Estimating gamma

Report for QR National

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1. Executive summary

Background and context

1. SFG Consulting (SFG) has been engaged by QR Network to provide an opinion in relation to the value of gamma that should be used in the context of the regulation of QR Network's regulated assets. Specifically, we have been instructed to:

    a) Summarise academic research in this field;

    b) Detail the recent findings of the Australian Competition Tribunal (the Tribunal);

    c) Emphasise the relevance of the above findings to QR Network's Access Undertaking;

    d) Highlight the inconsistency of the approach of the Queensland Competition Authority (the QCA or the Authority) with current market practice of making no adjustment in relation to franking credits; and

    e) State clearly the value of gamma in terms of an appropriate range for its point estimate.

Summary of conclusions

2. Our primary conclusions are:

    a) Gamma is estimated by regulators as the product of a distribution rate (F) and an estimated value of distributed credits (theta);

    b) The best available estimate of the distribution rate is 0.7;

    c) The best available estimate of theta is a range of 0 to 0.35:

        i) The upper bound of this range is the estimate from the state-of-the-art dividend drop-off analysis that was recently used by the Tribunal; and

        ii) The lower bound of this range is consistent with:

            (1) The observed market practice of valuation experts, corporations, government agencies and credit rating agencies;

            (2) The results of the simultaneous price study published in the *Journal of Financial Economics*; and

            (3) The dividend drop-off evidence when the value of cash dividends is 100 cents per dollar, consistent with the use of the Capital Asset Pricing Model (CAPM).

    d) Consequently, the best available estimate of gamma is a range of 0 to 0.25.

2. The role of gamma in regulatory determinations

Effect of dividend imputation tax credits and the role of gamma

3. In a dividend imputation tax system, such as has operated in Australia since 1987, dividends paid by Australian companies out of profits that have been taxed in Australia have tax credits attached to them. For example, a company that earns a profit of $100 and pays $30 corporate tax and then distributes the remaining $70 as a dividend to shareholders, can attach $30 of dividend imputation tax credits to the $70 dividend. Those tax credits can be used by resident investors to reduce their personal tax obligations by $30. These tax credits are of no value to non-resident investors under the Australian dividend imputation legislation.

4. In the Australian regulatory environment, the "gamma" parameter has an important effect on the grossing up for corporate tax. Continuing the example above, suppose a regulator determines that shareholders require a return of $70. In the absence of dividend imputation, a pre-tax profit of $100 would be required. The firm would then pay $30 in corporate tax and distribute the remaining $70, as required. That is, the required return on equity is "grossed up" to determine the pre-tax profit that the company must earn in order to provide shareholders with their required return after corporate tax has been paid.

5. In an imputation system, however, the $70 dividend comes with $30 of tax credits attached to it. The gamma parameter effectively acknowledges that those tax credits have a potential value to shareholders. This is a market value – how much the market price of a share will increase as a result of the credits attached to the dividend stream. Suppose, for example, that the $30 of tax credits have a value to shareholders of $15. In that case, the shareholders would have received a $70 cash dividend and tax credits with a value of $15, and would therefore have been over-compensated because they would have received total compensation of $85 when their required return was only $70.

6. Rather, in this case the firm's pre-tax revenue requirement should have been set at $82.35, in which case the firm would pay tax of $24.71 (30%) and pay a cash dividend of $57.65. Attached to that cash dividend would be $24.71 of tax credits, which we continue to assume are valued at half their face value – $12.35. The total of cash dividend ($57.65) and tax credits ($12.35) provides shareholders with the $70 return that they require.[1]

7. That is, the role of gamma is as an estimate of the value of dividend imputation tax credits, having an effect via the grossing up for corporate tax.

Estimation

8. Gamma is estimated by regulators as the product of two components:

$$\gamma = F \times \theta$$

where F is the distribution rate (the proportion of created imputation credits that are distributed to shareholders) and θ is the value of a distributed credit. Imputation credits are created whenever a

[1] The revenue requirement is calculated by back-solving from the return requirement. Let the revenue requirement be X. For a corporate tax rate of 30%, the cash dividend that can be paid out of pre-tax profit of X is X(1-0.30). The amount of imputation credits that are created by the payment of corporate tax is 0.30X. At half their face value, these imputation credits are valued at 0.5(0.30)X. The sum of the cash dividend and the imputation credit must provide shareholders with the $70 they require. Hence: X(1-0.30)+0.5(0.30)X=70, and the implied value of X is 82.35.

firm pays a dollar of Australian corporate tax. But to distribute all of the imputation credits it creates, a firm would have to distribute 100% of its (Australian) profits as dividends. The average firm does not do this, because it retains some profits to finance capital expenditure.

9. If, for example, firms distribute 70% of the imputation credits they create and if those credits are each valued at 35% of face value, then gamma would be:

$$\gamma = F \times \theta = 0.7 \times 0.35 = 0.25$$

10. This would mean that 25% of the corporate tax that the firm pays is assumed to flow back to shareholders, so the grossing up for corporate tax would be reduced accordingly.

3. Estimating the distribution rate, *F*

Definition of the distribution rate

11. The distribution rate (or franking credit payout ratio) is the ratio of:

    a) the total amount of franking credits that are distributed (or paid out) to shareholders during a particular period, to

    b) the amount of franking credits that are created during that same period.

12. For example, if the average firm created $100 of franking credits in a year and distributed $70 of those to shareholders in that year, the distribution rate for that year would be 70%.

Approaches for estimating the distribution rate

13. Two approaches have been proposed for determining the distribution rate:

    a) **Empirical distribution rate** – the observed empirical estimate of the actual distribution rate of real firms across the Australian economy; and

    b) **Assumed distribution rate** – an assumed value that is based on the proposition that the observed empirical evidence is irrelevant.

