The Relationship Between Franking Credits and the Market Risk Premium

Implications for Regulatory Cost of Capital

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Executive Summary

In a dividend imputation tax system, equity investors have three potential sources of return: dividends, capital gains, and franking (tax) credits. However, the standard procedures for estimating the market risk premium (MRP) for use in the CAPM, ignore the value of franking credits. Officer (1994)[1] notes that if franking credits do affect the corporate cost of capital, their value must be added to the standard estimates of MRP. In this paper, we explicitly derive the relationship between the value of franking credits (gamma) and the MRP. We demonstrate that our derivations are entirely consistent with Officer (1994) and Lally (2004).[2] We show that the standard parameter estimates that have been adopted by Australian regulators violate this deterministic mathematical relationship.

Specifically, setting gamma to 0.5 and MRP to 6% necessarily requires a dividend yield that is more than twice what we observe in the market. Consequently, these two parameter values are demonstrably inconsistent.

We show how information on dividend yields and effective tax rates bounds the values that can be reasonably used for gamma and the MRP. We demonstrate that setting gamma to zero is the most straightforward and most complete way to restore consistency. This solution also has a number of other advantages:

- It also allows observations pre- and post-imputation to be included in the same data set without adjustment when estimating MRP, consistent with common practice.
- There are also no implications for how high or low dividend yields would have to be.
- No other parameter estimates would have to change.
- This is consistent with the most recent evidence from market data[3] and from dividend drop offs[4].
- This is consistent with the market practice of valuation experts[5] and corporate treasuries.[6]

The issue of the relationship between the value of franking credits and the MRP has not yet been fully considered by Australian regulators. The Essential Services Commission and ESCoSA have recognised that there is a relationship between these two parameters such that the assumed value of franking credits

[1] Officer, R. R. (1994). The Cost of Capital of a Company Under an Imputation Tax System. Accounting and Finance, 34(1), 1-17.
[2] Lally, M. (2004). The Cost of Capital for Regulated Entities: Report prepared for the Queensland Competition Authority. School of Economics and Finance(Victoria University of Wellington).
[3] Cannavan, D., Finn, F., & Gray, S. (2004). The Value of Dividend Imputation Tax Credits in Australia. Journal of financial Economics, 73, 167-197.
[4] Bellamy, D., & Gray, S. (2004). Using Stock Price Changes to Estimate the Value of Dividend Franking Credits. Working Paper, University of Queensland, Business School.
[5] Lonergan, W. (2001). The Disappearing Returns. JASSA, 1(Autumn), 8-17.
[6] Truong, G., Partington, G. and Peat, M. (2005). Cost of Capital Estimation and Capital Budgeting Practice in Australia. AFAANZ Conference.

must be reflected in the estimate of MRP.[7] However, these decisions did not address the deterministic mathematical relationship that must exist between these two parameters that is developed in this paper.[8]

[7] See Section 5 for more detail.

[8] In its recent Electricity Distribution Price Review, the Queensland Competition Authority dealt briefly with the relationship between the value of franking credits and the market risk premium. In doing so, the Authority was responding to a rather technical submission from Ergon Energy. The Authority's response appears to have missed the point that was being made in that submission. In particular, they rejected an increase in their estimate of the MRP, suggesting that the value of franking credits had already been incorporated in their existing estimate. The real issue, of course, is not the level of MRP or gamma, but the consistency between them. If two estimates can be shown to be demonstrably and mathematically inconsistent with each other, then one must change in order to restore consistency. This paper makes that point in a simpler and more intuitive way.

1. Introduction

It is standard practice to measure equity returns as dividends plus capital gains. Indeed, all known data sources measure equity returns in this way. However, in a dividend imputation system, there is potentially a third component of returns—franking credits. To the extent that franking credits are valued by the market, this value must be added to the standard return measure. Officer (1994) makes this point in the paper that develops the cost of capital framework under a dividend imputation tax system.

If franking credits form part of the equity return for individual firms, they must also form a part of the market return. Therefore, if franking credits have value, this value must be reflected in estimates of the MRP. However, standard estimates of the MRP ignore franking credits entirely. Hence, if the MRP is estimated using returns that are measured in the standard way (reflecting dividends and capital gains only), the assumed value of franking credits must be added to compute a grossed-up MRP, which can then be used in the CAPM to compute the cost of equity capital.

In this paper, we review the mathematically deterministic relationship between the assumed value of franking credits and the estimate of MRP. This is the framework developed by Officer (1994). Our focus in this paper is not on how to best estimate the value of franking credits or the market risk premium, but on the relationship between them. If franking credits are assumed to have value, the MRP must reflect this. It is inconsistent to assume that franking credits are valuable such that they reduce corporate cost of equity, but then ignore them when estimating the market risk premium.

The main contribution of the paper is that we derive an explicit relationship between the value of franking credits (gamma), the MRP, and the assumed tax rate. If tax rates and the value of franking credits are assumed to be high, the MRP must also be high. This is because higher tax payments generate more tax credits, which are more valuable if gamma (γ) is assumed to be high. This value of franking credits must then be added to standard estimates of MRP.

However, the assumptions about tax rates and the value of franking credits must also be consistent with observed dividend yields. This is because franking credits can only be distributed with dividend payments. It would be inconsistent to assume that large amounts of franking credits are created and that these credits are valuable to investors if observed dividend yields were wholly insufficient to distribute these credits to investors. In this paper, we examine the mathematical relationship between these various parameters. We then examine how standard assumptions about parameter values would have to be changed in order to preserve internal consistency.

In the next section, we revisit the Officer (1994) framework and provide an intuitive economic explanation of how franking credits might affect the cost of capital of Australian firms. Section Three derives the deterministic mathematical relationship between gamma and MRP. In Section Four, we draw several examples from Australian regulatory determinations and demonstrate that the parameter values typically assumed are internally inconsistent. We also explore methods for restoring internal consistency. Section Five examines attempts that have been made to adjust MRP estimates for the value of franking credits and Section Six concludes.

