While there is much interest in the implications of a tax system based on dividend imputation (such as Australia's), little has been written about its effect on investment decision-making.

**Tim Brailsford and Kevin Davis** explore the interaction between the imputation system, corporate investment decisions, financial valuation and analysis. They examine how dividend imputation can be incorporated into the estimation of the cost of equity capital, which is a key element in corporate capital budgeting, equity analysis and valuation.

The mechanics of the imputation system mean that dividends paid to resident shareholders out of Australian-source profits on which corporate tax has already been paid (and known as franked dividends) carry imputation tax credits. Consequently, in comparison with the pre-1987 "classical" tax system, franked dividends attract less tax at the shareholder level and corporate income generated for distribution to shareholders attracts less tax overall.

The introduction of imputation should therefore have reduced the cost of equity capital for Australian companies. In addition, investment in equities should have been stimulated and the use of equity finance rather than debt encouraged, because imputation has reduced total taxation of equity income streams relative to the (unchanged) taxation of debt income streams.

While these general principles are well understood, corporate treasurers, finance officers, financial analysts and advisers are still struggling to incorporate the precise impact of dividend imputation on the estimation of the cost of equity capital and therefore on investment decisions.1

Allowing for imputation is important in the commonly adopted approach for project and company valuations of discounted cashflow analysis (DCF), in which forecast cashflows are discounted at an appropriate cost of capital. A typical method involves the use of an after-tax weighted average cost of capital (WACC) as the discount rate to calculate the present value of cashflows after company tax (but before interest payments on debt and associated tax deductions). Because the WACC is calculated using an after-tax cost of debt, no allowance for tax deductions arising from interest is made in estimating the cashflow series. (In effect, the cashflow series is calculated "as if" the project were unlevered.)

This approach focuses on future cashflows on an after-company-tax but before-personal-tax basis to calculate a present value. This has several advantages. One is that cashflows can be identified at the company level and the identity and tax status of the suppliers of capital are ignored. Another is that rates of return used in the cost-of-capital calculation are identifiable market rates.

In essence, subsequent income tax liabilities of shareholders are ignored, on the assumption that these are independent of corporate taxes. Under a "classical" tax system (as in Australia pre-1987), that is a reasonable assumption, although the differential tax treatment of shareholder returns arising as capital gains rather than dividends does create some complications.

The introduction of the dividend imputation system has clouded the issue, meaning that modifications to the traditional WACC formula are needed. While the introduction of the imputation system had no direct effect on the cost of debt, the rate of return required by equity holders may have been substantially altered and will depend crucially on the form (franked dividends, unfranked dividends and capital gains) in which shareholders receive returns. Thus, we now focus on the estimation of the cost of equity capital.

**Cost of Equity Capital: The Basic Approach**

An estimate of the cost of equity capital (\(k_e\)) is required for such things as corporate DCF analysis, stock valuation through capitalisation of earnings, and takeover offer assessment in independent...
expert reports. The capital asset pricing model (CAPM) is often used to obtain estimates of \( k_e \). In its simplest formulation the CAPM is expressed as:

\[
k_e = r_f + \beta (E(r_m) - r_f)
\]

where \( r_f \) is the risk free interest rate and \( E(r_m) - r_f \) is the expected market risk premium. As an example, consider the estimation of \( k_e \) for ANZ. If the risk-free rate is 6 per cent, the expected return on the market is 13 per cent and the beta of ANZ's equity is 1.3, then:

\[
k_e = 6 + 1.3(13 - 6) = 15.1 \%
\]

This specification assumes that both debt and equity income are taxed equivalently in the hands of the recipient, and is thus usable in either a zero-tax world or for examining cashflows after corporate tax in a classical tax system. (Note, however, that even under a classical tax system, the formula given above ignores complications created by preferential tax treatment of capital gains.) It is not appropriate under the dividend imputation tax system and a key issue is how to adjust the model for taxes in the current Australian environment.

If we are to utilise the model to value cashflows after corporate tax but before personal tax, we need to establish the after-corporate-tax but before-personal-tax cost of equity capital.

