CORPORATE TAX RATES AND THE COST OF CAPITAL

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EXECUTIVE SUMMARY

A decrease in the corporate tax rate impacts upon corporate valuation in several ways. For taxpaying, fully franked dividend paying companies:

* cash flows after company tax are increased;

* the required rate of return on equity (after company tax but before personal tax) is increased (since dividends carry lower imputation credits);

* the after-tax cost of debt is increased (since the interest tax shield is reduced);

* consequently, the WACC (after corporate tax) is also increased;

* the increase in corporate after-tax cash flows and in WACC have offsetting effects.

Where companies have a 100% payout ratio of fully franked dividends, and the market places full value on imputation credits, the company tax is equivalent to a withholding of personal investor tax. Except for some minor timing issues associated with tax payments, a change in company tax without a change in personal tax rates will therefore have no effect on corporate value. (The cash flows generated by the company

are unchanged, and the government total tax take is unaffected, although the timing might be marginally affected under full imputation). In this scenario, the increase in the discount rate used to value after company tax cash flows offsets the increase in after company tax cash flows.

Where companies are in a non-taxpaying position, because of past tax losses (for example), the effects are somewhat more complex. In this case, the required rate of return on equity (after company tax but before personal tax) is dependent upon an "average effective" company tax rate of the company over a long horizon. For such companies:

* a decrease in the company tax rate will not affect after-tax cash flows - until a taxpaying position is reached;

* the date at which a taxpaying position is reached will be unaffected by the change in company tax rate;

* the required rate of return will increase, but by less than that for tax paying companies;

[1] INTRODUCTION

As part of the Labor government's reform of the taxation system, it has proposed a decrease in the annual tax rate on corporations from the existing 39% to 33% (effective 1/7/1993). Associated with this reform are changes in the collection of tax with collection reverting back to a quarterly basis. This paper examines the effect of the change in the corporate tax rate on the cost of capital.

[2] THE WACC MODEL

As outlined in the Grant Samuel report on Coal & Allied, a commonly adopted approach is to use an after-tax WACC to discount the cash flows after company tax but before interest (and the associated tax deduction). Consistent with that report, an after corporate tax weighted average cost of capital (k) can be expressed as:

$$k = k_e \frac{E}{V} + k_d (1-t_c) \frac{D}{V}$$

where:
- k_e is the effective cost of equity capital
- k_d is the effective cost of debt capital
- t_c is the corporate tax rate
- E is the market value of equity
- D is the market value of debt
- V is the value of the firm ($V = E + D$)

Since this discount rate is used to evaluate the present value of after corporate tax cash flows, a reduction in the corporate tax rate will increase corporate values (since after-tax cash flows are increased) but only if the applicable discount rate applicable is unaffected. In fact, a change in the corporate tax rate (t_c) affects the cost of capital (k) by affecting both the after-tax cost of debt and the after-tax cost of equity (assuming no change in capital structure).

[3] THE COST OF DEBT CAPITAL

There is little reason to expect the pre-tax cost of debt to Australian companies to change in response to a change in t_c. Interest rates are determined in a highly integrated world market, and thus are largely unaffected by changes in any one nation's tax system. However, the after-tax cost of debt will rise when the corporate tax rate falls. This is because the tax shield on debt which arises from the tax deductibility of interest payments is now worth less. For example, if the cost of debt (before-tax) is 10.7%, then under a 39% tax rate, the after-tax cost is 6.53%; whereas under a 33% tax rate, the after-tax cost is 7.17%. However, such a change is unlikely to substantially effect the WACC when using moderate amounts of debt.

For firms carrying tax losses, the after-tax cost of debt will be higher than would otherwise be the case, as the tax deductibility of interest cannot be realised until a future period when the company is in a tax-paying position. Thus, in present value terms, the interest deductibility is less than $t_c.k_d$.

[4] THE COST OF EQUITY CAPITAL

[4.1] The CAPM and Taxes

A common method for deriving discount rates to value future assets or companies generating risky cash flows is to use the Capital Asset Pricing Model (CAPM). By estimating the "beta" of those cash flows, the appropriate discount rate for any asset i, $[E(r_i)]$, can be derived from a CAPM equation such as:

$$E(r_i) = r_f + \beta_i [E(r_m) - r_f].$$

In this expression, r_f is the risk free interest rate, and $[E(r_m) - r_f]$ is the expected market risk premium.

The CAPM is a partial equilibrium model of risky asset pricing derived under the assumption that investor preferences depend upon expected return and risk (as measured by the variance of returns). Two elements of the model are particularly significant in considering the impact of changes in company tax rates.