Empirical distribution rate is 70%

14. It appears to be common ground that the observed empirical distribution rate is approximately 70%. This figure is based on estimates from two studies, Hathaway and Officer (2004) who report an estimate of 0.71 and Hathaway (2010) who reports an estimate of 0.69. Both of these studies use data provided by the Australian Taxation Office to measure the ratio of:

    a) the total amount of franking credits that are distributed (or paid out) to shareholders during a particular period, to

    b) the amount of franking credits that are created during that same period.

15. That is, these studies measure the actual distribution rate (exactly as defined) each year and report an average value of close to 0.7. This average distribution rate has been quite stable over the period since imputation was introduced into Australia. For example, the average figure over the most recent ten-year period reported by Hathaway (2010) is immaterially different from the earlier figure reported by Hathaway and Officer (2004).

16. Consequently, it is generally accepted that the actual practice of Australian firms is to distribute to shareholders approximately 70% of the franking credits that are created each year.

Basis for assumed distribution rate of 100%

17. Over 2008-2009, the Australian Energy Regulator (AER) undertook a *Review of WACC Parameter Estimates*, culminating in a *Statement of Regulatory Intent* (SoRI) in May 2009. In its SoRI, the AER recognised that the empirical distribution rate was approximately 70%, but adopted an assumed

distribution rate of 100% based on the recommendation of its consultant, Associate Professor Handley. That is, the AER recognised that, on average, the actual distribution rate of franking credits is approximately 70% but then estimated gamma *as though* the distribution rate were 100%:

> …the adoption of a payout ratio of 1.0 does not imply an expectation that all credits will be paid out in each period. Rather as Handley advised, the full distribution of free cash flows is the standard assumption for valuation purposes, therefore for consistency, a 100 per cent payout of imputation credits is appropriate.[2]

18. In the regulatory setting, the 100% distribution rate is acknowledged to be an "assumption"[3] and that the value of 100% is "an assumed distribution rate."[4] Moreover, the AER notes that any value above 0.7 would have to be based on "theoretical grounds"[5] whereas "the empirical evidence currently before the AER supports a value of the payout ratio of 70%."[6]

19. The basis for the assumed 100% distribution rate is a report from the AER's consultant, Handley (2010). In particular, Handley concludes that retained credits should be assumed to be just as valuable to investors as those that have been distributed.[7] The basis for this conclusion is that those credits that have been retained in one year will be distributed to investors soon after. In this case, the time value loss would be negligible and retained credits would be approximately as valuable to investors as those that have already been distributed.

20. Handley (2010, p. 37) suggests that "investment bankers and or potential corporate raiders" will come up with some means to unlock the value of these retained credits. The AER (SA Final Decision, p. 151) has conjectured that this could be done via three means:

    a) Off-market buy-backs;

    b) Dividend reinvestment plans; and

    c) Special dividends.

21. But there are several problems with this view:

    a) All three of these mechanisms are *already* included in the 70% distribution rate. The 70% figure is the ratio of (i) the total amount of franking credits distributed via any means including those set out above, to (ii) the total amount of franking credits created;

    b) In any event, the mechanisms set out above are small in the overall scheme of things. For example, less than 10 off-market buybacks occur in an average year;

    c) The amount of "special" distributions for the average firm would be enormous. For the average Australian firm distributing $70 of franking credits in a given year, an *additional* $60 in

[2] SoRI, p. 410.
[3] DBP Draft Decision, Paragraph 664.
[4] DBP Draft Decision, Paragraph 664.
[5] Envestra SA Draft Decision, p.109.
[6] Envestra SA Draft Decision, p.109.
[7] Handley (2010, pp. 37-38) recognises that retained franking credits do exist in reality and that they are likely to be valued less than distributed credits, but then concludes that we should ignore this valuation differential when estimating gamma. That is, he concludes that gamma should be estimated either by assuming away the existence of retained credits or by recognizing that they exist and then assuming that they are just as valuable as distributed credits.

special distributions would have to be made every second year just to keep the franking account balance from building up. This is an extraordinarily large amount of special distributions and there is no evidence that *any* firm has ever distributed anything like this amount of special dividends, much less that the *average* firm does (or ever could do) this; and

d) The only available evidence on this issue suggests that firms are *not* able to routinely distribute all of their franking credits, but rather that franking account balances are growing to huge amounts over time as more and more credits are retained within the firm. Handley (2010, p. 36) notes that at the end of 2007, no less than $150 billion of unused retained franking credits were locked inside firms and McKenzie and Partington (2010, p. 27) note that "the tendency has been for the total of franking account balances to rise through time."

22. For even a dollar of retained credits to be distributed, 100% of the franking credits created in a given year would have to be distributed in that year. And this would then have to happen for the *average* firm *every* year. The fact that this has clearly *not* happened is evidence that retained franking credits are not routinely distributed *at all*.

23. It appears to be logically impossible for retained franking credits to be routinely distributed soon after their retention. In our view, there is no basis for the conclusion that retained credits are just as valuable as those that have already been distributed.

Empirical distribution rate should be used

24. An estimate of the distribution rate of franking credits is available, it appears to be uncontroversial, and it should be used. If we know that the distribution rate is 70%, we should use a distribution rate of 70%. We should not assume that the distribution rate is, or should be, something different from what we can observe it to be. This is particularly the case given that the 70% estimate is the best estimate that is available and it has been arrived at on a reasonable basis.