The simplest approach is to work backwards from a CAPM based on investor returns after personal tax (which is also consistent with the underlying theory of the CAPM). Since the CAPM estimates individual equity returns relative to those provided by the market overall, two questions must be answered.

First, how are returns on the equity in question received? Second, how are returns on the market portfolio received? We assume initially that returns on the market portfolio are completely in the form of franked dividends, and examine first the case where an individual equity provides returns in the same form.

Traditionally, expected returns in the CAPM model are implicitly assumed to be after corporate tax. In this scenario, the after-personal-tax CAPM then becomes:

\[
E(r_i) = r_f + \beta \frac{E(r_m) - r_f}{1 - \tau_p}
\]

where \( r_i \) and \( r_m \) are yields on equity and the market respectively after company tax but before personal tax. \( r_f \) is the yield on risk-free debt, \( \tau_p \) is the investor’s effective marginal tax rate on equity income, and \( \tau_c \) is the effective corporate tax rate.

This complicated equation is, in fact, quite straightforward. Remember that it focuses on after-personal-tax returns. Pre-tax returns from the riskless asset \( r_f \) are taxed at the investor level, and hence multiplied by the factor of \( (1-\tau_p) \), while returns to equities are taxed through the dividend imputation system where they are first grossed up (divided) by the factor \( (1-\tau_c) \) and then taxed at the personal rate. Obviously the expected return depends on both the personal tax rate \( \tau_p \) and the corporate tax rate \( \tau_c \).

However, to assist in deriving a cost of equity for use in corporate financial analysis, we are interested in the CAPM after corporate tax but before personal tax. Hence, removal of personal taxes, by dividing equation (1) by \( (1-\tau_p) \) which is common to all terms, yields:

\[
\frac{E(r_i)}{(1-\tau_p)} = r_f + \beta \frac{E(r_m)}{(1-\tau_c)}
\]

Note that individual equity and market returns are “grossed up” to reflect franking credits, which assumes that franking credits are fully valued by investors. This suggests an alternative approach, favoured by some who would argue that franking credits are not fully valued, involving addition of the value of the imputation tax credits at both the individual share and aggregate market levels. That is, denoting \( I \) as the value of the imputation tax credits, we could express the model as:

\[
E(r_i + I) = r_f + \beta \frac{E(r_m + I)}{(1-\tau_c)}
\]

If investors treat franking credits as equivalent to a saving of tax of amount \( \tau_c \) per dollar of dividend the above two approaches are equivalent. But if investors value imputation credits less than fully, the latter approach can be adjusted to allow for that effect.

The equations presented above provide the appropriate CAPM formulation for use in the WACC model in the case where equity returns take the form of fully franked dividends. But to apply that model, it is still necessary to estimate the inputs into the model, comprising the equity beta, the risk-free interest rate and the market risk premium. The first two components are straightforward (and not affected by imputation), but the last is particularly problematic. It raises the question of whether the introduction of imputation has affected the return required on Australian equity relative to that on debt. There are two possibilities.

If we believe that domestic investors determine Australian equity prices, then the market risk premium based on returns on which personal tax is paid, now represented by the grossed-up (overall) market risk premium \( E(r_m)/(1-\tau_c) - \tau_c \), should not change from its pre-imputation level of \( E(r_m) - \tau_c \). That is, Australian investors will still demand the same after-all tax premium to invest in the market portfolio.

For example, if \( r_c \) were 6 per cent and \( E(r_m) \) were 13 per cent pre-imputation, a taxpayer with a personal tax rate of 47 per cent would have received an after-personal-tax differential return of \((0.13 - 0.06)\times(1-0.47) = 0.0371 \) or 3.71 per cent. After imputation, the after personal tax differen-
UNFRANKED DIVIDENDS AND CAPITAL GAINS

Where returns to a specific company take the form of unfranked dividends (and we continue to assume market returns occur by way of franked dividends), the after-personal-tax CAPM becomes:

\[ E(r) = \eta + \beta [E(r_m) - \eta (1 - \tau_f)] \]

The equation is rather cumbersome but can be rearranged to form the appropriate formula for unfranked returns after corporate tax but before personal tax as:

\[ E(r) = \eta + \beta [E(r_m) / (1 - \tau_f) - \eta] \]

