

DIVIDEND IMPUTATION

and the corporate cost of capital

STEPHEN GRAY, Professor of Finance, UQ Business School, University of Queensland

The contentious debate about how to best estimate the value of imputation credits has been heightened in the regulatory setting. While an accurate estimate of the cost of capital is important for every firm, it is particularly important for regulated infrastructure firms where a regulator sets the allowed revenue each year in accordance with its estimate of the cost of capital. This paper explains how the regulatory allowance depends on the estimated value of imputation credits and summarises the debate that has occurred, over many years, in this setting.

The valuation of dividend imputation tax credits has been a contentious issue in Australia ever since the imputation tax system was introduced in 1987. A range of theoretical and conceptual frameworks have been proposed and a range of empirical estimation methods have been used. Some of the divergence of views has been summarised by Ainsworth et al. (2016) in this issue.

One of the reasons that so much attention has been focused on this issue is that the value of imputation credits has a potential impact on a firm's cost of capital — if imputation credits are valuable to investors in aggregate, the firm's cost of equity capital will be reduced as shareholders receive part of their required return from the government via imputation tax credits.¹

Whereas an accurate estimate of the cost of capital is important for every firm, it is particularly important for regulated infrastructure firms such as gas and electricity networks and some rail, port, telecommunications and water assets. In those cases, a regulator sets the allowed revenue each year in accordance with its estimate of the cost of capital. Thus, the firm's bottom line varies depending on the regulator's estimate of the cost of capital, which in turn depends on the estimate of the value of imputation credits.

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Dividend imputation tax credits represent a portion of the return to equity

There are two (equivalent) ways to see how dividend imputation might affect the corporate cost of capital:

- It will cost the firm less to provide equity investors with the return that they require. That is, for a given total required return on equity (set in global capital markets), the cost to the firm will be reduced by the extent to which investors value imputation credits. Suppose, for example, that investors have a 10 per cent required return on equity for a particular firm. In a classical tax system, the firm would be solely responsible for generating that return for shareholders. In an imputation system, however, the government provides equity holders with potentially valuable imputation credits. If investors (in aggregate) receive a yield of say 1 per cent from those credits, the firm will need to pay only 9 per cent to its shareholders.
- To the extent that equity investors (in aggregate) value imputation credits, they will bid up the stock price to reflect the present value of those credits. Consequently, a firm will be able to raise more equity from a given stream of dividends.

That is, the imputation system provides a type of subsidy for the firm's payment of returns to equity holders in much the same way as the firm receives a tax subsidy for the interest payments that it makes to its debt holders. In the case of equity, the subsidy comes via the distribution of imputation credits and, in the case of debt, the subsidy arises from the deductibility of interest payments. In both cases, the firm's *after-tax* cost is the total return that investors require, less the value of the tax subsidy from government. Other things being equal, a higher or more valuable tax subsidy will mean a lower cost of capital for the firm.

In his seminal paper on this topic, Officer (1994)² shows that the firm's weighted-average cost of capital (WACC) in a dividend imputation tax system can be written as:

$$WACC = \frac{E}{V} r_e \left[\frac{1-T}{1-T(1-\gamma)} \right] + \frac{D}{V} r_d [1-T]$$

where

$\frac{E}{V}$ and $\frac{D}{V}$ represent the relative proportions of equity and debt finance, respectively

r_e and r_d represent the total required return on equity and debt, respectively

T is the relevant corporate tax rate, and

γ or "gamma" represents the value of imputation tax credits.

In this equation, r_d represents the total return that debt holders require from their investment in the firm and $[1-T]$ represents the proportion of that return that must be provided by the firm – the balance being provided via a government tax subsidy. To see this, consider a firm that borrows \$100 at 7 per cent. At the end of the year, the firm makes an interest payment of \$7.00, but then gets \$2.10³ of this back from the government – because interest is tax deductible. Thus, the *net* cost to the firm, or the *after-tax* cost is \$4.90.⁴ In algebraic terms, the cost to the firm of paying the required return to the debt holders is $r_d [1-T]$.

