will be able to distribute a higher proportion of the credits that it creates than will a purely domestic firm.

⁶⁹ Section 3.4, pp. 10-12.

⁷⁰ $49 \times 0.3 / (1-0.3) = 21$.

⁷¹ $70\% \times 30 = 21$.

123 Moreover, based on the QCA's own figures, large multinationals distribute 84% of the credits that they create and the average Australian firm distributes only 70%. Thus, it is clear that large multinationals have higher distribution rates than other firms.

124 In a recent report for the QCA, Lally (2016 QCA) purports to show that large multinationals do *not* have higher imputation credit distribution rates than the average firm. Lally purports to establish this claim in two ways:

- a. He provides a conceptual example of a firm *beginning* its foreign investment by using retained earnings, noting that the example is irrelevant for firms with established foreign operations – such as those in the sample of 20 that form the basis of the 84% estimate;⁷² and
- b. He provides some figures for a group of seven large multinationals.⁷³ We fail to see how one can determine whether A is larger than B by examining only A. The more logical approach would be to compare A (84%) against B (70%) as we have done above.

125 Moreover, NERA (2015) use Australian Tax Office data to estimate distribution rates for various types of companies from 2000-2012. Their results are summarised in Table 3 below.

Table 3: Distribution rate 2000-2012 by company type

Firm type	Distribution rate
Top 20 ASX listed	0.840
Public, but not top 20 ASX listed	0.693
All public	0.755
Private	0.505
All companies	0.676

Source: NERA (2015), Table 3.4, p. 23.

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

⁷² Lally (2016 QCA), p. 36-37.

⁷³ Lally (2016 QCA), p. 36-37.

Reliability of the ATO data

127 In its Market Parameters Decision, the QCA notes Lally's "concerns about the ATO data" and the AER's rejection of those concerns.⁷⁴ This issue here is that there are two ways to use the ATO data to estimate the distribution rate:

- a. The franking account balance (FAB) method. This approach begins with the total corporate tax paid since imputation began (which is equal to total credits created since imputation began (since every dollar of corporate tax paid creates a dollar of imputation credits). Then it takes the total franking account balances of all companies (the ATO provides the aggregated figure directly). This represents the amount of created credits that have not yet been distributed. Those credits not in the FABs must have been distributed – hence the distribution rate is easy to estimate.
- b. The dividend method. This estimate is computed by making an estimate of the amount of credits distributed each year divided by the amount of corporate tax paid (and therefore the amount of credits created) each year. However, it is very difficult to estimate the amount of credits distributed each year. This is because one has to keep track of dividends flowing from one company to another or to trusts or life insurance offices and so on.

128 The dividend approach produces estimates that are materially lower than the 70% estimate from the more standard FAB approach. It is generally accepted, including by the AER, that the 70% estimate is more reliable and that is the estimate that has always been used.⁷⁵

129 The concern raised by Lally (2016 QCA) is that, because the franking account balance method produces a different estimate of the distribution rate to the dividend method, the ATO data is unreliable and we should therefore adopt a distribution rate based upon the 20 largest listed firms. Yet the examination of the ATO data over time has recognised why estimation error occurs more often in the dividend method – because tracking dividends flowing amongst different entities is challenging, whereas franking account balances (as used by Lally in his analysis of 20 large firms) are likely to show less estimation error.

130 The figures compiled by Hathaway (2013) from ATO data show an estimate of the distribution rate of approximately 0.7 from the franking account balance method and 0.5 from the dividend method.⁷⁶ The difference between these two

⁷⁴ Market Parameters Decision, p. 91.

⁷⁵ See NERA (2013, pp. 5-9), Hathaway (2013, pp. 22-39), and the AER's 2013 Rate of Return Guideline (p. 158).

⁷⁶ Hathaway (2013, Figure 1) in which Hathaway reports the access fraction.

figures does not suggest that they should be replaced with a figure of 0.84, based upon a sample of firms which we know will be different from other firms – if any firms are going to have relatively high distribution rates, due to generating proportionately less tax from Australian operations.

Tribunal decision on the distribution rate

131 The specific issue of whether it is appropriate to estimate the distribution rate with regard to a sample of multi-nationals was also considered in the recent *PIAC-Ausgrid* case:

The Networks Applicants say that the AER should not have relied on an estimate of the distribution rate for listed equity in estimating the distribution rate because it was likely to be unrepresentative of the distribution rate of the benchmark entity. This is because a large proportion of listed companies are multinational firms with foreign profits which will generally have an incentive [or ability] (by virtue of generating foreign-sourced income) to distribute a higher proportion of imputation credits. In contrast, the benchmark entity, by definition, is an entity with 100 percent Australian income.⁷⁷

132 The Tribunal rejected the AER's reasons for placing weight on an estimate that was dominated by multinationals and determined that the long-standing approach of estimating the distribution rate using ATO data for all companies should be maintained:

...the Tribunal is of the view that it is appropriate to follow past practice.⁷⁸

Analysis by the QCA

133 The Lally (2015 QCA) report to the QCA does not address the key question of whether it is inappropriate to estimate the distribution rate by using a sample of multinational firms that are able to use foreign-sourced income to help distribute the imputation credits that they create.

134 The DBCT draft and final decisions do not address the multinationals point in any way.

135 Rather, the QCA's reasons for adopting the Lally estimate are based on the QCA's consideration that the Lally data is more reliable than the ATO data in that it is based on audited financial statements and contains no unexplained discrepancies.⁷⁹ However, there are two problems with the QCA's reasoning. The first is that the Lally approach estimates the wrong thing. What is required is an estimate of the distribution rate for a benchmark efficient firm that has no access to foreign profits, whereas Lally has estimated the distribution rate for large multinationals.

⁷⁷ PIAC-Ausgrid, Paragraph 1105.

⁷⁸ PIAC-Ausgrid, Paragraph 1106.

⁷⁹ DBCT Draft Decision, p. 105.

136 The second problem is that the QCA seems to have misunderstood the issues that have been raised in relation to the ATO data. As explained above, two approaches have been considered for using the ATO data to estimate the distribution rate – the FAB approach and the dividend approach. One produces a direct estimate that is based on reliable data that has never been questioned and the other approach produces a lower estimate using different data and the application of some assumptions. The fact that the two estimates differ is not a reason to reject them both. The ATO FAB estimate of the distribution rate is widely regarded as being reliable and appropriate. For example, the AER has stated that:

We consider this is a reasonable approach to estimate the payout ratio. In particular, we consider it is simple, fit for purpose, transparent, replicable and based on reliable and publicly accessible data sets.⁸⁰

Similarly, in *PLAC-Ausgrid* the Tribunal observed that:

The distribution rate was interpreted as “the proportion of imputation credits generated that is distributed to investors”. It was estimated with a cumulative payout ratio approach which uses Australian Taxation Office (ATO) Franking Account Balances (FAB) statistics to calculate the proportion of imputation credits generated (via tax payments) that have been distributed by companies since the start of the imputation system. There is no dispute about this definition or the reliability of the ATO FAB data used to determine the distribution rate.

Conclusions in relation to the distribution rate:

137 In our view, the distribution rate should be set to the standard estimate of 0.7 because:

- a. The Lally approach provides an estimate of the wrong thing – the distribution rate for multinationals with substantial foreign income rather than for the benchmark efficient entity; and
- b. The standard ATO estimate is widely considered to be reliable and appropriate.

⁸⁰ AER Draft Rate of Return Guideline – Explanatory Statement, p. 236.

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