



Weighted Average Cost of Capital (WACC)
Article by Bernard Vallely, FCCA, MBA, Current Examiner.

RELEVANT TO :

P1 Managerial Finance

P2 Financial Management (Transitional Students)

P2 Strategic Corporate Finance

20TH February 2010

INTRODUCTION

Most publicly limited companies (PLCs) will use a number of different sources of finance including:

Ordinary Shares – A form of equity, with no guaranteed dividend expectation on the part of shareholders.

Preference Shares – A form of equity participation which confers preferential rights to shareholders in relation to dividend entitlement and on the winding up of a company. Such shares are referred to as a form of prior charge capital.

Note: It should be noted that dividend payments are not tax deductible.

Redeemable Debt Securities – These are in effect long term loans such as debentures and bonds. A company will be committed to servicing such debt. Such interest payments attract corporation tax relief. There may be many variations in the manner in which such debt securities are issued such as, Zero Coupon bonds and Deep Discounted bonds.

Irredeemable Debt Securities – Whilst rarely seen in practice, these long term loans are serviced by tax deductible interest payments and remain in issue in perpetuity.

Likewise, most PLCs will have occasion to raise new long term funds. The reasons for this may include:

- to fund investment plans
- to invest in infrastructure/capital developments
- to provide the funds to redeem long term loans/debt securities

When raising such funds there are a number of factors to be considered including:

- the gearing structure of the organisation
- the cost of the various sources of funding the organisation
- benchmark borrowing rates e.g. EURIBOR
- likely lending margins
- the availability of tax relief on servicing costs
- corporation tax rates
- equity market/share price performance
- availability or otherwise of equity investors
- the need for and availability of asset backing (debt financing)
- the existence or otherwise of providers of debt finance

COST OF SOURCES OF CAPITAL

In assessing the cost of funding a company it is essential that management are aware of the cost of the individual sources of finance used by the company, and the average cost of funding the organisation having allowed for all sources of finance employed. This is referred to as the company's Weighted Average Cost of Capital (WACC). In essence the WACC calculation considers the cost of each source of funds used, with each source being weighted based on the relative market value thereof.

Note: In calculating the cost of debt finance, the tax relief available on interest payments is explicitly allowed for.

Cost of Ordinary Share Capital

This can be calculated using one of two models namely:

- Dividend Growth Model
- Capital Asset Pricing Model (CAPM)

Dividend Growth Model

This approach is based on Gordon's Growth Model, which considers that the value of an ordinary share is the present value of the future dividend payments to shareholders, allowing for an average annual percentage growth in dividend payments.

The formula for determining the cost of ordinary shares is: **$K_e = D_o (1+g)/P_o + g$**

K_e = Cost of Ordinary Shares

D_o = The most recent dividend paid (per share/or in total)

g = The annual compound percentage rate of growth in dividend payments (per share/or in total). This rate may be given or may need to be calculated from a stream of historic dividend payments.

P_o = Ex dividend market value of ordinary shares (per share/or in total)

Capital Asset Pricing Model (CAPM)

This model determines the required return/cost of equity by relating the perceived risk of the investment (as measured by Beta Factor) to the risk free rate of return (Government Bonds) and the rate of return expected from the market portfolio i.e. a diversified portfolio of risky investments.

The CAPM formula is as follows: **$K_e = R_f + B(R_m - R_f)$**

K_e = Cost of Ordinary Shares

R_f = Rate of return on risk free investments

R_m = Rate of return on market portfolio

B = Beta factor of the ordinary share in question

Cost of Preference Shares

The formula is : **$K_p = D/P_o$**

K_p = Cost of Preference Shares

D = Annual preference dividend payable (in total/or per share)

P_o = Ex dividend market value of preference shares (in total/or per share)

Cost of Irredeemable Debt

$$K_d = I (1-t)/P_o$$

K_d = Cost of irredeemable debt

I = Annual interest payable

t = Corporation Tax rate

P_o = Ex interest market value of the irredeemable debt

Cost of Redeemable Debt

This is calculated using a trial and error approach to determine the Internal Rate of Return (IRR) relating to the future cash flows pertaining to the debt to its redemption date.

Determination of the Weighted Cost of Capital (WACC)

Once the cost of the individual sources of finance have been determined the WACC calculation involves aggregating the costs of all sources of finance employed. This is carried out on a weighted basis with the ex dividend (relating to equity) and ex-interest (relating to debt) market value of each source of finance being used as respective weights. The following example serves as an illustration as how to calculate a company's WACC.