The same applies to the cost of equity. In the Officer equation, r_e represents the total return that equity holders require from their investment in the firm and $\left[\frac{1-T}{1-T(1-\gamma)} \right]$ represents the proportion of that return that must be provided by the firm. In the case of equity, the firm is responsible for paying dividends and generating capital gains, and the government contributes imputation credits via the tax system. The WACC formula reflects the cost to the firm of paying the required return to the equity holders. For example, if the corporate tax rate is 30 per cent and the value of imputation tax credits is 25 per cent of the face amount of credits that are generated by the payment of corporate tax, the Officer formula suggests that the firm must contribute $\left[\frac{1-0.3}{1-0.3(1-0.25)} \right] = 90.32\%$ of the equity holders' required return on equity via dividends and capital gains, with the other 9.68 per cent being provided by government as imputation credits.⁵

Application to infrastructure regulation

The idea that equity holders receive a portion of their required return on equity is particularly important in the context of infrastructure regulation. Infrastructure assets such as electricity and gas distribution and transmission networks, water businesses and some telecommunications, rail and port assets are natural monopolies. For example, there will only be a single electricity distribution network in any city. To ensure that prices do not reflect monopoly rents and that the efficient amount of investment occurs, an economic regulator will determine the maximum allowed revenue each year for the regulated business. For example, the Australian Energy Regulator (AER) is responsible for regulating gas and electricity transmission and distribution businesses in all states other than Western Australia. The total value of the assets of these companies is in the hundreds of billions.

The way the AER goes about setting the maximum allowed revenue for each business is to use what is known as a 'building block' approach. This involves setting the allowed revenue such that the regulated firm is able to cover efficient operating costs, corporate taxes and regulatory depreciation,⁶ and generate sufficient profits to provide a fair return on capital. The return on capital is the product of what the regulator considers to be a fair return for investors (or WACC) and the value of the assets that are being regulated (known as the regulated asset base, or RAB). For example, if a firm has assets with a value (RAB) of \$7 billion and the regulator has determined that a fair return (WACC) is 10 per cent, the firm would be allowed to charge prices so that its profit (after covering efficient operating costs etc.) was \$700 million. This profit would then be paid to investors as a return on the capital that they have provided to the firm. The regulator will separately determine what it considers to be a fair return on debt and equity capital (in light of the different nature and risk of those two forms of investment) and combine them by taking a weighted-average to form an estimate of the WACC.

It is the return on equity capital that is relevant to the discussion about the benefits of the dividend imputation tax system. As previously indicated, dividend imputation tax credits form a part of the return that equity holders receive, and that component of the return is paid by government via the tax system. So if, as in the simple example provided, equity holders require a total return of 10 per cent and imputation credits provide a yield of 1 per cent, the regulated firm will be allowed to generate a profit that allows it pay a 9 per cent return to its equity holders. Thus, for regulated infrastructure firms a higher regulatory valuation of imputation credits means commensurately lower allowed revenues.

This means that it is very important for the regulator to accurately estimate the extent to which the market values imputation credits — if the regulator overestimates the value of imputation credits investors in the firm will be undercompensated, and vice versa.

The appropriate estimate of gamma has long been a point of contention in the regulatory setting. Prior to 2009, the Australian regulatory approach had always been to set gamma at 0.5. In its 2009 WACC Review, the AER proposed to change its estimate of gamma to 0.65.⁷ This decision was appealed by the first set of regulated network businesses to have that estimate applied to them. The Australian Competition Tribunal ruled that the AER had erred in deriving its new estimate and substituted a new estimate of 0.25.⁸ That estimate remained in force until the AER released its 2013 Rate of Return Guideline, which proposed that the estimate of gamma should be restored to 0.5. Shortly afterwards, the AER reduced its proposed estimate to 0.4 and the AER applied that estimate in a number of decisions in 2015. Those decisions were also appealed to the Tribunal, which in February 2016 again ruled that gamma should be set at 0.25. That is, the estimation of the value of imputation credits has been a topic of considerable debate in the Australian regulatory setting over many years. The main issues in this debate are considered below.