25. As noted in Section 8 below, the Australian Competition Tribunal and the AER now agree that the distribution rate should be based on an empirical estimate and that the best available estimate is 70%.

4. Estimating the value of distributed tax credits, theta

Approaches for estimating the value of distributed credits

26. The value of a distributed imputation tax credit, theta, is the value to the representative investor of a one dollar imputation tax credit that is distributed to them. Three methods have been proposed to estimate theta:

    a) Aggregate tax statistics redemption rates;

    b) Dividend drop-off analysis; and

    c) Simultaneous price studies.

Redemption rates

Method

27. The redemption rate approach is to estimate the ratio of (a) the total amount of franking credits redeemed in a given year, to (b) the total amount of franking credits that were created in that year. That is, it is a measure of the extent to which franking credits are redeemed. The AER estimates this to be 0.74, based on a paper by Handley and Maheswaran (2008).

28. We note that in the post-2000 period, Handley and Maheswaran (2008) do not *measure* the actual amount of franking credits that are redeemed, but rather *assume* that all franking credits distributed to residents will be redeemed.

Upper bound or point estimate?

29. In his advice to the AER, Handley (2010) suggests that redemption rates provide an *upper bound* for theta. He does not suggest that this approach provides an *estimate* of theta. Moreover, Handley and Maheswaran (2008) do not claim anywhere in their paper that the redemption rate approach provides an estimate of gamma (or theta) and the title of their paper (and the abstract) make it clear that the paper is about the efficacy of the imputation system (that is, the extent to which franking credits are *used*) and not about how franking credits might be *valued* or about the impact that imputation might have on the corporate cost of capital.

30. Suppose we take the AER/Handley estimate of 0.74. This implies that, on average, 74% of the franking credits that are distributed to shareholders end up being redeemed. But this tells us nothing about the *value* of those franking credits as reflected in the market price of the shares.

31. Suppose, for example, that 74% of all shareholders were residents who valued franking credits at 10 cents per dollar. What proportion of franking credits would we expect to see being redeemed? 74% of course – the resident investors may as well redeem their franking credits, as 10 cents is better than nothing. That is, observing how many franking credits get redeemed tells us nothing about their value to investors and certainly nothing about their effect on the corporate cost of capital.

32. Handley and Maheswaran (2008) and Handley's reports to the AER state that redemption rates do not provide "an estimate of gamma," but rather an "upper bound for gamma." The reason for this is that the redemption rates establish that 26% of shareholders do not value franking credits at all as

they allow them to lapse without being redeemed.[8] The remaining 74% of shareholders presumably do value franking credits, but the tax statistics provide no indication of what this value might be. It could be 100 cents or 1 cent. Under the Handley approach, assuming 100 cents provides an upper bound of 0.74 and assuming 1 cent provides a lower bound of essentially zero. That is, the Handley approach simply narrows the range for theta to 0 to 0.74 – it provides no indication of the appropriate value from within that range.

AER's use of redemption rates as a point estimate

33. In the SoRI and a number of subsequent decisions, the AER was clear that it had rejected Handley's assessment of redemption rates providing an upper bound for theta, and that redemption rates should be treated as a *point estimate* of theta. The implicit assumption here is that franking credits distributed to residents are valued at 100 cents in the dollar. There are two problems with this assumption:

    a) There is no basis for it (and it is inconsistent with the advice of its consultant); and

    b) It is unreasonable in light of the fact that the AER values cash dividends at 80 cents per dollar (as set out below). It is not possible that any investor would value a dollar of franking credits more than a dollar of cash.

34. It is apparent in the SA Electricity Distribution Final Decision (AER, 2010) that the AER has misunderstood the point that is being made about tax credits providing an estimate of the upper bound for theta. The AER says that (p. 161):

> the AER also noted that the 0.74 estimate of theta by Handley and Maheswaran (2008) was not an upper bound on the reasonable range of estimates for theta, based on tax statistics. As noted in the draft decision, and consistent with the WACC review, the AER considers that a reasonable range of estimates for theta based on tax statistics is 0.67 to 0.81 and a point estimate of 0.74 is a reasonable point estimate for theta based on tax statistics.

35. That is, the AER has examined the estimates from two different sub-periods in the Handley and Maheswaran (2008) study:

    a) The first sub-period provides an upper bound estimate of 0.67 – thus the possible range for theta is narrowed to between 0 and 0.67;

    b) The second sub-period provides an upper bound estimate of 0.81 – thus the possible range for theta is narrowed to between 0 and 0.81.

36. The AER then takes an average of the two upper bounds and interprets this as a point estimate, which is clearly illogical.

37. As noted in Section 5 below, the Tribunal has recently ruled that redemption rates can only be used as an upper bound of the estimate of theta, and that the AER has erred in using them to produce a point estimate.

[8] This point is about the proper *interpretation* of the Handley and Maheswaran (2008) estimates, so we take their reported estimates (as adopted by the AER) at face value here.

Dividend drop-off analysis

Method

38. The dividend drop-off method involves examining stock price changes on ex-dividend days.[9] The amount by which stock prices change (on average) is assumed to reflect the value of the dividend and franking credit that has separated from the shares. This is implemented via regression analysis whereby the stock price changes are compared with dividends and franking credits as follows:

$$\Delta P = aD + \theta FC + \varepsilon$$

where ΔP represents the change in stock price, D represents the amount of the cash dividend, FC represents the amount of franking credits, and ε is a residual term that represents the extent to which the stock price might change for reasons other than the payment of the dividend and franking credit.