2. Interpretation of the Officer (1994) Framework

2.1. Consistency of Definitions

Officer (1994) develops a framework for consistently defining the cost of capital and cash flows in a dividend imputation tax system. This framework, and particularly the definitions of weighted-average cost of capital (WACC), have been widely adopted in Australian practice.

Officer (1994) presents definitions of WACC on a before and after corporate tax basis. In this section, we begin by examining his first definition of after corporate tax cash flows and WACC, for ease of exposition. Under this definition, the effect of franking credits is incorporated in the discount rate—the cost of equity capital. The same arguments apply regardless of which definition of WACC is used and whether franking credits are incorporated in the WACC or the cash flows. We subsequently examine the vanilla WACC specification, under which the effect of franking credits is incorporated in the cash flows. We demonstrate that the two approaches are entirely equivalent and lead to the same conclusions, based on the same intuition. Our points relate to the internal consistency of various parameter estimates. Using an estimate of γ in defining cash flows that is inconsistent with the estimate of MRP used to estimate WACC is just as problematic as if both are incorporated in the WACC estimate. Separating inconsistencies may make them harder to spot, but does not eliminate their effect. Moreover, Officer demonstrates that all of his WACC/cash flow definitions produce identical results so long as they are applied consistently.

2.2. Adjusting the Discount Rate

Officer (1994) begins by defining after corporate tax cash flows as $X_o(1-T)$, consistent with the standard textbook treatment. Here X_o represents operating cash flows and T represents the relevant corporate tax rate. The definition of the after corporate tax discount rate that is consistent with this definition of cash flows is stated in his Equation (7) as:

$$r_i = r_E \frac{S}{V} \frac{1-T}{1-T(1-\gamma)} + r_D \frac{D}{V}(1-T) \tag{1}$$

where:

r_i is the weighted-average cost of capital, reflecting the tax deductibility of interest and the value of franking credits,

r_E is the return on equity capital required by investors,

r_D is the return on debt capital required by investors,

$\frac{S}{V}$ is the proportion of equity finance,

$\frac{D}{V}$ is the proportion of debt finance,

T is the corporate tax rate, and

γ is the value of franking credits.

In this framework, r_D is the return that debtholders require (before personal tax) to compensate them for the risk involved in lending to the firm. Since these interest payments are tax deductible at the corporate level, the firm's after-tax cost of debt capital is $r_D(1-T)$. That is, if debtholders require a return of 7% and the corporate tax rate is 30%, the firm's after-tax cost of debt is 4.9%. Of the 7% required return, 4.9% is provided by the firm and 2.1% is effectively provided by government via the tax system.

The same applies to the cost of equity. Here, r_E is the return that equityholders require (before personal tax) to compensate them for the risk involved in owning shares in the firm. In the Australian regulatory framework, and in commercial practice, r_E is usually estimated using the Capital Asset Pricing Model (CAPM). This provides an estimate of the return that the equityholders require. As is the case for debt, there is a difference between the investors' required return and what the firm must pay if a government tax subsidy is relevant. In particular, equityholders require a total after corporate tax return of r_E. This return potentially has three components: dividends, capital gains, and franking credits. The firm is responsible for generating dividends and capital gains. Franking credits are paid by government via the tax system. Officer's WACC formula quantifies the proportion of r_E that must be generated by the firm, $\frac{1-T}{1-T(1-\gamma)}$, and the proportion that is paid by government via the imputation tax system, $\frac{\gamma T}{1-T(1-\gamma)}$. Thus, the firm's after-tax cost of equity capital is $r_E \frac{1-T}{1-T(1-\gamma)}$. Indeed this is the key contribution of Officer (1994). He derives the proportion of the required return on equity that must be generated by the firm via dividends and capital gains.

The calculation of these proportions is relatively straightforward, and can be best explained by way of an example. Consider Table 1 below.

Table 1: Derivation of Components of Equity Return

	\$	**Symbol**
Corporate Level		
Company Profit	100	1
- Company Tax	30	T
After tax Profit	70	$1-T$
Shareholder Level		
Dividend Received	70	$1-T$
Franking Credit Received	30	T
Value of Franking Credit	$\gamma 30$	γT

Table 1 illustrates a company that earns a \$100 profit, pays \$30 corporate tax and distributes the remaining \$70 as a dividend. The shareholder receives this \$70 dividend plus \$30 of franking credits, each of which is worth γ. Thus, the shareholder receives a \$70 dividend from the firm and franking credits with a value of \$30γ from government.

Algebraically, for every \$1 of corporate profit, the firm can distribute dividends worth $\$1-T$ and the government provides franking credits with a value of $\$\gamma T$. Consequently, the total shareholder return is:

$$1-T+\gamma T=1-T(1-\gamma).$$

The proportion of this provided by the firm is $\frac{1-T}{1-T(1-\gamma)}$ and the proportion provided by government is $\frac{\gamma T}{1-T(1-\gamma)}$.

Of course, this point is well recognized in the academic and practitioner literature. Copeland, Koller and Murrin (2000, p. 134)[9], for example, note that the WACC is "the opportunity cost to all the capital providers weighted by their relative contribution to the company's total capital." They also note (p. 134-5) that, "the opportunity cost to a class of investors equals the rate of return the investors could expect to earn on other investments of equivalent risk. The cost to the company equals the investors' costs less any tax benefits received by the company (for example, the tax shield provided by interest expense)." In a dividend imputation system, the government may also subsidize equity returns via the payment of franking tax credits.

In the detailed numerical example in his Appendix, Officer (1994, pp. 11 - 17), shows how the CAPM can be used to derive a required return on equity of 17.7% and that the firm's cost of equity is:

$$r_E \frac{1-T}{1-T(1-\gamma)}=17.7\% \frac{1-0.39}{1-0.39(1-0.5)}=13.4\% \tag{2}$$

using the parameter values assumed in the example. That is, the imputation tax system has reduced the firm's cost of equity capital by 4.3% in this case. The value of this reduction in the firm's cost of equity is capitalized into the stock price. In this case, the value of equity increases from \$120 million (under a classical tax system) to \$158.361 million (under an imputation system in which $\gamma=0.5$). Officer demonstrates that the equityholders' required return does not change. What changes is the proportion of this return that must be generated by the firm. In a classical system, the firm has to generate all of this return. In an imputation system, the government funds some of this required return (in fact 4.3%) which reduces the firm's after tax cost of equity from 17.7% to 13.4%. That is, the CAPM tells us what return equityholders require (a return that is measured after company tax but before personal tax) and Officer (1994) derives the proportion of that return that must be generated by the firm, $\frac{1-T}{1-T(1-\gamma)}$.

