Attachment 17

The Value of Gamma

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In the determination of allowed returns, a regulator will seek to determine the return on investment that would provide investors in a competitive market place an expected return appropriate to the level of risk. In raising capital a firm will find that not all investors share the same tax status. Australian resident personal taxpayers and superannuation funds face an imputation tax system that seeks to, in effect, treat corporate taxes as a prepayment of personal taxes. Australian residents who receive a dividend from an Australian company enjoy a credit, termed a franking credit, for the corporate taxes already paid on the earnings underlying the dividend. Foreign investors do not receive any credit for Australian corporate taxes already paid on the underlying income.

This does not mean that a company with a largely Australian resident shareholder base enjoys a lower cost of equity capital, and in turn a lower WACC, then an otherwise equivalent Australian company with a largely US shareholder base. An Australian resident will not pay more for the shares in the first company than the price at which the shares in the second are trading. Rather, an Australian resident investor will enjoy a higher after-personal-tax return than a US investor (in the same personal tax bracket) will enjoy if they both invest in the same Australian company and the Australian tax law works as intended by its framers. Australia's imputation system is intended to be discriminatory, and that discrimination evidences in the differential after-tax returns earned by resident and non-resident investors.

The fundamental question that a firm faces in determining its WACC, and one question the regulator must face in determining the allowed return, is not:

"What fraction of the dividends distributed from corporate profits are received by Australian residents who are then able to take advantage of franking credits?"

Rather the fundamental question is "If $10 is to be distributed as a dividend by an Australian company and the underlying corporate income has already been subject to corporate tax (and hence a franking credit attaches—the dividend is then termed a 'franked dividend') and a second $10 dividend is to be distributed from earnings that have not been subject to corporate tax

(and to which no franking credit then attaches—such a dividend is termed an 'unfranked' dividend), will the capital market pay more for the first dividend than the second?

If the answer to the fundamental question is no, then franking credits are not priced in the capital market. If franking credits have no market value,[1] then the ratio $\left[\frac{\text{market value of \$1 of franking credits}}{\text{market value of \$1 of unfranked dividends}}\right]$ is zero and the value of gamma, g, in the WACC formula below is zero.

$$\text{WACC} = \frac{D}{V}\left[r^d\left(1-t\right)\right] + \frac{E}{V}\left[r^e\left(\frac{1-t}{1-t\left(1-g\right)}\right)\right].$$

$$g \equiv \left[\frac{\text{the firm's franked dividends}}{\text{the firm's total dividends}}\right] \times \left[\frac{\text{market value of \$1 of franking credits}}{\text{market value of \$1 of unfranked dividends}}\right].$$

Note that the ratio $\left[\frac{\text{franked dividends}}{\text{total dividends}}\right]$ will vary across firms depending on the nature of its operations. Note also that the ratio $\left[\frac{\text{market value of \$1 of franking credits}}{\text{market value of \$1 of unfranked dividends}}\right]$ is a market determined value common to all firms.

WACC ≡ the cost of capital appropriate for the discounting of a firm's free cash flows, where free cash flows are by definition cash flows after-corporate amounts.

$t \equiv$ the corporate tax rate.

$r^d \equiv$ the expected interest plus capital gain return on debt.

$r^d\left(1-t\right) \equiv$ the (after-corporate-tax) cost of debt.

$r^e \equiv$ the expected dividend plus capital gain return on equity.

$r^e\left(\frac{1-t}{1-t\left(1-g\right)}\right) \equiv$ the (after-corporate-tax) cost of equity.

When $\left[\frac{\text{market value of \$1 of franking credits}}{\text{market value of \$1 of unfranked dividends}}\right] = 0$, then $g = 0$ irrespective of what fraction of a firm's dividends are franked. When $g = 0$ the cost of equity is r^e.

But if the answer to the fundamental question is yes, then a follow-up question arises:

[1] Franking credits can serve to reduce taxes paid by Australian resident recipients of franked dividends without necessarily having a positive market price.

> "How much does each dollar of franking credits add to the market value of a franked dividend relative to the value the market is willing to pay for a dollar of unfranked dividends?"