39. In this analysis, a is the estimated value of a \$1 dividend and θ is the estimated value of a \$1 franking credit. At the present 30% corporate tax rate, a \$1 fully-franked dividend will have \$0.43 of franking credits attached to it. If both are fully valued by investors, on average, a and θ would both equal one and on average the stock price would fall by \$1.43 on the ex-date, where:

$$\begin{aligned}\Delta P &= aD + \theta FC \\ &= 1 \times 1 + 1 \times 0.43 \\ &= 1.43.\end{aligned}$$

40. Different researchers estimate a and θ using slight variations of the equation above,[10] but the essence of what is being estimated is well-described by this equation – on average the stock price is expected to change by the market's assessment of the combined value of the dividend and franking credit.

AER's use of dividend drop-off analysis

41. In its SoRI, and in several subsequent determinations, the AER considered a number of dividend drop-off analyses, but ultimately relied on one single drop-off study – that of Beggs and Skeels (2006). Beggs and Skeels use the dividend drop-off technique to examine the effects of six changes to the Australian tax laws during the period from 1986 to 2004. They conclude that over their sample period cash dividends are close to fully valued and that the market value of imputation credits is generally insignificantly different from zero for a substantial proportion of the sample period (p.249):

> It was then found that cash drop-off ratios were consistently close to 1, but the franking credit drop-off ratios were significantly less than 1. Moreover, the franking credit drop-off ratios were not significantly different from zero for much of the sample data. This indicates that marginal investors did not value the franking credit, and provides an explanation as to why gross drop-off ratios less than 1 were observed.

42. However, the AER focused on the estimate of theta from the most recent sub-period that was examined by Beggs and Skeels (2006) on the basis that an estimate that uses the most recent data is

[9] These are days on which the dividend and associated franking credit separate from the shares. An investor who buys the shares prior to the ex-date is entitled to receive the dividend and franking credit, but an investor who buys the shares on or after the ex-date is not.

[10] For example, some researchers divide both sides of the equation by D to scale by the amount of dividends and others divide both sides by P to scale by the stock price.

likely to better reflect the current value of theta. The estimate of theta from that sub-period was 0.57.[11]

Regulatory debate

43. Throughout the SoRI process and a number of subsequent determinations, there was substantial debate about the AER's reliance on a single dividend drop-off estimate from a single sub-period in a single paper. It was argued that it was inappropriate for the AER to have relied on this single estimate for a number of reasons:

    a) The single sub-period on which the AER relied contained relatively few observations, which goes to the statistical reliability of the estimate;

    b) The statistical methodology of other papers should be preferred to that adopted by Beggs and Skeels (2006); and

    c) Even if the AER has a legitimate preference for the Beggs and Skeels (2006) variation of the drop-off methodology and for the use of recent data, it should have given at least some weight to a study performed by SFG, which had been commissioned to follow the Beggs and Skeels methodology, but to use an updated and more recent data set.

44. Subsequent to the AER's SoRI, Professor Chris Skeels (one of the authors of Beggs and Skeels, 2006) was engaged to perform a thorough peer review of the SFG study and of the AER's concerns with and criticisms of it. Skeels (2009, p.5) notes that:

> Many of the criticisms raised by the AER were little more than allusions to potential problems with the SFG analysis. In some cases I found that these allusions were ill-founded and readily dismissed. In other instances the appropriate response was to rework the model and to actually establish whether the concern was valid or not. This latter class of concerns was incorporated into the questions posed to SFG. I found their responses to be convincing in as much as the potential problems were demonstrated to have little or no material impact upon the results.

45. Professor Skeels (2009, p.5) then concluded that:

> I find that the results presented in Appendix I constitute an empirically valid study of the dividend drop-off problem for Australia and that the SFG estimate of theta of 0.23 represents the most accurate estimate currently available.

46. Nevertheless, the AER persisted in placing 100% weight on the result from the single sub-period in Beggs and Skeels (2006) and placed no weight at all on the results of the more up-to-date SFG study.

Current evidence

47. As set out in Section 8 below, the Tribunal has recently determined that the AER was in error in relying on the Beggs and Skeels (2006) result and was quite critical of that study. The Tribunal directed that a "state-of-the-art" dividend drop-off study be performed by SFG. The subsequent

[11] This estimated value for franking credits is accompanied by an estimate for the value of cash dividends of 0.80. As we discuss in other sections, the implied market value for one dollar of fully franked dividends is approximately one dollar, computed as $0.80 \times 1.00 + 0.57 \times 0.43 = 0.80 + 0.25 = 1.05$.

section discusses the terms of reference and tribunal decision in more detail. In this section we present the study's conclusions as the most recent, large-sample evidence (using a dividend drop-off methodology) on the value of a distributed credit.

48. The approach adopted in the SFG study was not to adopt a single estimate that is based on a single specific choice of:

    a) Model specification;

    b) Estimation technique;

    c) Sample period;

    d) Treatment of corporate announcements; and

    e) Treatment of outliers,

    but rather examine whether the proposed estimate is consistent with a whole range of different estimations.

49. The final conclusions of the SFG study are (paragraphs 101 – 102):

> In our view, considering all of the evidence set out above, an appropriate point estimate for theta based on dividend drop-off analysis is 0.35.
>
> Finally, it is important to note that dividend drop-off analysis produces estimates of two parameters: theta and the value of cash dividends. That is, the estimates from drop-off analysis come in pairs. The point estimate of 0.35 for theta is not independent of the estimated value of cash dividends. Rather the estimate of 0.35 for theta corresponds with an estimate in the range of 0.85 to 0.90 for the value of cash dividends.

50. These conclusions have been recently adopted in full by the Tribunal, and have been applied by the AER in all of its decisions since the Tribunal ruling.