First, investor preferences are related to returns after all taxes have been paid. Since interest and equity returns are typically measured at a point at which some tax remains to be paid, the CAPM equation derived in a world of taxation will reflect the current structure and level of taxes in place. Changes in tax rates can thus affect the appropriate formulation of the CAPM.

Second, the CAPM provides an estimate of the discount rate for risky cash flows <u>relative</u> to the risk free interest rate and the required return on the risky market portfolio. Changes in such a significant tax parameter as the company tax rate can affect these empirical magnitudes and thus affect the value of the discount rate applicable to any set of risky cash flows.

[4.2] Applying the CAPM in Australia

The Capital Asset Pricing Model (CAPM) can be used to estimate k_e, viz:

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

where: r_f is the return on a riskless asset
$E(r_m)$ is the expected return on the market portfolio
β is the company-specific systematic risk measure.

This CAPM specification is applicable to either a zero tax world or after corporate tax world in a classical tax system. The key issue is how to adjust the CAPM for taxes in the

Australian environment. Consistent with our notion of the WACC calculated as after corporate tax but before personal tax, we need to establish the after corporate tax but before personal tax cost of equity. Traditionally, the expected returns in the CAPM are implicitly assumed to be after corporate tax. However, under a dividend imputation system, the corporate tax can be viewed as a withholding tax. If we assume that the market (overall) is paying returns entirely in the form of fully-franked dividends then effectively no corporate tax is paid. The after personal tax CAPM then becomes:

$$E(r_i)\frac{(1-t_p)}{(1-t_c)} = r_f(1-t_p) + \beta_i[E(r_m)\frac{(1-t_p)}{(1-t_c)} - r_f(1-t_p)]$$

where: t_p is the investor's effective marginal rate of tax on equity income; and
t_c is the effective corporate rate of tax.

Intuitively, this equation claims that returns from the riskless asset are taxed at the investor level, while returns to equities are taxed through the dividend imputation system. Obviously the expected return depends on both t_p and t_c. However, we are interested in the CAPM after corporate tax but before personal tax. Hence, removal of personal taxes yields:

$$\frac{E(r_i)}{(1-t_c)} = r_f + \beta_i[\frac{E(r_m)}{(1-t_c)} - r_f]$$

(An alternative method of expressing this is:

$$E(r_i)+I = r_f + \beta_i[E(r_m + I) - r_f]$$

where I represents the value of the imputation tax credits.)

A decline in the corporate tax rate reduces the value of the imputation tax credits and hence, ceteris paribus, Australian taxpaying investors are worse off. This implies that the expected return on the market (as measured by the cash value of dividends and capital gains) should rise to compensate for the increase in the tax burden. However, provided it is domestic investors who drive Australian equity prices, there is no valid reason as to why the grossed-up (overall) market risk premium represented by $[E(r_m)/(1-t_c) - r_f]$ should change. Australian investors will still demand the same after-all tax premium to invest in the market portfolio which is given by $[E(r_m)/(1-t_c) - r_f](1-t_p)$. Since there has been no change in t_p, the grossed up premium (the term in the square brackets) should not have changed. Imputation is akin to a subsidy to domestic purchasers of domestic equities, and hence the "ungrossed" premium $[E(r_m)-r_f]$ in Australia can differ from the corresponding premia overseas.

For example, assume that under the classical tax system $E(r_m) = 15\%$ and $r_f = 8\%$ such that the market risk premium is 7%. Under imputation with $t_c = 39\%$, a grossed up premium of 7% implies that $E(r_m) = 9.15\%$. The fall in $E(r_m)$ reflects the fact that investors are better off because of the removal of the double taxation on dividends. This adjustment is consistent with investors requiring the same after all tax return. The analysis is also consistent with the argument that the introduction of imputation will not affect the final after all tax required rate of return.

Now consider what happens when t_c falls to 33% under imputation. We would expect $E(r_m)$ to increase to 10.05% reflecting the fact that investors now require a higher before personal tax rate of return because the imputation credits are now less valuable.

