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ACCA Research Institute

ACCA F9

Financial Management (FM)

财务管理

ACCA Lecturer: Sinny Shao

Part E：Business Finance——Cost of Capital II

1 Cost of debt

2 WACC

Cost of Debt

The cost of debt is the return an enterprise must pay to its lenders.

- For irredeemable debt , this is the (post-tax) interest as a percentage of the ex interest market value of the bonds (or preferred shares).
- For redeemable debt , the cost is given by the internal rate of return of the cash flows involved (interest and capital gain or loss at redemption).

Interest is tax-deductible and this is taken into account in the calculations

Cost of Debt

For the borrowing company, cost of debt represents:
(a) The cost of continuing to use the finance rather than redeem the securities at their current market price.
(b) The cost of raising additional fixed interest capital if we assume that the cost of the additional capital would be equal to the cost of that already issued.

Coupon rate & yield rate
Coupon rate——企业发行债务的票面利率
Yield rate——现行市场上的利率，也是计算债券价值的折现率

Cost of debt

三个例子学会计算cost of debt：

1)Lepus has issued bonds of $100 nominal value with annual interest of 9% per year, based on the nominal value. The current market price of the bonds is $90. What is the cost of the bonds?

2) Henryted has 12% irredeemable bonds in issue with a nominal value of $100. The market price is $95 ex interest. Calculate the cost of capital if interest is paid half-yearly.

$$\text{Cost of loan capital} = \left(1 + \frac{6}{95}\right)^2 - 1 = 13.0\%$$

Cost of Debt

Owen Allot has in issue 10% bonds of a nominal value of $100. The market price is $90 ex interest. Calculate the cost of this capital if the bond is:

(a) Irredeemable

(b) Redeemable at par after 10 years

(a) The cost of irredeemable debt capital is i/P0=10/90=11.1%

(b) The cost of redeemable debt capital . The capital profit that will be made from now to the date of redemption is $10 ($100-$90).

Year		*Cash flow*	*Discount factor*	*PV*	*Discount factor*	*PV*
		$	12%	$	11%	$
0	Market value	(90)	1.000	(90.00)	1.000	(90.00)
1–10	Interest	10	5.650	56.50	5.889	58.89
10	Capital repayment	100	0.322	32.20	0.352	35.20
				(1.30)		+4.09

Cost of Debt

Debt capital and taxation:
在 debt finance 中，利息费用可以享受 tax relief， 因此在考虑税的情况下，cost of debt 会更低

$$k_{d\,net} = \frac{i(1-T)}{P_0}$$

其中：
$k_{d\,net}$ is the after-tax cost of debt capital
i is the annual interest payment
P_0 is the current market price of the debt capital ex interest (that is, after payment of the current interest)
T is the rate of corporation tax

Cost of Debt

Cost of convertible debt:

Debt holders will only convert if the value of the shares is greater than the redemption value of the debt.

(a) If conversion is not expected, the conversion value is ignored and the bond is treated as redeemable debt.
(b) If conversion is expected, the IRR method for calculating the cost of redeemable debt is used, but the number of years to redemption is replaced by the number of years to conversion and the redemption value is replaced by the conversion value

Conversion value = $P_0 (1 + g)^n R$

Where	P_0	is the current ex-dividend ordinary share price
	g	is the expected annual growth of the ordinary share price
	n	is the number of years to conversion
	R	is the number of shares received on conversion

Cost of Debt

Example:
A company has issued 8% convertible bonds which are due to be redeemed in five years' time. They are currently quoted at $82 per $100 nominal. The bonds can be converted into 25 shares in five years' time. The share price is currently $3.50 and is expected to grow at a rate of 3% pa. Assume a 30% rate of tax. Calculate the cost of the convertible debt.

WACC

Weighted average cost of capital (WACC) is the average cost of capital for all the company's long-term sources of finance, weighted to allow for the relative proportions of each type of capital in the overall capital structure.