51. This conclusion has also been adopted by the Independent Pricing and Regulatory Tribunal (IPART, 2011) in New South Wales in relation to its review of water prices for the Sydney Desalination Plant. IPART had previously adopted an estimate of 0.40 as the mid-point of an estimated range of 0.30 – 0.50. In light of this new evidence, it adopted a mid-point estimate of 0.25 as the mid-point of an estimated range of 0.00 – 0.50 (p. 92).

Value of package of dividend and imputation tax credit

52. Whereas dividend drop-off studies have reported a range of estimates of theta (and a corresponding range of estimates of the value of cash dividends), they have uniformly reported that the combined value of the package of a one dollar dividend and the associated 43 cent imputation credit is approximately one dollar. That is, the various studies agree that the combined value of the package is approximately one dollar, and only diverge with respect to the way this one dollar value is allocated between the cash dividend and the associated imputation credit.

53. By way of example, we note that the combined value of a one dollar dividend and the associated 43 cent imputation credit is approximately one dollar for both the Beggs and Skeels (2006) sub-period

(on which the AER sought to rely) and for the state-of-the-art SFG study which has recently been adopted by the Tribunal:

a) For Beggs and Skeels the combined value is $1.0 \times 0.80 + 0.43 \times 0.57 = 1.0$; and

b) For SFG the combined value is $1.0 \times 0.85 + 0.43 \times 0.35 = 1.0$.

54. This uniform combined value is important in the context of the consistency issue that is discussed in Section 6 below.

Simultaneous price studies

Method

55. The best-known example of the simultaneous security price method is Cannavan, Finn and Gray (2004), which was published in the top-ranked *Journal of Financial Economics*. They examine the simultaneous prices of shares (which entitle the holder to receive dividends and franking credits) and futures contracts (which do not). The difference in the respective prices is then used to obtain estimates of the value of cash dividends and the value of franking credits.

56. Cannavan, Finn and Gray (2004) conclude that the combined value of a $1.00 cash dividend and the attached franking credit is approximately $1.00, consistent with the results from dividend drop-off studies. They also conclude that cash dividends are fully valued and that theta is close to zero, after the 1997 tax amendment that effectively prevented non-residents from "selling" franking credits to residents.

57. In our view, this paper provides strong evidence in support of theta (and consequently gamma) taking a value close to zero.[12] It is based on a large sample, involves thousands of observations for each stock that is examined (whereas each stock only has two ex-dividend dates per year), and has met the criteria for publication in the leading journal. We also note that, as set out in the following section of this report, the empirical result from this paper (that theta, and consequently gamma, has a negligible value) is consistent with the practice of Australian companies and expert valuation professionals.

Conclusions in relation to theta

58. Our main conclusions in relation to the estimation of theta are:

a) We agree with the Tribunal that redemption rate tax statistics do not provide an estimate of theta and should not be used for that purpose;

b) We agree with the Tribunal that the best available dividend drop-off estimate of theta is 0.35 – from the state-of-the-art SFG study. This estimate of theta is conditional on cash dividends being valued at 85 cents in the dollar; and

c) The best available estimate of theta using the simultaneous security price method is the estimate of zero from Cannavan, Finn and Gray (2004). This estimate of theta is conditional on cash dividends being valued at full face value.

[12] In particular, if theta is zero, then gamma is also zero, regardless of what value is used for the distribution rate.

59. These results produce a range of estimates for theta of 0 − 0.25, and a corresponding range for the value of cash dividends of 100% − 80% of face value.

5. Recent decision of the Australian Competition Tribunal

Background and context to Tribunal review

60. Prior to the last process for setting the AER's SoRI, the long-standing regulatory precedent was to set gamma equal to 0.5. In its SoRI in May 2009, the AER set gamma to 0.65. As set out above, this estimate was based on:

    a) Setting F to 100%. The AER's consultant on this issue proposed that F should be set on the basis of theoretical assumption rather than market evidence; and

    b) Setting θ to 0.65 as the mid-point of two estimates:

        i) A dividend drop-off estimate of 0.57 (Beggs and Skeels, 2006) whereby one compares the prices of shares immediately before the ex-dividend date with the prices of the same shares immediately after, as a means of inferring the implied value of dividends and the tax credits that are attached to them; and

        ii) An estimate of 0.74 based on ATO tax statistics and about the proportion of imputation credits that are redeemed (Handley and Maheswaran, 2008).

61. The first three business to be regulated under the AER's SoRI estimate of 0.65 were ENERGEX, Ergon Energy and ETSA Utilities, all of whom sought a review by the Tribunal. This review took place under the National Electricity (Distribution) Rules and has become known as the *Gamma Case*.

Issues and Tribunal findings

Estimating the distribution rate

62. Recall that the distribution rate (F) is the ratio of (a) the total amount of franking credits distributed to shareholders in a given year, to (b) the total amount of franking credits created in a given year. In the *Gamma Case*, the AER abandoned its contention that F should be set to 100% even before the hearing. In its submissions to the Tribunal prior to the hearing, the AER then acknowledged that an estimate above 0.7 was unsupportable and therefore that the distribution rate should be set to 0.7. In summarising the AER's position on this issue, the Tribunal stated that:

> The AER accepts that on the material presently before the Tribunal, there is no empirical data that is capable of supporting an estimated distribution ratio higher than 0.7. The AER therefore accepts that it is open to the Tribunal to adopt a substitute distribution ratio of 0.7.[13]

63. The Tribunal then concluded and ordered that:

> In light of these submissions and the material before the Tribunal, the Tribunal concludes that the distribution ratio is 0.7 for the calculation of gamma.[14]

[13] Australian Competition Tribunal [2010] ACompT 9, Paragraph 2.
[14] Australian Competition Tribunal [2010] ACompT 9, Paragraph 4.