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Firms outside the regulated infrastructure sector also have to address the issue of estimating gamma as that affects their own calculations of their cost of capital, which is used for the purposes of evaluating proposed new projects and setting hurdle rates.

The regulatory approach for incorporating the value of imputation credits

Officer (1994) goes on to show that the value of imputation credits can be incorporated in valuation exercises by making an adjustment to the discount rate (as above) or to the cash flows that are analysed, and that both approaches produce identical results. That is, it is equivalent to considering the government 'subsidy' as providing either part of the return that shareholders require or part of the cash flows that shareholders receive.

In this regard, the regulatory rules implement Officer's imputation credit adjustment to the return on equity via the allowance for the corporate tax cash flow rather than via the (equivalent) adjustment to the discount rate. Where the value of imputation credits is incorporated via the cash flows, a simple 'vanilla' version of the WACC is used:

$$WACC = \frac{E}{V} r_e + \frac{D}{V} r_d.$$

To see that the two approaches are equivalent, consider an example consistent with the one above, where equity holders require a return of 10 per cent and (because gamma is estimated to be 0.25) 0.968 per cent of this is deemed to come in the form of imputation credits.⁹ If the equity holders have invested \$1,000 of equity capital in the firm they will require a total return of \$100. In the absence of imputation, the firm would have to be allowed to earn a pre-tax profit of \$143. The firm would then pay \$43¹⁰ of corporate tax, leaving the required \$100 to return to equity holders.

However, with imputation, the pre-tax profit would only have to be \$129. The firm would then pay \$38.71¹¹ of corporate tax, creating the same amount of imputation credits.¹² This leaves \$90.32 to be returned to equity holders. The equity holders also receive some value in the form of imputation credits — \$38.71 of credits are created and each is estimated to have a value of 0.25, giving a total value of \$9.68. Thus, the equity holders receive a return from the firm of \$90.32 and credits valued at \$9.68, giving them the total \$100 return that they require.¹³

Note that the Officer formula above implies that the corporate tax amount of \$38.71 can be calculated directly as:

$$\text{Corporate tax} = \left[\frac{\text{Total required}}{\text{return to equity}} \right] \times \frac{T}{1 - T(1 - \gamma)} = 100 \times \frac{0.3}{1 - 0.3(1 - 0.25)} = 38.71.$$

This calculation is embedded into the regulatory assessment of allowed revenues.¹⁴

Estimating the value of imputation tax credits

The standard approach for estimating the value of imputation tax credits is as the product of two sub-parameters:

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

where F is the proportion of created credits that are attached to dividends and distributed to investors, and θ , or 'theta' is the market value of a distributed credit.

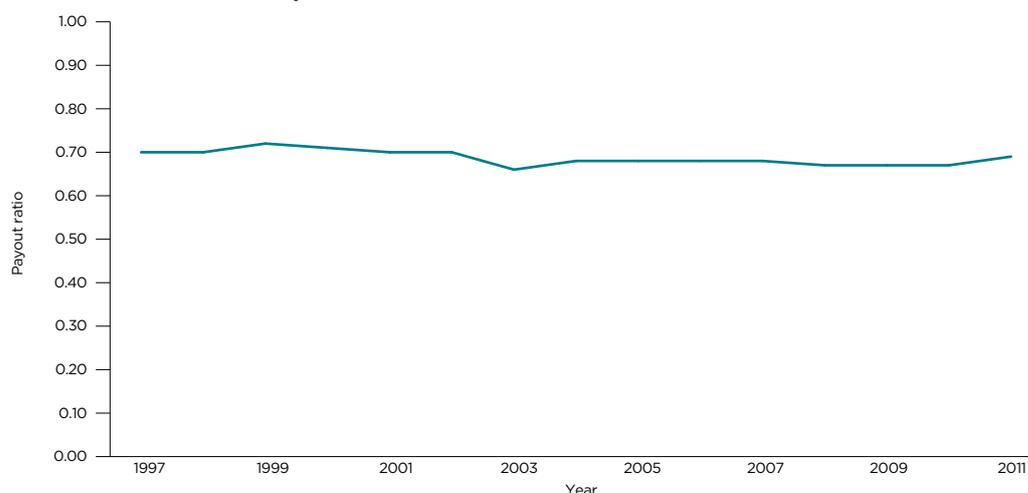
For example, if 70 per cent of credits are distributed and each of those is valued by the market at 35 per cent of the face amount, $\gamma = 0.7 \times 0.35 = 0.25$. Thus, we need estimates of the distribution rate and theta.