[9] Copeland, T. E., Koller, T., & Murrin, J. (2000). Valuation: Measuring and Managing the Value of Companies (3rd ed.). New York: McKinsey and Company Wiley.

2.3. Adjusting the Cash Flows

Alternatively, Officer (1994) also shows how the value of franking credits can be incorporated in the firm's cash flows rather than the discount rate. In his Equation (12), Officer defines the vanilla WACC as:

$$r_{iii} = r_E \frac{S}{V} + r_D \frac{D}{V}. \tag{3}$$

This discount rate should be applied to cash flows defined as in his Equation (11):

$$(X_0 - X_D)(1 - T(1-\gamma)) + X_D, \tag{4}$$

where X_D represents interest payments to debtholders.

That is, under an imputation system, the cash flow to equity holders is:

$$(X_0 - X_D)(1 - T(1-\gamma)). \tag{5}$$

Without imputation $(\gamma = 0)$, the cash flow to equity holders would be:

$$(X_0 - X_D)(1 - T). \tag{6}$$

Thus, the component of the cash flow to equity that is due to the value of franking credits is the difference between the two:

$$(X_0 - X_D)\gamma T. \tag{7}$$

Therefore, the proportion of the total cash flow to equity that is due to franking credits is:

$$\frac{(X_0 - X_D)\gamma T}{(X_0 - X_D)(1 - T(1-\gamma))} = \frac{\gamma T}{1 - T(1-\gamma)}. \tag{8}$$

This is the same proportion of the cost of equity that was due to franking credits, as derived above.

2.4. Summary: The Main Implication of the Officer Framework

Officer (1994) demonstrates that if we prefer to incorporate the value of franking credits in the discount rate, we can conclude that $\frac{\gamma T}{1 - T(1-\gamma)}$ proportion of the cost of equity is paid by the government via franking credits. If we prefer to put the value of franking credits into the cash flows instead, we conclude that $\frac{\gamma T}{1 - T(1-\gamma)}$ proportion of the total cash flow to equity is paid by the government via franking credits. In both cases, the balance, $\frac{1-T}{1-T(1-\gamma)}$, must be generated by the firm itself.

3. The Relationship Between Gamma and MRP

3.1. The Cost of Equity Capital

The dominant commercial practice in Australia is to use the CAPM to estimate the return required by equityholders. This is the equilibrium return that they require on their equity investment after corporate tax but before personal tax. This return is defined as:

$$\hat{k}_e = r_f + \left(\hat{k}_m - r_f\right)\beta_e \tag{9}$$

Where $\hat{k}_e$ and $\hat{k}_m$ represent the expected returns on equity and the Australian market portfolio respectively; r_f the risk-free rate; and β_e is the firm's equity beta.

Officer (1994) shows that the market return should include the value of franking credits such that the expected return on equity is the total return, inclusive of dividends, capital gains and franking credits. If market returns are defined in terms of dividends and capital gains only, Officer (1994, eq. 18) shows that the value of franking credits must be added back to obtain the total after corporate tax market return. The CAPM then yields the total required return on equity, part of which must be provided by the firm and part of which is provided by government via franking credits.

3.2. Return to Equityholders under Dividend Imputation

Under a dividend imputation system, the expected return to equityholders comprises a return from dividends and capital gains, plus the benefit of franking credits, which can be expressed as:

$$\hat{k}_e = \hat{k}_e\left[\frac{1-T}{1-T(1-\gamma)}\right] + \hat{k}_e\left[\frac{\gamma T}{1-T(1-\gamma)}\right] \tag{10}$$

where $\hat{k}_e$ is the total required return on equity, which may be estimated using the CAPM, so long as the MRP includes the value of franking credits; T is the corporate tax rate; and γ is the market value of franking credits as a proportion of franking credits created. This specifically recognizes that part of the return required by equityholders is provided by the firm via dividends and capital gains and part is provided by government via franking credits.

On the right hand side of the equation, the first term represents the return on equity from dividends and capital gains, while the second term represents the return on equity from the benefits of dividend imputation. Allocating the total return to equityholders into these two components we can say that:

$$\text{Proportion of return from dividends and capital gains} = \left[\frac{1-T}{1-T(1-\gamma)}\right]$$
$$\text{Proportion of return from dividend imputation} = \left[\frac{\gamma T}{1-T(1-\gamma)}\right] \tag{11}$$

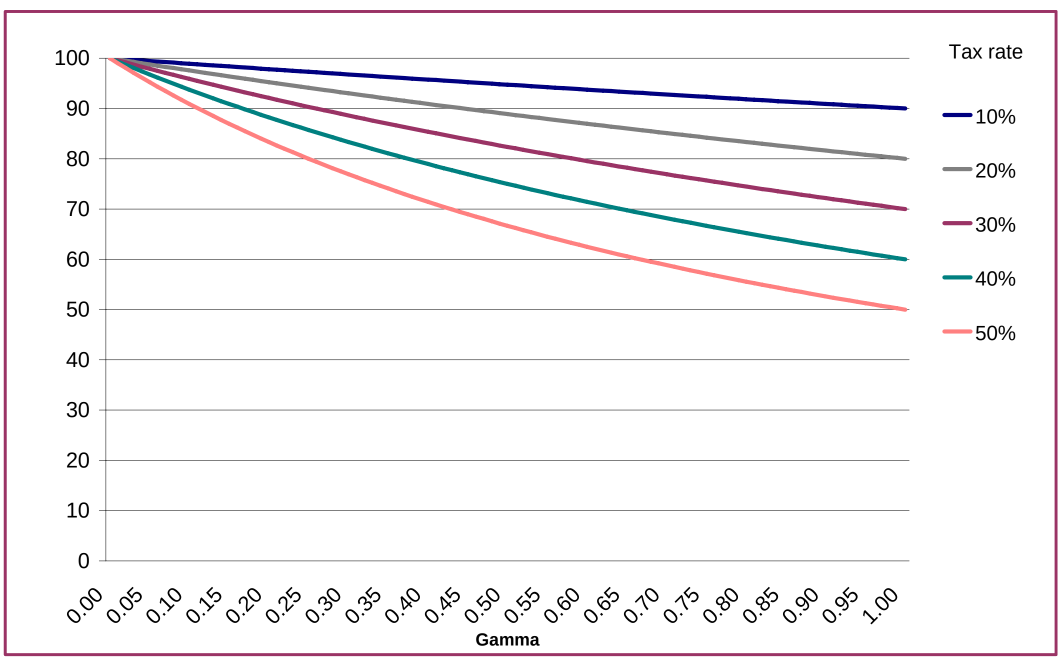
These proportions are based on Officer (1994) and are illustrated in terms of discount rates and cash flows in Section 2.