WACC的主要作用就是计算discount rate——used in NPV calculation

WACC计算公式：

$$WACC = \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d (1 - T)$$

k_e is the cost of equity
k_d is the cost of debt
V_e is the market value of equity in the firm
V_d is the market value of debt in the firm
T is the rate of company tax

WACC

The weighted average cost of capital can be used in investment appraisal if:

(a) The project being appraised is small relative to the company.

(b) The existing capital structure will be maintained (same financial risk).

(c) The project has the same business risk as the company.

Arguments against using the WACC

(a) New investments undertaken by a company might have different business risk characteristics from the company's existing operations.

(b) The finance that is raised to fund a new investment might substantially change the capital structure and the perceived financial risk of investing in the company

(c) Many companies raise floating rate debt capital as well as fixed interest debt capital.

WACC

Example:
When calculating the weighted average cost of capital, which of the following is the preferred method of weighting?
A Book values of debt and equity
B Average levels of the market values of debt and equity (ignoring reserves) over five years
C Current market values of debt and equity (ignoring reserves)
D Current market values of debt and equity (plus reserves)

Thank You!

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Example question

Example Question: DEC 2009 Q2

DD Co has a dividend payout ratio of 40% and has maintained this payout ratio for several years. The current dividend per share of the company is 50c per share and it expects that its next dividend per share, payable in one year's time, will be 52c per share.

The capital structure of the company is as follows:

	$m	**$m**
Equity		
Ordinary shares	25	
reserves	35	60
debt		
Bond A	20	
Bond B	10	30
Total value		90

Example Question

Bond A will be redeemed at par in ten years' time and pays annual interest of 9%. The current ex interest market price of the bond is $95·08.
Bond B will be redeemed at par in four years' time and pays annual interest of 8%. The cost of debt of this bond is 7·82% per year. The current ex interest market price of the bond is $102·01.

Bond A and Bond B were issued at the same time.

DD Co has an equity beta of 1·2. The risk-free rate of return is 4% per year and the average return on the market of 11% per year. Ignore taxation.

Example Question

Required:

(a) Calculate the cost of debt of Bond A. (3 marks)

(b) Discuss the reasons why different bonds of the same company might have different costs of debt. (6 marks)

(c) Calculate the following values for DD Co:

(i) cost of equity, using the capital asset pricing model; (2 marks)

(ii) ex dividend share price, using the dividend growth model; (3 marks)

(iii) capital gearing (debt divided by debt plus equity) using market values; and (2 marks)

(iv) market value weighted average cost of capital. (2 marks)

(d) Discuss whether a change in dividend policy will affect the share price of DD Co. (7 marks)

Answers

(a) The cost of debt of Bond A can be found by linear interpolation.

Using 11%, the difference between the present value of future cash flows and the ex interest market value = (9 x 5·889) + (100 x 0·352) – 95·08 = 53·00 + 35·20 – 95·08 = ($6·88)

Using 9%, the difference between the present value of future cash flows and the ex interest market value = (9 x 6·418) + (100 x 0·422) – 95·08 = 57·76 + 42·20 – 95·08 = $4·88

Cost of debt = 9 + ((11 – 9) x 4·88)/(4·88 + 6·88) = 9 + 0·83 =9·83%

Answers

(c)

(i) Cost of equity = 4 + (1·2 x (11 – 4)) = 4 + 8·4 = 12·4%

(ii) Dividend growth rate = 100 x ((52/50) –1) = 100 x (1·04 – 1) = 4% per year
Share price using DGM = (50 x 1·04)/(0·124 – 0·04) = 52/0·84 = 619c or $6·19

(iii) Number of ordinary shares = 25 million
Market value of equity = 25m x 6·19 = $154·75 million
Market value of Bond A issue = 20m x 95·08/100 = $19·016m
Market value of Bond B issue = 10m x 102·01/100 = $10·201m
Market value of debt = $29·217m
Market value of capital employed = 154·75m + 29·217m =$183·967m
Capital gearing = 100 x 29·217/183·967 = 15·9%

(iv) WACC = ((12·4 x 154·75) + (9·83 x 19·016) + (7·82 x10·201))/183·967 = 11·9%

Thank You!