Again returning to the ANZ example, assume that ANZ pays all dividends as unfranked. The estimate of \( k \) now becomes:

\[ k = 6 + 1.3[8.71 / (1 - 0.33) - 6] \]
\[ = 15.1\% \]

As expected, the required return when paying unfranked dividends is significantly higher than that required when paying franked dividends (15.1 per cent compared with 10.12 per cent). As unfranked dividends carry no imputation benefits, we would expect no change in the cost of equity capital from the classical tax system to the imputation system. Indeed, the ANZ examples demonstrate that this is the case. The required rate of return in both circumstances is 15.1 per cent.

If it is believed that returns will be in the form of both capital gains and unfranked dividends to shareholders, an adjusted after-personal-tax CAPM can be derived. If \( \alpha \) is the proportion of returns that accrue in the form of unfranked dividends, then \((1 - \alpha)\) is the proportion of returns that accrue in the form of capital gains upon which tax is assessable at the rate \( t_c \). This effective capital gains tax rate can be thought of as that tax rate which, if applied to capital gains as they accrued, would make their present value
equal to that when they are eventually taxed upon realisation. The appropriate return specification after all taxes in this case of capital gains and unfranked dividends is:

\[
E(\alpha(1-\omega) + (1-\alpha)(1-\omega)) = \eta(1-\omega) + \beta[E(\alpha(1-\omega) + (1-\alpha)(1-\omega)) - \eta(1-\omega)]
\]

Rearranging, the formula for required returns after corporate tax but before personal tax is:

\[
E(\eta) = \frac{\eta}{z} + E(\alpha)/z(1-t_c) - \eta/z
\]

where \( z = \alpha + (1-\alpha)(1-t_c)/(1-t_p) \)

For example, if ANZ delivered its returns to shareholders as 40 per cent unfranked dividends and the remaining 60 per cent as capital gains, then the required rate of return can be calculated as follows.

First, calculate the value of \( z \) after estimating the various model inputs, which, if we assume an effective capital gains tax rate \( (t_c) \) of 30 per cent and a marginal personal tax rate \( (t_p) \) of 47 per cent, gives:

\[
z = 0.4 + (1-0.4)(1-0.3)/(1-0.47) = 1.19
\]

Second, calculate \( k_{p} \) in accordance with equation (5):

\[
k_{p} = 6/(1.19) + 1.3 \cdot 8.71/(1.19)(1-0.33) - 6/(1.19) = 12.69\%\]

This figure lies between the required return for the fully franked dividend \( (E(\eta) = 10.12 \text{ per cent}) \) and totally unfranked dividend \( (E(\eta) = 15.1 \text{ per cent}) \) cases.

These results are as intuition would suggest. We would expect the unfranked dividend case to require the highest rate of return because of the lack of imputation benefits. Next, the 40 per cent unfranked dividend and 60 per cent capital gains scenario ranks ahead of the totally unfranked dividend case because of the preferential treatment of capital gains vis-a-vis unfranked dividends.

Finally, the fully franked dividend scenario requires the lowest rate of return because the full benefits of imputation can be realised.

**SUB-OPTIMAL DIVIDEND PAYOUTS**

Some companies choose not to distribute the maximum amount of franking credits to their shareholders. One explanation of this phenomenon could be that shareholders prefer capital gains to franked dividends.

However, the assumptions required to generate such a preference involve very low effective capital gains tax rates combined with high personal tax rates and are unlikely to be satisfied in reality. This is particularly so if it is believed that the marginal price setting investors in the Australian market are life offices and superannuation funds.

An alternative explanation of dividend policies which do not involve maximum franking distributions is that management has non-tax-based reasons for implementing such policies. As a result, these dividend policies do not provide maximum tax benefits to the shareholders, and therefore the return required by shareholders will be higher than if the optimal (maximum franking distribution) dividend policy was followed.

In effect, management is putting a “tax” on its projects by withholding some benefits (franking credits) from the suppliers of funds. The calculation of the precise upward adjustment to the cost of equity capital in such situations is very complex and is reliant on a number of assumptions regarding tax rates, payout ratios, etc.