Table 2 and Figure 1 present these proportions for alternative values for the corporate tax rate and the value of franking credits. For example, with a corporate tax rate of 30% and gamma set at 0.5, 82% of the total return required by (or cash flow available to) equityholders is comprised of dividends and capital gains, while 18% of the total return (or cash flow) consists of franking benefits.

Table 2: Proportion of returns to equityholders from dividends and capital gains versus franking credits under alternative values for the corporate tax rate and the value of franking credits (gamma)

Tax rate	Gamma				
	0.00	**0.25**	**0.50**	**0.75**	**1.00**
Proportion of returns attributable to dividends and capital gains (%)					
10%	100	97	95	92	90
20%	100	94	89	84	80
30%	100	90	**82**	76	70
40%	100	86	75	67	60
50%	100	80	67	57	50
Proportion of returns attributable to franking credits (%)					
10%	0	3	5	8	10
20%	0	6	11	16	20
30%	0	10	**18**	24	30
40%	0	14	25	33	40
50%	0	20	33	43	50

Figure 1: Proportion of return on equity from dividends and capital gains under alternative tax rates and the value of franking credits (gamma)



3.3 Franking Credits and the MRP

Recall that implementation of the CAPM in this setting requires a market risk premium $\left(\hat{k}_m - r_f\right)$ that includes the value of franking credits. This framework, combined with the discussion in Sections 3.1 and 3.2, implies that we can derive an expression for the market risk premium. Combining the equations in Sections 3.1 and 3.2 we have:

$$r_f + \left(\hat{k}_m - r_f\right)\beta_e = \hat{k}_e\left[\frac{1-T}{1-T(1-\gamma)}\right] + \hat{k}_e\left[\frac{\gamma T}{1-T(1-\gamma)}\right]. \qquad (12)$$

For a firm with average systematic risk (β_e = 1, representative of the market portfolio), the cost of equity capital is:

$$r_f + \left(\hat{k}_m - r_f\right) = \hat{k}_e\left[\frac{1-T}{1-T(1-\gamma)}\right] + \hat{k}_e\left[\frac{\gamma T}{1-T(1-\gamma)}\right]. \qquad (13)$$

Consider the second term on the left-hand side of the equation, the market risk premium $\left(\hat{k}_m - r_f\right)$. This term represents the equityholders' compensation for bearing systematic risk, and includes the value of franking benefits. These franking benefits are quantified in the second term on the right-hand side of the equation, $\hat{k}_e\left[\frac{T\gamma}{1-T(1-\gamma)}\right]$. Hence, if we subtract the risk-free rate from both sides of the equation, we have:

$$\left(\hat{k}_m - r_f\right) = \hat{k}_e\left[\frac{1-T}{1-T(1-\gamma)}\right] + \hat{k}_e\left[\frac{\gamma T}{1-T(1-\gamma)}\right] - r_f$$

$$MRP = \begin{array}{c}\text{Market Return from}\\ \text{dividends and capital gains}\end{array} + \begin{array}{c}\text{Market Return from}\\ \text{franking credits}\end{array} - r_f \qquad (14)$$

Recall that Officer (1994) has shown that dividends and capital gains make up a proportion, $\left[\frac{1-T}{1-T(1-\gamma)}\right]$, of the total return to equity, the balance due to the value of franking credits. Next, define MRP_{fc} to be the market risk premium including franking credits and MRP_{dc} to be the market risk premium from dividends and capital gains only. Now, the total return on the market portfolio, including franking credits is $MRP_{fc} + r_f$ and the return from dividends and capital gains only is $MRP_{dc} + r_f$.

Hence,

$$\begin{bmatrix}\text{Market return from}\\ \text{dividends and capital}\\ \text{gains.}\end{bmatrix} = \begin{bmatrix}\text{Market return from}\\ \text{dividends, capital gains}\\ \text{and franking credits.}\end{bmatrix}\left[\frac{1-T}{1-T(1-\gamma)}\right]. \quad (15)$$

This implies that:

$$MRP_{dc} + r_f = \left[MRP_{fc} + r_f\right]\left[\frac{1-T}{1-T(1-\gamma)}\right], \quad (16)$$

in which case:

$$MRP_{fc} = \frac{r_f + MRP_{dc}}{(1-T)/[1-T(1-\gamma)]} - r_f. \quad (17)$$

Note that this formulation is entirely consistent with the analysis of Officer (1994, p. 9). In his Equation 17, Officer states that the market return including the value of franking credits is equal to the return as traditionally measured (dividends and capital gains only) plus the value of franking credits:

$$r_t' = r_t + \gamma \frac{C_t}{P_{t-1}}, \quad (18)$$

where r_t' is the all-inclusive market return (MRP_{fc} in our notation), r_t is the traditionally measured return (MRP_{dc} in our notation), γ is the value of franking credits, and $\frac{C_t}{P_{t-1}}$ is the franking credit yield. Officer (1994) defines C_t to be the amount of tax credits per share distributed at time *t*. However, this is a typographical error and C_t actually refers to credits *created* not *distributed*. It is well-known that γ is applied to franking credits created not distributed, and this is also consistent with the detailed calculations in Officer's appendix. Thus, $\frac{C_t}{P_{t-1}}$ must be interpreted as the amount of franking credits created per dollar of stock price.