The case of Coal & Allied (assuming full franking) can be examined. Under t_c = 39%:

$$\frac{E(r_i)}{(1-t_c)} = r_f + \beta_i [\frac{E(r_m)}{(1-t_c)} - r_f]$$

$$\frac{E(r_i)}{(1-t_c)} = 0.08 + 0.9 [\frac{0.0915}{(1-.39)} - 0.08] = 14.3\%$$

$$E(r_i) = 8.72\%$$

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$$\frac{E(r_i)}{(1-t_c)} = r_f + \beta_i [\frac{E(r_m)}{(1-t_c)} - r_f]$$

$$\frac{E(r_i)}{(1-t_c)} = 0.08 + 0.9 [\frac{0.0915}{(1-.39)} - 0.08] = 14.3\%$$

$$E(r_i) = 9.58\%$$

[4.3] Companies with Accumulated Tax Losses

For companies with accumulated tax losses, returns to shareholders must take the form of capital gains (if earnings are retained) or unfranked dividends (until a taxpaying position is reached). Since there would be no grossing up of dividends, the cost of equity would not be affected by the corporate tax rate change in a one-period CAPM model. In the context of the CAPM equation presented below, the corporate tax rate (t_c^*) applicable to companies while in a non-tax paying position would be effectively zero. Hence, the required rate of return for such a company will be higher by a factor of $(1-t_c)$ than that for an equivalent beta value company in a permanent full-franking position.

$$\frac{E(r_i)}{(1-t_c^*)} = r_f + \beta_i [\frac{E(r_m)}{(1-t_c)} - r_f]$$

However, the assumption of a zero effective tax rate ignores the gradual transition of the company into a tax-paying position as tax losses are realised, and ignores the company's consequent move into a franked dividend paying position. If, for example, the dividend rate is maintained constant irrespective of the franking proportion, investors will be better off after all taxes, as the company approaches full franking of dividends.

Thus, for long-term investment horizons, the effective tax rate (t_c^*) will lie somewhere between zero and t_c and will vary depending on the magnitude and timing of the tax losses. Hence, the appropriate cost of equity capital can only be determined on a case-by-case basis.

When the corporate tax rate is reduced, the discount rate will increase (consistent with the earlier argument in section 4.2). However, for currently non tax paying companies, the effective tax rate (t_c^*) will fall, but not by as much as the fall in t_c (since it is a weighted average of zero and the statutory rate). Hence, the effect will be that the increase in the discount rate for companies with tax losses is less than the increase in the discount rate for tax paying companies.

It should be noted that in the case of a levered company, the tax-shield on debt is unusable while in a tax loss situation. The appropriate after-tax cost of debt is no longer $k_d(1-t_c)$, but $k_d(1-\alpha t_c)$ where $0<\alpha<1$ represents the proportionate reduction in present value of the interest tax shield. The more distant is the return to taxpaying status, the lower is α. As noted earlier, a decrease in the corporate tax rate will increase the after-tax cost of debt, but this increase will be smaller for companies with significant tax losses.

[5] SUMMARY

The previous discussion has outlined how to estimate the WACC (after company tax but before personal tax) to be used as the discount rate, and the impact of an reduction in the company tax rate upon the WACC. It is likely that the new tax rate of 33 percent will increase the WACC applicable. However, note that this analysis is based upon certain assumptions indicated in the document. In particular, the precise effect on the WACC of a company in a tax-loss position (such as Coal & Allied) will depend upon company specific facts and forecasts.

APPENDIX 1

TARGET SHAREHOLDERS

The preceding analysis has sought to establish the effect of the change in the corporate tax rate on the cost of capital after corporate tax but before personal tax. It is arguable that when determining an offer price that the appropriate cost of capital is after all taxes. Assuming fully franked dividends, the after all tax cost of equity capital can be expressed as:

$$E(r_i)\,\frac{(1-t_p)}{(1-t_c)} = (1-t_p)\,[r_f + \beta_i\,[\frac{E(r_m)}{(1-t_c)} - r_f]]$$

From the above equation it is possible to establish the investor return after all taxes. However, the required return is dependent on the investor's personal rate of tax. For example if t_p = 15% and t_c = 33%, then investor return after all taxes = 12.16%. Alternatively, if t_p = 48.25% (47% plus medicare) and t_c = 33%, then the investor return after all taxes = 7.40%.

The change in the corporate tax rate will not affect the relativity between domestic investors. To the extent that personal investor tax rates remain unchanged, the differential after all tax return is maintained.

However, foreign investors who do not have access to the imputation credits are made relatively better off with a decrease in the corporate tax rate. This is because the imputation credits are less valuable to domestic investors under t_c = 33% (compared to t_c = 39%). To the extent that foreign investors are the marginal price setters, the before personal tax required rate of return will fall. However, it is unlikely that foreign investors are the marginal price setters for Australian companies.

APPENDIX 2

QUARTERLY TAX INSTALMENTS

The return to a quarterly tax instalment collection system will effectively bring forward tax payments. This difference in timing of tax payments should be accounted for in the numerator of any discounted cash flow analysis. For tax-paying companies, this will tend to reduce present value.