Estimating Theta

64. Having made a determination in relation to the distribution rate, the Tribunal then turned to the estimation of the other component of gamma, the value of distributed credits, theta. In particular, the theta parameter estimates the value, to the relevant shareholder, of a dollar of franking credits that has been distributed to them. Different shareholders will place a different value on the franking credits that are distributed to them. Resident shareholders can use franking credits to reduce their personal tax obligations, whereas non-resident shareholders obtain no benefit from franking credits. Theta represents the extent to which trading among all market participants results in some value in relation to franking credits being impounded into the stock price.

65. Two techniques for empirically estimating theta were considered by the Tribunal:

    a) Tax statistics about the proportion of distributed imputation tax credits that had been redeemed by shareholders, obtained from the Australian Taxation Office; and

    b) Dividend drop-off analysis, whereby the implied value of imputation tax credits is inferred from the price change that occurs over ex-dividend days.

66. The Tribunal held that the ATO tax statistics did not represent an estimate of market value and that the AER was wrong to have used them for that purpose.

67. This left the Tribunal with dividend drop-off analysis. On this point, the AER had sought to rely entirely on a single study by Beggs and Skeels (2006). The Tribunal held that the AER was wrong to rely on an out-dated and methodologically unsound dividend drop-off study. The Tribunal then directed that SFG should conduct a "state-of-the-art" dividend drop-off study to assist the Tribunal.[15] The Tribunal also directed that the dividend drop-off study to be performed by SFG "should employ the approach that is agreed upon by SFG and the AER as best in the circumstances."[16]

68. After a number of meetings and telephone conferences and circulation of several draft versions of proposed Terms of Reference, agreement on several matters could not be reached. This required a further hearing before the Tribunal on those matters that were in dispute. At the completion of this hearing, the Tribunal made an immediate ruling, finding against the AER on all issues.

69. SFG then conducted the state-of-the-art dividend drop-off study and circulated a draft report to all parties. The AER and the regulated businesses provided comments on the draft report and these were taken into account in a revised report that was provided to all parties and to the Tribunal.

70. At the final hearing, the AER submitted that the SFG study had departed from the Terms of Reference, could be criticised on numerous other grounds, and should therefore be afforded little weight. The Tribunal rejected these submissions entirely concluding that:

> It is not necessary to set out the details of the eight issues, since they raise no important or significant questions of principle…Calling them "major compliance issues" is unnecessarily pejorative.
>
> Whether or not the terms of reference have been departed from, what is important is whether the concerns raised by the AER with the construction of the database cast doubt

[15] Australian Competition Tribunal [2010] ACompT 7, Paragraph 146.
[16] Australian Competition Tribunal [2010] ACompT 7, Paragraph 147.

> on the value of SFG's analysis, requiring the Tribunal to give it less weight than it otherwise would. In the Tribunal's view, they do not.
>
> The Tribunal is satisfied that the procedures used to select and filter the data were appropriate and do not give rise to any significant bias in the results obtained from the analysis. Nor was that suggested by the AER.[17]

71. The Tribunal then accepted the estimates from the SFG state-of-the-art study:

> In respect of the model specification and estimation procedure, the Tribunal is persuaded by SFG's reasoning in reaching its conclusions. Indeed, the careful scrutiny to which SFG's report has been subjected, and SFG's comprehensive response, gives the Tribunal confidence in those conclusions. [18]

72. The Tribunal went on to conclude that:

> The Tribunal is satisfied that SFG's March 2011 report is the best dividend drop-off study currently available for the purpose of estimating gamma in terms of the Rules.[19]

and

> The Tribunal finds itself in a position where it has one estimate of theta before it (the SFG's March 2011 report value of 0.35) in which it has confidence, given the dividend drop-off methodology. No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the SFG report value.[20]

Final estimate of Gamma

73. Having determined that the appropriate distribution rate is 70% and that the best dividend drop-off estimate of theta is 0.35, the Tribunal had no more work to do other than to multiply these two estimates together to obtain a gamma estimate of 0.25:

> Taking the values of the distribution ratio and of theta that the Tribunal has concluded should be used, viz 0.7 and 0.35, respectively, the Tribunal determines that the value of gamma is 0.25.[21]

[17] Australian Competition Tribunal [2011] ACompT 9, Paragraphs 18-19.
[18] Australian Competition Tribunal [2011] ACompT 9, Paragraph 22.
[19] Australian Competition Tribunal [2011] ACompT 9, Paragraph 29.
[20] Australian Competition Tribunal [2011] ACompT 9, Paragraph 38.
[21] Australian Competition Tribunal [2011] ACompT 9, Paragraph 42.

6. Market practice

74. In this section, we consider the evidence about commercial and market practice in relation to imputation tax credits. We begin by noting that the issue is *not* about whether some investors might value or benefit from imputation tax credits. Unquestionably, some investors do value the imputation tax credits they receive and some do not. Rather, the key issue is whether dividend imputation affects the equilibrium cost of capital of Australian companies, and consequently the revenue requirement of the benchmark firm.

75. One (but not the only) consideration that is relevant when estimating gamma is whether market professionals in practice actually adjust their cost of capital estimates for an assumed equilibrium value of imputation tax credits in the way that the AER proposes. The evidence suggests that they do not. Specifically, the great majority of market professionals make no adjustment at all to either the cash flows or the discount rate to reflect any assumed value of imputation tax credits. In particular:

    a) The great majority of independent expert valuation reports make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits (Lonergan, 2001; KPMG, 2005);

    b) The great majority of CFOs of major Australian companies (who between them account for more than 85% of the equity capital of listed Australian firms) make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits (Truong, Partington and Peat, 2008);

    c) Published Queensland Government Treasury valuation principles require government entities to make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits (OGOC, 2006); and

    d) Credit rating agencies such as Moody's and Standard and Poor's also make no adjustments in relation to imputation credits to any quantitative metric that they compute when developing credit ratings for Australian firms.