This is also consistent with the adjustment proposed by Lally (2004)[10]:

$$r_t' = r_t + UD\frac{C_{dist}}{DIV}, \quad (19)$$

where U is the value to the relevant investor of franking credits once distributed, D is the cash dividend yield, and C_{dist}/DIV is the ratio of distributed imputation credits to dividends paid. Note

[10] Lally, M. (2004). The Cost of Capital for Regulated Entities: Report prepared for the Queensland Competition Authority. School of Economics and Finance(Victoria University of Wellington).

that U applies to franking credits that have been distributed, whereas γ applies to franking credits created, so $\gamma = U \times DR$ where DR represents the distribution rate, or the ratio of franking credits distributed to franking credits created $\left(DR = \frac{C_{dist}}{C_{created}} \right)$. Thus, Lally's adjustment can be written as:

$$UD\frac{C_{dist}}{DIV} = \frac{\gamma}{DR}\frac{DIV}{P_{t-1}}\frac{C_{dist}}{DIV} = \gamma\frac{C_{created}}{P_{t-1}}. \tag{20}$$

which is identical to the Officer adjustment in Equation (18).

To establish the equivalence of our Equation (17) and the Officer/Lally adjustment in Equation (18), first note that the market return (after company tax) measured in the standard way is:

$$r_t = r_f + MRP_{dc}. \tag{21}$$

The amount of corporate tax paid on this return (and hence the amount of franking credits created per dollar of stock price) is:

$$r_t\frac{T}{1-T} = \left(r_f + MRP_{dc}\right)\frac{T}{1-T} = \frac{C_t}{P_{t-1}}.\text{[11]} \tag{22}$$

Finally, the return including the value of franking credits can be written as:

$$r_t' = r_f + MRP_{fc}. \tag{23}$$

Substituting Equations (21)-(23) into Equation 17 yields:

$$r_f + MRP_{fc} = r_f + MRP_{dc} + \gamma\left(r_f + MRP_{dc}\right)\frac{T}{1-T}. \tag{24}$$

which implies that:

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[11] Here, we gross-up the after corporate tax return to a pre corporate tax return by dividing by $(1-T)$. Then we compute corporate tax paid by multiplying this pre-tax return by the corporate tax rate, T. Consider, for example, a stock price of $P_{t-1} = \$1$, and a return of $r_t = 12\%$. If the tax rate is 30%, the pre-tax return is $\frac{12\%}{1-0.3} = 17.14\%$ and the amount of corporate tax paid is $0.3 \times 17.14\% = 5.14\%$. The amount of corporate tax paid is, by definition, equal to the amount of franking credits created. Expressed as a proportion of the stock price, this is $\frac{C_t}{P_{t-1}}$.

$$\begin{aligned} r_f + MRP_{fc} &= \left(r_f + MRP_{dc}\right)\left(1 + \frac{\gamma T}{1-T}\right) \\ &= \left(r_f + MRP_{dc}\right)\left(\frac{1-T(1-\gamma)}{1-T}\right)' \end{aligned} \qquad (25)$$

which is equivalent to Equation (17).

That is, the value of franking credits must be added to the standard measure of the MRP. The required adjustment depends only on the assumptions made about the corporate tax rate and the value of franking credits.

4. Consistency Between Parameters in Australian Practice

Having established the adjustment that is required to properly incorporate the value of franking credits and that our approach is exactly equivalent to the adjustment derived by Officer (1994) and Lally (2004), we now examine Australian regulatory practice. Australian regulators have uniformly adopted the Officer (1994) framework for estimating the required return on capital.

The goal of this section is two-fold. First, we demonstrate that the set of parameter values that is commonly used in Australian regulatory practice is inconsistent with Equation (17). That is, the parameters collectively are inconsistent with the framework to which they apply! Second, we examine alternatives for restoring consistency. This requires a change to the value of at least one parameter.

4.1. Interpretation of current regulatory practice

It is common for the following parameter estimates to be used in Australian regulatory determinations: MRP = 6%; $T = 30\%$; $\gamma = 0.5$. Also, assume that the relevant risk-free rate is 6%. It is unclear whether Australian regulators, in general, consider that this estimate of the MRP includes the value of franking credits. As most regulatory determinations ignore this issue, we separately examine each possibility in turn.

4.2. MRP = 6% incorporates the value of franking credits

If the 6% estimate of MRP is assumed to include the value of franking credits, and gamma is assumed to be 0.5, Equation (17) implies that:

$$\begin{aligned} MRP_{fc} &= \frac{r_f + MRP_{dc}}{(1-T)/[1-T(1-\gamma)]} - r_f \\ 6\% &= \frac{6\% + MRP_{dc}}{(1-0.3)/[1-0.3(1-0.5)]} - 6\%, \end{aligned} \qquad (26)$$

which implies that the MRP from dividends and capital gains (the standard measure) is only 3.9%. In other words, in the absence of dividend imputation, the average stock on the Australian equity market would be expected to earn a return from dividends and capital gains just 3.9% above the risk-free rate. This is unreasonable, considering the historical evidence. A lower value of gamma would imply that less of the 6% MRP is due to franking credits and more is from dividends and capital gains, which would seem to be more reasonable.

In particular, there is strong evidence that an appropriate estimate of the MRP from dividends and capital gains (ignoring franking credits) is at least 6%. Gray and Officer (2005)[12] review the available evidence and a range of new empirical methodologies and conclude that "Our conclusion is that there is nothing in the recent data nor in [recently developed "data adjustment techniques"] that justifies a change in the regulatory precedent of using 6% as an estimate of the market risk premium. Indeed the mean excess market return is substantially above 6% over relatively short or long

[12] Gray, S. and R.R. Officer, (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, Report prepared for Victorian Electricity Distribution Price review.

historical periods. Estimates below 6% can only be achieved by making selective adjustments to the historical data." (p. 3).