When $1 of franking credits adds as much value as the market value of $1 of unfranked dividends, then franking credits are fully valued by the capital market and the value of gamma in the WACC formula is *potentially* unity. Gamma is only *potentially* unity because the actual value of gamma will depend on the proportion of the firm's dividends that are distributions of earnings previously subject to corporate tax. When $1 of franking credits has the same market value as $1 of unfranked dividends, then gamma for a particular firm is given by:

$$g \equiv \left[\frac{\text{franked dividends}}{\text{total dividends}}\right] \times 1 = \left[\frac{\text{franked dividends}}{\text{total dividends}}\right].$$

When the answer to the fundamental question is yes and at least some of a firm's dividends are franked then gamma for that firm is > 0 and the cost of equity for that firm is $r^e\left(\frac{1-t}{1-t\left(1-g\right)}\right) < r^e$. In turn the firm's WACC is lower than it would be if gamma were zero. When all dividends are distributions of after-corporate-tax earnings *and* franking credits are fully valued then $g = 1$ and the cost of equity is $r^e\left(1-t\right)$.

One cannot answer both the fundamental and the follow-up question simply by assuming an answer. This is the approach taken in Lally (2002). Lally (2002) observes that franking credits would be worth as much as franked dividends if investors who could not take advantage of imputation credits had no influence on the prices of Australian shares. Given this observation Lally assumes that Australian shares are priced as if this were true. Lally then concludes that gamma must be unity.

But one need not answer the question by assuming the result. One can examine the empirical evidence. And even if one concluded from an examination of the empirical evidence that franking credits are fully valued (i.e., that overseas investors have no influence on the relative valuation of franked and unfranked dividends), it does not follow that gamma is one. Gamma will only be equal to one for those firms with 100% franked dividends.

In a forthcoming publication, Cannavan, Finn and Gray (2003) [CFG] undertake a thorough empirical study of our fundamental question. They do so by examining data on individual share futures contracts. A futures contract is an agreement to trade a share at a future date at a pre-agreed price. Absent any dividend between now and the date of the exchange the

futures price to be paid later is simply the current market price plus interest thereon. This is natural since if I buy a share today I have the share but must pay now. If instead I enter a futures contract obligating me to acquire the share at a later date then I will acquire ownership of the share and I can delay the agreed payment of the futures price until the later date.

When that later date comes after the next dividend payment, the buyer of the share for a futures contract will acquire the share at the future date but will not acquire the missed dividend. Thus by comparing the prices of a share to be acquired immediately, and hence with the right to the next dividend, with the futures price to be paid later to acquire the share after the next dividend, one can determine the amount the capital market is willing to pay for that dividend. And by comparing the amount that the capital market is willing to pay for franked dividends versus for unfranked dividends a researcher can determine the market's valuation of franking credits.

Prior to 1997 various stratagems existed that allowed all investors, both resident and non-resident alike, to effectively receive the benefits of franking credits. An empirical examination of share prices and futures prices for the period prior to 1997 lead CFG to conclude that tax credits did have value during this period —for each $1 of tax credits the market was willing to pay a price of up to 50% of the price paid for $1 of unfranked dividends; i.e, prior to 1997 the ratio $\left[\frac{\text{market value of \$1 of franking credits}}{\text{market value of \$1 of unfranked dividends}}\right]$ was reliably greater than zero, and possibly as large as ½.

In 1997 tax law changes that precluded the share trading strategies that had previously allowed non-resident investors to effectively enjoy the benefits of tax credits were introduced. From an examination of post 1997 share and futures prices, CFG conclude that "it is difficult to detect any value in tax credits at all after the amendment."

Australian residents may well enjoy the tax credit, but post 1997 they have not had to pay any more for a dollar of franked dividends (i.e., dividends with attached tax credits) then they must pay for a dollar of unfranked dividends. The implication for Australian companies raising equity capital is clear. To raise capital Australian companies must price the issue so that it is potentially attractive to overseas investors; i.e., to investors who do not qualify for imputation credits. Thus the best available empirical evidence on the value of gamma under the current tax law is that gamma is zero.

Cannavan, Damien, Frank Finn and Stephen Gray, 2003, "The value of dividend imputation credits in Australia," University of Queensland Working Paper.

Lally, Martin, 2002, "The cost of capital under dividend imputation," Paper prepared for the Australian Competition and Consumer Commission.