The distribution rate

The distribution rate is the ratio of credits distributed to credits created. Credits are created whenever a company pays corporate tax to the Australian Tax Office (ATO) and credits are distributed when attached to dividends. For every dollar of dividends paid, the firm can attach $\frac{T}{1-T}$ dollars of imputation credits. The only way a firm can distribute all of the credits that it creates in a year is to distribute 100 per cent of its Australian profits as dividends. But firms generally do not do this, preferring to reinvest some portion of profits back into the firm to finance future growth. Consequently, some credits are not distributed. In fact, as at the end of the 2013 financial year (the last year for which data is available) there were more than \$270 billion of credits that have been created by firms but not distributed.¹⁵

The cumulative imputation credit distribution ratio has been very stable for many years at around 70 per cent, as shown in Figure 1 below.

FIGURE 1: Cumulative imputation credit distribution rate



Source: Australian Taxation Office.

In the regulatory setting, the Australian Competition Tribunal has been called upon twice in recent years to adjudicate upon the estimation of gamma — in the 2011 Gamma case led by ETSA Utilities¹⁶ and in the recent Networks NSW case. In both cases, the Tribunal adopted a distribution rate of 70 per cent, consistent with the evidence set out in Figure 2.¹⁷

The value of distributed credits, theta

The other component of gamma is the value of distributed credits in the hands of investors. There are a number of reasons why distributed credits would be valued, in aggregate across the market, at less than the face amount. These include:

- > Credits that are distributed to non-resident investors have no value as they cannot be redeemed.¹⁸
- > Some credits that are distributed to resident investors cannot be redeemed due to the 45-day rule.¹⁹
- > There is an administrative/accounting cost as credits have to be recorded and claimed.
- > There is a time value loss as distributed credits cannot be immediately converted into cash — they are recorded in the investor's tax return when it is lodged after the end of the financial year.
- > In the absence of dividend imputation, investors will select a portfolio of investments that is optimal for them. Imputation is likely to lead resident investors to tilt their portfolio more towards stocks that distribute imputation credits. They will do this to the extent that the value of these credits (to them) exceeds the costs of moving the portfolio away from what would otherwise be optimal. It is the net value that is relevant — the total value of the credits net of the cost of moving away from the optimal portfolio.

Thus, we require an estimate of the extent to which the aggregate value (to investors) of distributed credits is less than the face amount of those distributed credits. The majority of the recent work on this question has been performed in the regulatory setting where the regulator's estimate of the value of imputation credits directly affects the allowed revenue. In recent years, the AER has used two approaches — redemption rates and dividend drop-off analysis.

The redemption rate is an estimate of the ratio of credits redeemed to credits distributed, and the AER has used two approaches to estimate this ratio. The first is a direct estimate from ATO tax statistics of total credits redeemed and total credits distributed across the whole economy each year. The most recent estimate from this approach is 45 per cent.²⁰

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The AER has also estimated the redemption rate by using an 'equity ownership' approach based on Australian Bureau of Statistics data on the proportion of Australian shares owned by resident investors. This approach is based on a number of assumptions including:

- All credits distributed to resident investors will be redeemed.
- All credits redeemed are valued at the full face amount.