In addition, Dimson, Marsh and Staunton (2003)[13] report that the average arithmetic mean of Australian equity returns (measured as dividends plus capital gains only) relative to Government bonds was 7.6% from 1900-2002 with a standard deviation of 19.0%, which is significantly different from 3.9% at a level of just 2%. And out of the 16 developed international markets studied, they report that only two had a market risk premium of less than 3.9% (based on dividends and capital gains).

Also, the data sources that are used to justify the estimate of 6% are generally based on dividends and capital gains only. For example, the Queensland Competition Authority recently adopted a 6% estimate "primarily on the basis of historical averaging methodology" in which franking credits are ignored entirely[14].

Moreover, this interpretation is also demonstrably inconsistent with observed dividend yields. If the risk-free rate is 6% and the MRP estimate of 6% is assumed to include the value of franking credits, the total return required on the market portfolio is 12% $\left(r_f + MRP = 6\% + 6\%\right)$. Recall that this is an after corporate tax return. We have shown in Section 3.2 that application of the results in Officer (1994) imply that if $\gamma = 0.5$ and T = 30% equity investors receive about 18% of their return from franking credits and the remaining 82% from dividends and capital gains. That is, the return from franking credits is assumed to be about 2.1% with the remainder coming from dividends and capital gains. If we further assume that franking credits, once distributed, are valued at about 60% of face value[15], the yield of franking credits must be 3.5% $\left(\frac{2.1\%}{0.6}\right)$. That is, the average firm in the market portfolio must distribute franking credits with face value of 3.5% of the stock price. At a corporate tax rate of 30%, with every $1 of dividends paid, franking credits of 43 cents $\left(\frac{T}{1-T} = \frac{0.3}{1-0.3}\right)$ can be distributed. Therefore, to generate a franking credit yield of 3.5%, the average firm must generate a dividend yield of 8.2% $\left(\frac{3.5\%}{0.43}\right)$. That is, a $10 stock pays a dividend of $0.82, with franking credits of $0.35, if fully franked. This franking credit is then worth $0.21 to the relevant investor. To the extent that not all dividends are fully franked, the aggregate dividend yield on the market portfolio would have to be even higher than 8.2%. Since the observed dividend yield on the market portfolio is an order of magnitude less than this, the assumptions of $\gamma = 0.5$, T = 30% and MRP_{fc} = 6% are dramatically inconsistent with observed market data.

In particular, Figure 2 below plots the observed Australian market dividend yields over recent years. Over the last 12 years, the dividend yield on the Australian market has averaged about 3.5%, varying

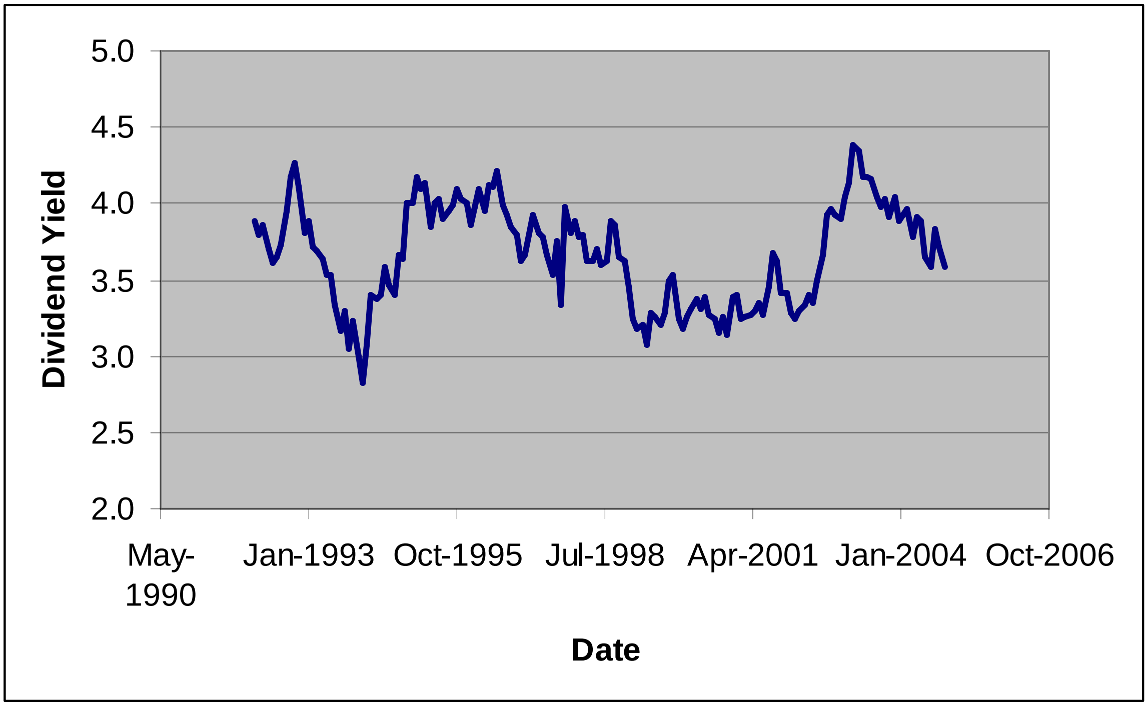
13 Dimson, E., Marsh, P., & Staunton, M. (2003). Global Evidence on the Equity Risk Premium. Journal of Applied Corporate Finance, 15(4), 8-19.

14 QCA. (2004). Draft Determination Regulation of Electricity Distribution, p. 98.

15 Recall that gamma reflects (i) the rate at which the franking credits that are created by the payment of corporate tax are distributed to shareholders, and (ii) the value that the relevant shareholder places on each dollar of franking credits they receive. It is common to assume that about 80% of created franking credits are distributed and that, once distributed, franking credits are worth about 60% of face value to the relevant investor. ESCOSA document their use of a 60% estimate in the Draft 2005 - 2010 Electricity Distribution Price Determination and the QCA (2004) uses 62.5% in the Draft Determination Regulation of Electricity Distribution.

between 3-4%. Clearly, a required dividend yield above 8% is well outside the bounds of reasonableness.

