

Chapter 17

THE COST OF CAPITAL

1. Introduction

In an earlier chapter we looked at the theoretical valuation of equity and of debt. In this chapter we will apply the same principles to the calculation of the cost of equity and the cost of debt.

- This is much more important, in that in order to appraise investments the company needs to know the cost of capital to use. The calculations in this chapter will start to help us to calculate this cost of capital.

2. The cost of equity

If a company is trying to decide whether or not to invest in a new project, they will need to know the cost of the money being used. If the project is being financed by shareholders (either by way of a new issue of shares, or by the use of retained earnings), then we need to be able to calculate the rate of return that shareholders will require.

The only way that we are able to estimate the likely cost of future equity finance is to look at the existing shares and determine what rate of return the shareholders are currently demanding.

We can do this for quoted shares by using the principles described in the earlier chapter when we calculated the market value of shares. We said that the market value of a share depends on the future expected dividends and the shareholders required rate of return.

For quoted shares we know the market value (it is printed in the newspapers!) and therefore if we know the future expected dividends, we can simply work backwards.

Example 1

S plc has in issue \$1 shares with a market value of \$2.40 per share. A constant dividend of 30c per share has just been paid.

What is the shareholders required return (k_e), (and therefore the cost of equity to the company)?

The problem with this example is that it assumes that shareholders are expecting a constant dividend. In practice, as we discussed before, it is more likely that they are expecting growth in dividends.

When there is growth in dividends we use exactly the same formula as in Chapter 15, but rearranged.



2.1. The formula

$$r_e = \frac{D_0(1+g)}{P_0} + g$$

where:

r_e = the share holders required rate of return (=cost of equity)

D_0 = the current dividend

P_0 = the current market value per share (ex div) 0

g = the rate of dividend growth p.a.

Example 2

T plc has in issue 50p shares with a market value of \$4.20 per share. A dividend of 40c per share has just been paid.

Dividends are growing at 6% p.a..

What is the cost of equity?

Example 3

U plc has in issue \$1 shares with a market value of \$3.60 per share. A dividend of 30c per share has just been paid.

Dividends are growing at 8% p.a..

What is the cost of equity?



3. Estimating the rate of growth in dividends

When using the formula for the cost of equity, we need to know the rate of dividend growth that shareholders expect in the future. If this figure is given us in the examination then there is obviously no problem.

However, you may be expected to estimate the dividend growth rate using one of two approaches:

- using the rate of growth in the past
- using the 'r_b' model

3.1. Past dividend growth

Example 4

It is now the year 2001, and X plc has paid out the following total dividends in past years:

1996	\$28,000
1997	\$29,000
1998	\$32,000
1999	\$31,000
2000	\$33,000

Estimate the average rate of growth of dividends p.a..

3.2. 'rb' growth

This approach considers the reason for growth in dividends. In order to have long-term growth in dividends, the company needs to achieve long-term growth in earnings.

In order to achieve long-term earnings growth, the company needs to expand, which will require additional investment. The only long-term, continual source of finance that shareholders will be in a position to expect is the retention of earnings. If all earnings are distributed as dividends then shareholders will not be in a position to expect growth, whereas the more of the earnings that are retained for expansion then the more growth shareholders will be expecting.

The growth can be estimate using the following formula:

$$g = r b$$

where:

b = the proportion of earnings retained in the company

r = the rate of return that the company can earn on re-investment



What follows is a short illustration of the principle of rb growth:

COMPANY A

Earnings \$100, all distributed as dividend (no retention)

	Yr 0	Yr 1	Yr 2
Earnings	100	100	100
Retained	–	–	–
Dividend.	100	100	100

High dividend; no dividend growth; no growth in market value

COMPANY B

Earnings \$100; 40% distributed as dividend. Retention is re-invested at 10% p.a.

	Yr 0	Yr 1	Yr 2
Earnings	100	100	106
Retained	60	106	112.36
Dividend	40	42.4	44.944

Annotations: Retained at Yr 0 is 60 (60%) of 100. Retained at Yr 1 is 63.6 (63.6%) of 100. Retained at Yr 2 is 67.416 (67.416%) of 106. Dividend at Yr 1 is 42.4 (42.4%) of 100. Dividend at Yr 2 is 44.944 (44.944%) of 106. Growth rates: 10% on retained earnings, 6% on dividends.

Lower dividend; growth in dividends; growth in market value.

Growth rate = $r \times b = 10\% \times 60\% = 6\%$ p.a.

Example 5

Y plc retains 40% of earnings each year and is able to reinvest so as to earn a return of 20% p.a.

What is the expected growth rate in dividends?

Example 6

Z plc has in issue \$1 shares with a market value of \$2.80 per share. A dividend of 20c per share has just been paid (earnings per share were 32c).

The company is able to invest so as to earn a return of 18% p.a..

- Estimate the rate of growth in dividends
- Estimate the cost of equity
- Estimate the market value per share in 2 years time



4. The cost of debt

If we intend to raise debt to finance a project then we need to estimate the return that debt lenders will require. The best way we can estimate this is to look at existing debt in the company and calculate the current cost.

If the company has traded debt, we can do this by using the valuation theory (from Chapter 15) backwards! We know the current market value and the future receipts and can therefore calculate the investors' required rate of return.

There is one additional problem however. Although it is the investors required rate of return that determines the rate of interest that the company has to pay, we assume that any debt interest payable attracts tax relief for the company and that therefore the actual cost of debt to the company is lower. (Note: throughout this examination we ignore the effect of income

- tax on the investor)

4.1. Irredeemable debt

Remember from Chapter 7 that irredeemable debt is debt that is never repaid. It does not exist in practice, but in the examination you assume debt to be irredeemable unless told otherwise.

Example 7

F plc has in issue 8% irredeemable debentures quoted at 90 p.c. ex int.

- what is the return to investors (k_d) ?**
- what is the cost to the company, if the rate of corporation tax is 30%?**

4.2. Redeemable debt

Example 8

G plc has in issue 6% debentures quoted at 85 ex int.

The debentures are redeemable in 5 years time at a premium of 10%

- What is the return to investors (k_d) ?**
- What is the cost to the company if the rate of corporation tax is 30%?**



5. The weighted average cost of capital (WACC)

In the previous sections we have seen how to calculate the cost of both equity and debt.

However, most company are financed using a mixture of both equity and debt.

It is useful for our later work to be able to calculate the average cost of capital to the company. We do this by calculating the cost of each source of finance separately (as in the previous sections) and then calculating a weighted average cost, using the ex div/int market values of the equity and debt.

Example 9

J plc is financed as follows:

Equity – 5 million \$1 shares quoted at \$2.50 cum div, on which a constant dividend of 32c per share is about to be paid.

Debt - \$4M 8% debentures quoted at 92 ex int.

Corporation tax is 30%

- (a) Calculate the returns to investors on equity and on debt
- (b) Calculate the WACC to the company

Example 10

K plc is financed as follows:

Equity – 10 million \$1 shares quoted at \$3.20 ex div, on which a dividend of 20c per share has just been paid. Dividends are growing at 8% p.a..

Debt - \$6M 10% debentures quoted at 105 ex int. The debentures are redeemable in 6 years time at a premium of 10%

Corporation tax is 30%

Calculate the weighted average cost of capital

The weighted average cost of capital is often (but not always) the rate that we use for the discounting of cash flows when we do investment appraisal. However, this chapter is simply about the arithmetic – we will discuss the relevance of the WACC in the following chapters.

When you finished this chapter you should attempt the online F9 MCQ Test