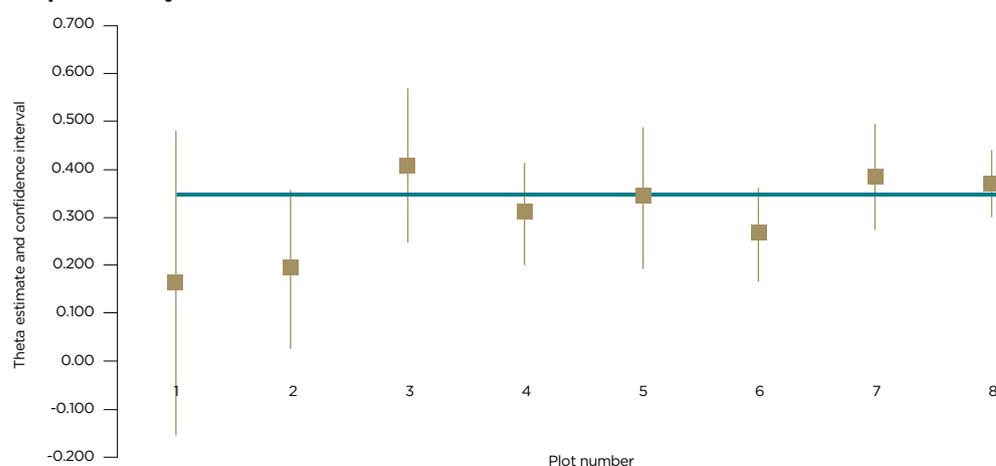
The AER's most recent estimate from this approach is a range from 38 per cent to 68 per cent.²¹

Regulated businesses have twice challenged the AER's use of redemption rates in appeals to the Australian Competition Tribunal. In both the 2011 Gamma case and in its 2016 judgment in the Networks NSW case the Tribunal held that the redemption rate cannot be used as an estimate of the value of distributed credits, but can only be used as an upper bound against which any point estimate can be tested.²²

This leaves the second approach that the AER has used for estimating the value of distributed credits – dividend drop-off analysis. This approach involves some form of regression of the dividend drop-off (the change in the stock price over the ex-dividend day, when the dividend and credit separate from the share) on the amount of the dividend and the amount of the attached credit. A number of different econometric specifications are usually used to control for variation in stock prices and stock return volatility across the sample and to ensure that the results are as robust as possible.

Dividend drop-off analyses were also considered by the Tribunal in the 2011 Gamma case and the recent Networks NSW case. In the 2011 case, the Tribunal directed that a new drop-off analysis should be conducted by SFG Consulting.²³ This study used a range of econometric approaches set out in Terms of Reference that were approved by the Tribunal. The primary estimates from that study, updated to the end of 2012, are summarised in Figure 2. The conclusion from this study is that the value of distributed credits (theta) should be set at 0.35 and the Tribunal has adopted that estimate.²⁴

FIGURE 2: Estimates of the value of distributed credits (theta) from the SFG Consulting drop-off study



Source: SFG Consulting 2013, Figure 5, p. 24. Each plot number is for a different econometric specification.

In its recent Networks NSW decision, the Tribunal again adopted a theta of 0.35²⁵ based on the updated estimate from SFG Consulting.²⁶ The Tribunal also noted that this estimate was somewhat lower than all of the upper bound redemption rate estimates, therefore passing that cross-check.²⁷

The current regulatory estimate of gamma

In both of the cases where it has considered the value of imputation credits, the Tribunal combined a 70 per cent distribution rate with a theta of 0.35 to produce an estimate of gamma of 0.25 (= 0.7×0.35).²⁸

A gamma of 0.25 implies that imputation credits provide approximately 10 per cent of the required return on equity.²⁹ Consequently, allowed revenues will be set such that the firm is able to provide 90 per cent of the return on equity to equity holders, who are assumed to recover the other 10 per cent from imputation credits.