Figure 2: Australian Market Dividend Yield



Source: Reserve Bank of Australia, http://www.rba.gov.au/Statistics/Bulletin/F07hist.xls

In addition, note that foreign investors do not benefit from franking credits. Thus, setting the MRP to 6% including the value of franking credits is equivalent to assuming that foreign investors will provide capital in return for a 3.9% risk premium on the average stock. Since this is demonstrably less than what has been obtained in every other domestic market, it fails the test of economic reasonableness.

For all of these reasons, it seems impossible to sustain an argument that the 6% estimate of the MRP includes a 2.1% return from franking credits.

Finally, note that the paper on which the regulatory precedent of setting gamma to 0.5 was based, has recently been updated by the authors. Hathaway and Officer (2004)[16] now advocate setting gamma to 0.35 based on a 70% distribution rate and a 50% utilization rate. If the analysis above is re-worked with these estimates, the result is that a dividend yield of 7.4% is required to distribute sufficient franking credits to warrant the assumed value. Even this reduced value of gamma is demonstrably inconsistent with observed dividend yields.

Similarly, altering the assumed corporate tax rate (e.g., from 30% to 36%) or the risk-free rate (from 6% to 5%) makes little difference to these calculations. The conclusion is that the standard types of parameter values that have been used in Australian regulatory determinations are demonstrably

[16] Hathaway, N. & R.R. Officer, The Value of Imputation Tax Credits, www.capitalresearch.com.au/downloads/ImputationUpdate2004.pdf.

inconsistent with observed dividend yields. The actual dividend yield is simply too low to distribute sufficient franking credits to justify their assumed value.

4.3. MRP = 6% reflects dividends and capital gains only

If the 6% estimate of MRP is assumed to exclude the value of franking credits, Equation (17) implies that:

$$
\begin{aligned}
MRP_{fc} &= \frac{r_f + MRP_{dc}}{(1-T)/[1-T(1-\gamma)]} - r_f \\
&= \frac{6\% + 6\%}{(1-0.3)/[1-0.3(1-0.5)]} - 6\% \\
&= 8.6\%.
\end{aligned}
\tag{27}
$$

that is, the MRP including the value of franking credits is 8.6%.

However, this is also dramatically inconsistent with observed data on dividend yields. Recall that if $\gamma = 0.5$ and $T = 30\%$, about 18% of the total return comes via franking credits. Thus, the return from franking credits in this case is about 2.6%. Using the same logic as the previous case, a dividend yield of 10% is required to distribute sufficient franking credits to warrant this return. As in the previous case, reducing gamma to 0.35 or making small adjustments to the corporate tax rate or risk-free rate does not get close to restoring consistency.

Thus, however we interpret the MRP estimate of 6%, the standard set of parameter values produce results that are demonstrably inconsistent with each other and with observed data on dividend yields. In the remainder of this section, therefore, we explore ways of restoring consistency by altering parameter values.

4.4. Changing parameter values to restore consistency: Setting $\gamma = 0$

Setting the value of franking credits to zero is the most straightforward and most complete way to restore consistency. In this case, a MRP of 6% is based on dividends and capital gains only.

Using the same logic as above, the market return of 12% is made up entirely of dividends and capital gains – there is no value from franking credits. Since no value is required from franking credits, there is no requirement that a particular amount of franking credits must be distributed and therefore no requirement for a minimum dividend yield.

In this case, observations pre- and post-imputation can be included in the same data set without adjustment. There are also no implications for how high or low dividend yields would have to be. Importantly, no other parameter estimates would have to change. As a separate issue, this is consistent with the most recent evidence from market data[17] and from dividend drop offs[18]. That is,

[17] Cannavan, D., F. Finn & S. Gray (2004), The Value of Dividend Imputation Franking Credits in Australia, Journal of Financial Economics, 73, 167-197.

[18] Bellamy, D. & S. Gray (2004), Using Stock Price Changes to Estimate the Value of Dividend Franking Credits, Working Paper, University of Queensland Business School.

the adjustment that restores internal consistency of parameter estimates is also consistent with recent empirical estimates.

It is also perfectly consistent with observed market practice. Truong, Partington and Peat (2005)[19] survey 356 listed Australian firms about various corporate finance practices. All firms were included in the All Ordinaries Index in August 2004, Australian and not in the finance sector. On the question of how franking credits were treated, 85% of respondents indicated that they made no adjustment for the value of franking credits.

Lonergan (2001)[20] surveys expert valuation reports prepared in relation to takeovers. He reports that of 122 reports reviewed only 48 (or 39%) provided support showing how they had arrived at the WACC used in their reports. Of these, 42 (or 88%) used the CAPM to compute the cost of equity capital and made no adjustment for dividend imputation. Only six reports made any sort of adjustment to reflect dividend imputation. Furthermore, of the few reports that did make an adjustment for the value of franking credits, for all but one the ultimate effect on the value of the company was negligible or zero. Importantly, nearly half of Lonergan's sample is from after the 1997 introduction of the 45-day rule that was introduced to prevent trading in franking credits, yet only one expert report from this period made any mention of the value of franking credits.
Lonergan (2001) also provides a list of conceptual grounds cited in reports for not adjusting for imputation credits, including:

- The value of franking credits is dependent on the tax position of each individual shareholder;
- There is no evidence that acquirers of businesses will pay additional value for surplus franking credits;
- There is little evidence that the value effects of dividend imputation are being included in valuations being undertaken by companies and investors or the broader market;
- Foreign shareholders are the marginal price-setters of the Australian market yet many such shareholders cannot avail themselves of the benefit of franking credits; and
- There is a lack of certainty about future dividend policies, the timing of taxation and dividend payments and consequently about franking credits.

Consequently, setting $\gamma = 0$ not only avoids the demonstrable internal inconsistency identified above, but it is also perfectly consistency with the dominant accepted market practice.

[19]Truong, G., Partington, G. and Peat, M. (2005). Cost of Capital Estimation and Capital Budgeting Practice in Australia. AFAANZ Conference.
[20] Lonergan, W. (2001). The Disappearing Returns. JASSA, 1(Autumn), 8-17.