76. In summary, the standard market practice is to make no adjustment at all in relation to imputation tax credits when valuing assets or estimating the corporate cost of capital.

7. Internal consistency

Inconsistency with estimate of required return on equity

77. One issue that has been raised in the SoRI process and in subsequent determinations is that there is an apparent inconsistency whereby the AER has proposed to use different estimates for the same parameter in two different parts of the same Weighted Average Cost of Capital (WACC) estimation exercise. In particular, inconsistent estimates of the value of cash dividends are used in two places in the AER's reasoning:

    a) The AER's empirical estimates of theta (and consequently gamma) are conditional on an estimated value of cash dividends of 80 cents per dollar;[22] and

    b) The AER's estimate of the required return on equity using the CAPM is conditional on cash dividends being valued at 100 cents per dollar.

AER accepts that the inconsistency exists

78. It is clear that both Handley (2008) and the AER have accepted that there is such an inconsistency:

> Handley agrees with SFG that the empirical evidence from dividend drop-off studies – that cash dividends are less than fully valued – presents an apparent inconsistency with the standard CAPM.[23]

79. Moreover, Handley (2009, p.29) notes that the AER has:

    a) Relied upon US dividend yield studies to conclude that dividends are valued at 100 cents per dollar in supporting its use of the standard CAPM in one step of the WACC estimation exercise; and

    b) Relied upon drop-off studies to conclude that dividends are less than fully valued (80 cents per dollar) when estimating gamma.

80. Handley (2009, p.29) also notes that this "at first appears to be an inconsistency." He then notes that the AER is "not concerned with" this inconsistency because it is using different estimates of the value of dividends in the two different steps of its WACC estimation exercise (p.29):

> i.e. US dividend yield studies in relation to the CAPM and drop-off studies in relation to gamma.

Relevance of the inconsistency

81. There is a clear inconsistency: The AER has used a different estimate of the value of cash dividends in two steps of its WACC estimation exercise. This gives rise to two questions:

[22] In particular, recall that a consistent result among all dividend drop-off analyses is that the combined value of a one dollar cash dividend and the associated 43 cent imputation tax credit, is one dollar. The sub-period result from Beggs and Skeels (2006), on which the AER sought to rely, set the value of theta at 0.57 and the value of cash dividends at 80 cents per dollar. Thus, the combined value of the package of dividend and imputation credit is $1.0\times0.8+0.43\times0.57=1.0$. This means that the AER's theta estimate of 0.57 is conditional on cash dividends being valued at 80 cents per dollar.

[23] Explanatory Statement, p. 335.

a) Whether the inconsistency needs to be rectified; and

b) If it does need to be rectified, how this should be done.

82. In our view, it is effectively self-evident that such inconsistencies must be rectified. Otherwise it would be open to a regulator to use inconsistent estimates throughout the WACC estimation exercise. For example, it would be inconsistent and wrong:

a) for a regulator to estimate the risk-free rate using the yield on 5-year government bonds, but to use the yield on 10-year government bonds when estimating market risk premium; or

b) to estimate beta relative to a domestic market index, but to use a world market index when estimating market risk premium; or

c) to assume a payout ratio of 100% when estimating theta but a substantially lower payout ratio when estimating market risk premium.

83. In our view, it is similarly inconsistent and wrong to set the value of cash dividends to 100 cents when estimating required return on equity, but to use an estimate of 80 cents when estimating gamma.

84. This view is consistent with the finding of the Australian Competition Tribunal in the *GasNet* case[24] where the Tribunal held that it is neither permissible nor appropriate to use different values for the same parameter in two places in the same WACC estimation.

85. If, however, it *is* considered legitimate for a regulator to have inconsistent estimates of the same parameter in two steps of the same WACC estimation process and that there is nothing to constrain the regulator in this regard, then the remainder of this section is irrelevant.

Restoring consistency

86. The AER has used a different estimate of the value of cash dividends in two steps of its WACC estimation exercise. Logically, consistency is restored by using the same estimate in both steps. Logically again, there are two possibilities:

a) Use an estimate of the value of cash dividends of 100 cents in both steps of the WACC estimation; or

b) Use an estimate of the value of cash dividends of 80 cents in both steps of the WACC estimation.

87. If consistency is to be restored, one of these courses of action must be taken. The only question is which one.

88. We note that the consequences of using an estimate of 100 cents for the value of cash dividends are:

a) The use of the standard CAPM can be continued, because that model is based on cash dividends being valued at 100 cents in the dollar; and

[24] Australian Competition Tribunal, [2003], Re GasNet Australia (Operations) Pty Ltd ACompT 6, Paragraphs 46-47.

b) The implied dividend drop-off estimate of theta (and consequently of gamma) is zero. This is because the combined value of one dollar dividend plus 43 cent imputation credit is consistently estimated at one dollar. If the cash dividend is valued at 100 cents in the dollar, there remains nothing left to assign to the imputation credit.