However, a rough approximation can be obtained by the following. Assume a worst-case scenario where profits which are retained lose all the value of their franking credits. This assumption is conservative in that it will bias upward the discount rate. Thus, an estimate of the cost of equity capital (after all taxes) for a firm which only partially distributes its franked profits can be derived by using:

**FRAINED DIVIDENDS**

<table>
<thead>
<tr>
<th>FRANKED DIVIDENDS</th>
<th>RETAINED EARNINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( E(\eta)\alpha(1-t_c)/(1-t_c) + (1-\alpha)(1-t_c) )</td>
<td>( r(1-t_c) + \beta[E(\eta)(1-t_c)/(1-t_c) - \eta(1-t_p)] )</td>
</tr>
</tbody>
</table>

where \( \alpha \) is the proportion of available franked dividends paid as such.

Again, this expression is rather cumbersome but can be rearranged to obtain the required return after corporate tax but before personal tax:

\[
E(r) = \frac{\eta}{w} + \beta[E(\eta)/(w(1-t_c) - \eta/w)]
\]

where \( w = \alpha/(1-t_c) + (1-\alpha)/(1-t_p)/(1-t_p) \)

Assume that ANZ is in a position of being able to pay fully franked dividends but chooses to distribute only 60 per cent of these available dividends to shareholders. In reality, many Australian companies are likely to be in a similar position. Hence, \( \alpha = 0.6 \) and assume again that \( t_p = 30 \text{ per cent} \). First, calculate the value of \( w \):

\[
w = (0.6/(1-0.33) + (1-0.6)/(1-0.47)/(1-0.47) = 1.42
\]

Second, calculate \( k_{p} \) in accordance with equation (6):

\[
k_{p} = 6/1.42 + 1.3 \cdot 8.71/1.42(1-0.33) - 6/1.42 = 4.23 + 1.3 \cdot 9.15 - 4.23 = 10.63 \%
\]

This can be compared with the case where 100 per cent payout of franking credits occurred, in which the required rate of return was 10.12 per cent. The higher rate of return reflects the loss of
franking credits which the company is not giving to its shareholders when circumstances indicate that the optimal payout ratio is 100 per cent.

The exact difference between the two cost of capital figures is sensitive to the assumptions about the various tax rates (especially the capital gains tax rate) and dividend payout ratios. Nevertheless, the basic idea is reasonably straightforward, and can be adapted to suit the specific circumstances of each corporation.

SUMMARY
In evaluating Australian-based projects, it is important to note that all successful projects will, by definition, generate returns which provide positive franking account balances. (There may be some timing discrepancies between cashflows and tax liabilities, and certain tax concessions may reduce the tax liability on some projects. These are best handled on a case-by-case basis.) Consequently, it is appropriate as a first step to assume that cashflows from a project can be distributed as franked dividends. If the dividend policy of the company is to distribute 100 per cent of franking credits, the appropriate estimate of the cost of equity capital (after company tax but before personal tax) is:

\[ E(n) = \pi(n - t_c) + \beta[E(r_m) - \pi(n - t_c)] \]

This figure can be used by itself or as an input into the overall corporate cost of capital and has myriad uses in capital budgeting, project evaluation, stock analysis and valuation.

The formula is straightforward and easily applied. In the case of unfranked dividends at the firm level, and in the case of corporate retention of franked dividends at the firm level, we have indicated the appropriate adjustments which are necessary.

As a final point, in reality, total market returns do not consist solely of franked dividends (as implicitly assumed in the above formulations). If some allowance for unfranked dividends and earnings retention is made at the aggregate market level, then the market risk premium should be higher than first estimated.

However, over time we will move towards a fully franked market.

The estimation of the market risk premium depends on the assumption about the influence of foreign investors. We have indicated that the observed market risk premium may have fallen post-imputation.

However, if it is believed that Australian equity prices are set by international investors who do not benefit from imputation, then the market risk premium will have remained unchanged. Thus, historical estimates of the market risk premium can be applied to the CAPM without adjustment.

NOTES