5. Empirical Adjustments to MRP Estimates

5.1. Hathaway's Adjustment

Some attempts have been made to adjust estimates of the MRP to reflect the assumed value of franking credits. For example, Hathaway (2005)[21] has recently proposed that estimates of the MRP should be increased by 50 basis points to accommodate the value of franking credits. This adjustment is based on setting gamma to 0.35. This, in turn, is based on a 70% distribution rate and a 50% utilization rate. That is, 70% of the franking credits that are created are distributed by the firm, and these distributed credits are worth 50% of their face value to the relevant shareholder.

Hathaway's 50 basis point adjustment is constructed as follows.[22] First, he notes that the average dividend yield over the Australian market is around 3.5%. Of these dividends, about 70% are franked, which provides a franked dividend yield of about 2.5%. At a 30% tax rate, 0.43 cents of franking credits are attached to every $1 of dividends. Therefore, a 2.5% dividend yield provides a franking credit yield of 1.06%. Finally, using a 50% utilization rate, these franking credits are worth 0.53% to the relevant shareholder. Hathaway concludes that "When estimating the MRP post-1988 we are missing one component of shareholder returns, namely the market value of the franking credits. This means that the average annual market return and the average MRP will be under-estimated by about 53bp."[23]

However, this adjustment is demonstrably inconsistent with the very assumptions on which it is based. To see this, note that if the value of franking credits is 0.53% and if $\gamma = 0.35$, then the total amount of franking credits created (expressed as a percentage of equity value) must be $\frac{0.53\%}{0.35} = 1.51\%$. Since franking credits are created by the payment of Australian corporate tax, this also represents the amount of tax paid. Thus, the average company return before corporate tax must be 5.03% $\left(\frac{1.51\%}{0.3}\right)$, generating tax of 1.51% and an after company tax return of only 3.52%. These values are all expressed as a percentage of the equity value. If expressed as a percentage of total firm value, they are even lower! Clearly these implied returns are economically unreasonable. Moreover, this after-tax return of 3.52% implies an earnings multiple of nearly 30 (1/0.0352) for the Australian market, which is more than twice the observed value.

The problem with this adjustment is that there is a disconnect between the observed dividend yield on which the calculation is based and the implied dividend yield that is required to support such a large estimate of gamma. Such a large value of gamma can only be supported by dividend yields that are much higher than what we actually observe. The actual observed dividend yield is too low to distribute sufficient franking credits to warrant the high value of gamma that is used. Of course, this problem is even more pronounced when gamma is assumed to be 0.5 rather than Hathaway's estimate of 0.35.

[21] Hathaway, N. (2005). Australian Market Risk Premium, Capital Research, www.capitalresearch.com.au/downloads/AustMRP.pdf.

[22] Ibid, p. 11.

[23] Ibid, p. 11.

5.2. Regulatory Adjustments

The link between the assumed value of gamma and the estimate of the MRP has been recognised in two recent Australian regulatory determinations, though neither provides a detailed calculation of the required adjustment to the MRP estimate in the manner of Hathaway (2005).

In the Review of Gas Access Arrangements Final Decision[24] (2002, p. 324), the Victorian Essential Services Commission (ESC) implicitly notes that there are three components to the equity return: dividends, capital gains and franking credits. The standard way in which equity returns are measured is in terms of dividends and capital gains only. Thus, the value of franking credits must be added to any such measure (to the extent that franking credits have any value to the relevant investor). The ESC reports that (p. 324), "its assumption about the value of franking credits requires an upward adjustment to the measured cash equity premium to add back the non-cash value of franking credits since 1987—which the Commission has estimated to add 0.2 percentage points onto the long term average."

The Essential Services Commission of South Australia[25] (ESCOSA) (2004, p. 179) has performed a similar adjustment reporting that, "if the non-cash value of franking credits for the period since 1987 are included" the mean MRP over 1882 - 2001 increases by 0.1%.

While neither decision explains the detailed calculations that underpin these adjustments, it is possible to reverse-engineer the size of the adjustment to the post-1988 observations that would be required to increase the 120-year mean MRP estimate by the required amount. Our calculations indicate that the annual adjustment for the value of franking credits must be 70-90 basis points. These adjustments are higher than that used by Hathaway (2005) primarily because they are based on value of 0.5 (rather than 0.35) for gamma. As with the results of Hathaway above, these adjustments require unreasonably low after-tax returns and earnings multiples that simply do not conform with observed market data.

[24] ESC. (2002). Review of Gas Access Arrangements Final Decision.

[25] ESCOSA Draft 2005 - 2010 Electricity Distribution Price Determination: Part A - Statement of Reasons, p. 180.

6. Conclusions

In this paper, we use several approaches to formally derive the mathematically deterministic relationship that exists between the cost of capital parameters under the Officer (1994) framework. This same relationship applies regardless of whether the value of franking credits is reflected in the discount rate or the cash flows. The relationship we derive is exactly equivalent to that derived, in different ways, by Officer (1994) and Lally (2004).

We further demonstrate that the parameter values that have been adopted as standard in Australian regulatory determinations violate this relationship. The parameters are collectively inconsistent with each other and with external data on dividend yields.

We demonstrate that setting gamma to zero is the most straightforward and most complete way to restore consistency. This solution can be explained by and is consistent with the market practice of valuation experts and corporate treasuries.

It also restores the internal consistency among cost of capital parameters and with external data on dividend yields. Since this is also the simplest adjustment to make to the standard set of regulatory parameters and is the most economically reasonable, we suggest that the corporate approach should be generally adopted.

This means that no adjustment for franking credits is required when estimating the MRP. Moreover, it enables pre- and post-imputation observed market returns to considered as equivalent units, which is practically important given the long data sets required to estimate this parameter.

If however, franking credits *are* assumed to have value, it is essential that the cost of capital parameters are shown to collectively satisfy the relationship in Equation (17) and be consistent with the observed data on dividend yields. To date, this constraint has not been considered and applied by Australian regulators.