8. QCA approach for QR Network

Current value of gamma

89. The most recent QCA decision relating to QR Network is the 2010 Access Undertaking. In its draft decision in relation to that undertaking (QCA, 2010), the QCA set out its reasons for adopting a gamma value of 0.5. In particular, this gamma estimate is consistent with the QCA's regulatory precedent and is based on:

    a) An estimate of 0.8 for the distribution rate, *F*; and

    b) An estimate of 0.625 for the value of distributed imputation credits, theta,

    the product of these two estimates being 0.5.

90. In its QR Network draft decision, the Authority notes (p.54) that its estimate of theta (0.625) is based on Hathaway and Officer (1999). More recent evidence consistently provides lower estimates. This evidence includes an updated analysis by Hathaway and Officer (2004) themselves who report a value of 0.50, the estimate of 0.57 from Beggs and Skeels (2006), the estimate of 0.41 from Minney (2010) and the estimate of 0.35 from SFG (2011).

91. In its 2010 draft access undertaking, QR Network accepted the Authority's proposed estimate of 0.50, so that remains the current value of gamma in relation to QR Network.

QCA considerations

92. In its consideration of the gamma parameter for the 2010 draft access undertaking, the Authority had regard to the value adopted by the AER in its SoRI as set out in Table 1 below.

Table 1. QCA and AER gamma estimates

Parameter	QCA	AER
F	0.8	1.0
Theta	0.625	0.65
Gamma	**0.5**	**0.65**

93. In its Draft Decision, the Authority stated that it considers its gamma estimate of 0.5 to be conservative for two reasons. First, the Authority states that (p.55):

> available evidence indicates that the distribution rate is 1.0.

94. However, as set out above, the AER's 100% estimate of the distribution rate, *F*, was not based on any "evidence" whatsoever, but was simply assumed. All of the empirical evidence supported a distribution rate of 70%, such that the QCA's value of 80% is not conservative, but rather is aggressive relative to the available evidence.

95. The Authority's second reason for considering its estimate of gamma to be conservative is that (p.54):

> the utilisation rate [theta] for a domestic CAPM is likely to be closer to one than the current estimate of 0.625.

and (p.55)

> The Authority believes that the AER's estimate of 0.65 is conservative as it again reflects the impact of foreign investors.

96. The issue here is that the Authority uses the CAPM to estimate the required return on equity. One of the assumptions of the CAPM is a closed market – no investors inside the market are able to invest in assets outside the market, and no investors from outside the market are able to invest in assets inside the market. That is, "the market" is completely segregated. However, the AER's estimate of theta is based on stock prices, which are affected by the trading of non-resident investors, who would not be able to invest if the Australian market really were completely segregated. Moreover, the prices that Australian investors are willing to pay for Australian stocks may also be affected by the returns that are on offer from foreign stocks.

97. The origin of this view dates right back to work performed for the for the Authority, by Lally (2004, pp.44–45) who concludes as follows:

> Since national capital markets are assumed to be segregated, it would be inconsistent to recognise foreigners. Accordingly they are omitted from consideration.

98. Lally (2004) goes on to suggest that if all foreign investors are omitted from consideration, the only remaining investors are residents. Since all resident investors can utilise franking credits, Lally suggests that an appropriate estimate of theta is one.

99. The alternative to simply *assuming* that theta is equal to one, is to empirically *estimate* it using market data. When estimating all other WACC parameters, consideration is given to the available market data and empirical estimates. The weight that is applied to a particular estimate then depends upon the precision with which it is estimated, the statistical reliability of that estimate, and whether the estimate is economically reasonable. The same should apply to the estimation of theta, and consequently gamma.

100. Another way of looking at this issue is that the theoretical assumption approach involves estimating theta not as it *is*, but as it *would be* if there were no foreign investors. But if we estimate theta on this basis, consistency demands that we should do the same for *all* WACC parameters. For example, the risk-free rate would presumably be higher if no foreign investment were allowed, as there would be less demand for Australian government bonds.

101. In summary, when estimating theta one must decide whether to:

    a) Assume a value for theta by omitting from consideration the impact of foreign investors, in which case all WACC parameters should also be estimated not as they are, but as they would be if there were no foreign investors; or

    b) Estimate theta with reference to market data in the same way that all other WACC parameters are estimated.

102. In our view, it is appropriate to estimate theta, and consequently gamma, from market data in the same way that all other WACC parameters are estimated. We note that this is consistent with the approach adopted by the AER and by other regulators.

QCA position

103. In its recent draft decision, the Authority concluded that (p.55):

> The Authority notes that this decision does not preclude its future considerations of the arguments for a change in the gamma estimate based on the evidence available at that time.

104. In relation to this conclusion, we note that the Authority has maintained the same values of the distribution rate and theta since its first WACC decision, even though a considerable volume of new evidence (including published empirical estimates) have become available. Consequently, it is not clear what new evidence would be required in order for the Authority to change its estimate of gamma. However, the previously-mentioned decision of the Tribunal which we have reviewed above, presumably carries material weight.

9. Conclusions and recommendations

105. As set out above, our primary conclusions are:

a) Gamma is estimated as the product if a distribution rate (F) and an estimated value of distributed credits (theta);

b) The best available estimate of the distribution rate is 0.7;

c) The best available estimate of theta is a range of 0 to 0.35:

   i) The upper bound of this range is the estimate of the state-of-the-art dividend drop-off analysis that was recently used by the Australian Competition Tribunal; and

   ii) The lower bound of this range is consistent with:

      (1) The observed market practice of valuation experts, corporations, government agencies and credit rating agencies;

      (2) The results of the simultaneous price study published in the *Journal of Financial Economics*; and

      (3) The dividend drop-off evidence when the value of cash dividends is 100 cents per dollar, consistent with the use of the standard CAPM.

d) Consequently, the best available estimate of gamma is a range of 0 to 0.25.

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