The Tribunal has now twice ruled that:

- Gamma should be interpreted as the market value of imputation credits and must be estimated on that basis.
- Estimates of the redemption rate can only be used to set an upper bound and cannot be used as a point estimate.
- The best available estimate of gamma is 0.25.

However, within regulatory circles, there remains a range of views about how gamma should be interpreted and estimated. It is only the optimists who would think that this issue has been settled in the Australian regulatory setting.

Notes

1. The precise mechanics of how imputation affects the corporate cost of capital is addressed in the following subsection.
2. Officer, R, 1994, 'The cost of capital of a company under an imputation tax system,' *Accounting and Finance*, vol. 34, pp. 1-17.
3. $\$7.00 \times 30\%$, the corporate tax rate.
4. $\$7.00 - \4.90 .
5. The derivation of the Officer formula is explained via a simple numerical example in an [appendix](#).
6. Australia operates an 'incentive based' regulatory framework whereby the regulator makes an assessment of the operating costs, corporate taxes, and depreciation that would be incurred by an efficient business, rather than allowing the business to recover whatever its actual costs might have been. If the business is able to beat the efficient benchmark, it keeps some of the efficiency gains. If businesses consistently beat the regulatory allowance, the regulator will redefine what it considers to be efficient and the process begins again.
7. For reasons that are set out in more detail below.
8. For reasons that are set out in more detail below.
9. The officer formula shows that when gamma is set to 0.25, 9.68% of the total required return on equity comes in the form of imputation credits.
10. 30% of \$143.
11. 30% of \$129.
12. Every dollar of corporate tax paid in Australia creates a dollar of credits.
13. A more detailed explanation of the equivalence of the two approaches for reflecting the estimated value of imputation credits is set out in an [appendix](#).
14. For example, it appears at Row 59 of the [Analysis](#) tab in the AER's Post-Tax Revenue Model (PTRM).
15. ATO tax statistics, 2012-13.
16. Now SA Power Networks.
17. The judgment in the 2011 Gamma case is available as *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9 (12 May 2011), see para. 42. The judgment in the Networks NSW case is available as *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (26 February 2016), see para. 1106.
18. Technically, non-resident investors can use imputation credits to eliminate withholding tax, but this is of no net benefit as investors generally receive a credit in their home jurisdiction for any withholding tax paid in Australia.
19. Any investor who buys and sells shares within a 45-day period is unable to redeem credits attached to dividends attached to those shares.

20. AER Jemena Electricity Networks Preliminary Decision, October 2015, Appendix 4, p. 18.
21. AER Jemena Electricity Networks Preliminary Decision, October 2015, Appendix 4, pp. 18–19. The AER adopts a range of 56–68% for all equity and 38–55% for listed equity.
22. See *Application by Energex Limited (Gamma) (No 2)* [2010] ACompT 7 (13 October 2010) para. 91 and *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (26 February 2016), paras 1095–96.
23. SFG Consulting, 2011, 'Dividend drop-off estimate of theta', Report for the Australian Competition Tribunal, 21 March. This study was authored by Prof Stephen Gray (the author of the current paper) and Dr Jason Hall, who have prepared a number of reports on the estimation of gamma for regulated entities. This study has been updated to the end of 2012 in SFG Consulting 2013, 'Updated dividend drop-off estimate of theta', 7 June.
24. *Application by Energex Limited (Gamma) (No 5)* [2011] ACompT 9 (12 May 2011), see para. 38.
25. *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (26 February 2016), para. 1103.
26. SFG Consulting, 2013, 'Updated dividend drop-off estimate of theta', report for the Energy Networks Association, 7 June.
27. *Energex Limited (Gamma) (No 5)* [2011] ACompT 9 (12 May 2011), paras 33–34 and *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (26 February 2016), para. 1111.
28. *Energex Limited (Gamma) (No 5)* [2011] ACompT 9 (12 May 2011), para. 42 and *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (26 February 2016), para. 1171.
29. From the Officer (1994) formula, $\left[\frac{1-0.3}{1-0.3(1-0.25)} \right] = 90\%$.