WACC CALCULATION ILLUSTRATION

Diamond PLC is a company which manufactures high quality jewelry. The company enjoys a 35% market share in its traditional market, Ireland. Diamond PLC has ambitious expansion plans for the forthcoming 18 months, during which it plans to pursue a growth strategy of market development, by expanding into the Scandinavian market. Diamond PLC plans to raise €10 million to finance the strategy. The company's management team have not set views on how these funds will be raised. Relevant extracts from Diamond PLC's most recent published Statement of Financial Position are as follows:

Diamond PLC	
Statement of Financial Position	
Extract	
As at 28th February 2010	
	€000s
Equity Attributable to Equity Holders	
2,000,000 Ordinary shares @ €5 each	10000
12% Preference Shares @ €2 each	4000
Other Reserves (Retained Revenue Reserves)	6000
	20000

Information relevant to equity shares:

- Diamond PLC's ordinary shares are presently trading at €9.60 cum-div. At a recent board meeting the Directors agreed an ordinary dividend for the year of €0.60c per share. This dividend will be paid on 24th March 2010. A review of the trend of ordinary dividends paid by Diamond PLC for the last ten years reveals an average annual rate of growth in dividends will be 12%.
- The company's preference shares have an ex-div market value of €4.70. The annual preference dividend was paid four days ago. Preference dividends are paid annually.

Diamond PLC has also raised significant funding through debt financing as follows:

- €5 million in 7% redeemable debentures. They are redeemable at par on 28th February 2012. These debentures are presently trading at 90% of the value they were issued at. Debenture interest is paid annually. All interest payments relating to the y/e 28/2/2010 have been made in full.
- €3 million in 4% irredeemable debentures. All interest due to date has been recently paid. These debentures are presently trading at 70% of their book value.

Required:

Calculate Diamond PLC's weighted average cost of capital (WACC)

Note: Corporation tax of 20% is payable on profits in the year in which profits are reported.

Suggested Solution**Weighted Average Cost of Capital (WACC)**

Diamond PLC has four sources of finance namely:

- Ordinary Shares
- Preference Shares
- Redeemable Debentures
- Irredeemable Debentures

Diamond PLC has raised finance in different forms and in different proportions, with each having a different cost. The WACC represents the overall cost of financing Diamond PLC calculated by determining the cost of each source weighted in accordance with the market value of each separate source.

The WACC of Diamond PLC is 13.53%. This has been calculated as follows:

WACC		Note	MV (Ms)	% Cost	Weighting	% Weight	Weighted
Ordinary Shares (ex div)		1	18	19.47%	18/34	52.94%	10.31%
Preference Shares (ex div)		2	9.4	5.11%	9.4/34	27.65%	1.41%
Irredeemable Debentures		3	2.1	4.57%	2.1/34	6.18%	0.28%
Debentures at MV		4	4.5	11.54%	4.5/34	13.24%	1.53%
Weighted Average Cost of Capital			34			100.00%	13.53%

Note 1) Cost of Equity (Gordon's Growth Model)	
$[\frac{.60 \times (1 + .12)}{.0960 - .60}] + .12 =$	19.47%

Note 2)Cost of Preference Shares	
Dividend Payable/Ex Div. Market value	
= 24/470 * 100 =	5.11%

Note 3)Cost of Irredeemable Debentures	
(Interest Payable - Tax)/Ex Int. Market value	
= (120*.8)/2100 * 100 =	4.57%

Note 4)Cost of Debentures (IRR Calculation)					
Year	Value	Interest	Tax Relief	Redee m	Net C flow
	€000s	€000s	€000s	€000s	€000s
0	-4500				-4500.00
1		350	-70		280.00
2		350	-70	5000	5280.00

Year	Discount @ 10%			Discount @ 15%		
	Net C flow	D factor	PV	Net C flow	D factor	PV
	€000s		€000s	€000s		€000s
0	-4500.00	1	-4500.00	4500.00	1	-4500.00
1	280.00	0.9091	254.55	280.00	0.8696	243.49
2	5280.00	0.8264	4363.39	5280.00	0.7561	3992.21
	Net Present Value +		117.94	Net Present Value -		-264.30
IRR(Cost of Debentures)=10%+[117.94/(117.94+264.30)]*(15%-10%) = 11.54%						

WHY CALCULATE A COMPANYS WEIGHTED AVERAGE COST OF CAPITAL (WACC)

- to understand the cost of funding the company
- to consider the possibility of reducing the cost of funding the company by replacing sources of finance (such as redeemable debt) with cheaper sources, thus reducing the overall WACC
- to consider replacing equity funding (perhaps through share re-purchase) with cheaper debt financing which attracts tax relief
- to determine the discount rate that should be used for the purpose of appraising new capital investment proposals
- to determine and increase the market value of the company. This is because investment analysts may value a company by comparing the perpetual profits/cash flows generated by a company to the cost of funding the company as indicated by its WACC. Using the formula:

Market Value = Annual Perpetual Cash Flows OR Profits / WACC

In this case a reduction in the denominator i.e. the WACC will increase the market value of the company as a whole with the resultant increase in equity share prices.
