

Topic Nine: Company Cost of Capital

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This lecture

› In this lecture, we will cover the following:

- Examine the components of the company cost of capital:
 - Calculation of the company cost of capital
 - Estimation of the cost of debt capital
 - Estimation of the cost of preference share capital
 - Estimation of the cost of equity capital
 - The impact of tax on the company cost of capital
- Examine the components of free cash flows:
 - Reporting of cash flows in financial statements
 - Preparation of free cash flow forecasts

› **Readings: BMA Chapter 9**



Company valuation

- › If the firm is assumed to have an infinite life, the value of the firm is given by:

$$V = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}$$

where:

- CF_t = free cash flow generated by the company in period t
 - r = appropriate discount rate for the company
 - = required rate of return
 - = cost of capital
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Company Cost of Capital

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The company cost of capital

Shareholders

\$10 million invested
Required return = 16% p.a.
Annual cost = \$1.6 million



Debt holders

\$10 million invested
Interest rate = 9% p.a.
Annual cost = \$0.9 million



COMPANY

Capital	Amount	% of Total Capital	Annual Cost (%)	Annual Cost (\$)
Equity	\$10m	50%	16%	\$1.6m
Debt	\$10m	50%	9%	\$0.9m
Total	\$20m	100%	?	\$2.5m



The company cost of capital

- › Since the company cost of capital is just a weighted average of the cost of capital of every instrument a company has issued, it is often referred to as the **weighted average cost of capital (WACC)**.
- › The WACC (with **no taxes**) can be expressed as:

$$WACC = \left(r_d \times \frac{D}{D + E} \right) + \left(r_e \times \frac{E}{D + E} \right)$$

where:

- r_d = cost of debt capital
 - r_e = cost of equity capital
 - D = market value of debt
 - E = market value of equity
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The company cost of capital

Example

The market value of debt and equity of a company are \$10 million each. The debtholders of this company charge an interest rate of 9% p.a. while the equity holders require a return of 16% p.a. on their investment. What is the company's cost of capital?



The company cost of capital

Example

A company is 40% financed by risk-free debt. The interest rate charged is 8.25%. Shareholders have contributed \$35 million and their opportunity cost of capital is 13.5%. What is the company cost of capital?

$$w_d = 40\% = 0.4$$

$$w_e = 100 - 40\% = 60\% = 0.6$$

$$r_d = 0.0825 \text{ and } r_e = 0.135$$

$$\begin{aligned} WACC \text{ (no taxes)} &= (r_d \times w_d) + (r_e \times w_e) = (0.0825 \times 0.4) + (0.135 \times 0.6) \\ &= 0.033 + 0.081 = 0.114 = 11.40\% \end{aligned}$$



The cost of debt capital

- › The price of a bond formula is given by:

$$D = C \left[\frac{1 - (1 + r_d)^{-n}}{r_d} \right] + \frac{F}{(1 + r_d)^n}$$

where:

r_d = required return on debt capital (yield to maturity)

- › The **cost of debt** capital is the minimum rate of return that the firm's creditors demand when they lend money to the company. It is possible to imply the cost of debt from the bond pricing formula. However, corporate debt is often not actively traded, and hence, market values cannot be easily observed.
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The cost of debt capital

› There are several other approaches:

1. Assume the debt is risk-free and use a relevant proxy:

$$r_d = r_f$$

2. Add a certain percentage to the government bond yield:

$$r_d = r_f + \textit{risk premium}$$

3. Calculate the cost for the company to issue debt:

$$r_d = \frac{\textit{net interest}}{\textit{average net debt}}$$



The after-tax cost of debt capital

- › Since interest expenses are tax deductible, then we need to adjust for tax effects:

$$\text{Cost of debt capital (A/T)} = r_d(1 - t_c)$$

where:

r_d = required return on debt capital (yield to maturity)

t_c = corporate tax rate

- › The WACC (**with taxes**) can then be expressed as:

$$WACC (A/T) = \left[(1 - t_c) \left(r_d \times \frac{D}{D + E} \right) \right] + \left(r_e \times \frac{E}{D + E} \right)$$



The after-tax cost of debt capital

Example

The market value of debt and equity of a company are \$10 million each. The debtholders of this company charge an interest rate of 9% p.a. while the equity holders require a return of 16% p.a. on their investment. What is the company's after-tax cost of capital if the tax rate applicable is 15%? If the tax rate applicable is 35%?



The cost of preference share capital

- › Preference shares are a type of hybrid instrument that a company may elect to issue for raising capital. They usually pay a fixed dividend amount per annum in perpetuity.
- › The **cost of preference shares** capital is the minimum rate of return that investors require of the firm when they purchase its preference shares:

$$r_{ps} = \frac{Div}{P_0}$$

where:

r_{ps} = required return on preference shares

Div = (constant) dividend per period

P_0 = current price or value of preference share



The cost of preference share capital

Example

The preference shares of Bendigo and Adelaide Bank (BENPG) are currently trading at:



BENPG - BEN ADE BK - CTG PRE 3M PER RD T-

Last

Movement

104.710

0.605% ▲

\$0.630 ▲

What will be the required rate of return on these preference shares if they have a par value of \$100 and pay an annual unfranked dividend of 3.75% p.a.?



The cost of equity capital

- › The **cost of ordinary equity** capital is the minimum rate of return that investors expect to receive from investing in a company's ordinary shares.

 - › There are several approaches:
 1. Implied from the current stock price and company fundamentals.

 2. The CAPM.
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1. Implied from current stock prices

- › The value of a share is given by the present value of all future dividends that the company is expected to pay:

$$P_0 = \sum_{t=1}^{\infty} \frac{Div_t}{(1 + r_e)^t}$$

where:

P_0 = current price of ordinary shares

Div_t = dividend paid in period t

r_e = cost of equity capital



1. Implied from current stock prices

- › The constant growth model assumes that companies pay dividends that grow at a constant rate in the long-run.
- › The value of a share can be expressed:

$$P_0 = \frac{Div_1}{r_e - g}$$

where:

- P_0 = current price or value of ordinary share
 - Div_1 = $Div_0(1+g)$ = dividend at end of the first period
 - r_e = required return on equity capital
 - g = constant growth rate (r_e must be $> g$)
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1. Implied from current stock prices

Example

Brambles has just paid its annual dividend today. The forecasted growth is 2.6% p.a. compounded quarterly. What is the implied cost of equity capital?

Brambles	BXB	BRAMBLES LIMITED	
	Industrials		
Summary	Key statistics	Details	
11.430	DAILY	DAILY VOLUME	
14 Oct 2019	-0.170 -1.466%	2,054,204	
	MARKET CAP ?	BID	OFFER
	18.16bn	11.430	11.440
	# SHARES ?	DIVIDENDS	
	1.57bn	Most recent	17c
	52 WEEK	Dividend ex-date	14/10/19
	LOW 9.576 HIGH 13.136	Franking	0%
	L H		

Dividend search results

Code	Company Name	Div Amount	Ex Div Date
BXB *	BRAMBLES LIMITED	17c	14/10/2019



2. The CAPM

- › An alternative approach to estimating the cost of equity capital is to use the CAPM:

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

where:

$E(r_i)$ = expected return on stock i

r_f = risk-free rate of return

$E(r_m)$ = expected return on the market

β_i = beta of stock i



2. The CAPM

Example

The total market value of the common stock of ABC is \$6 million and the total value of its debt is \$4 million. The treasurer estimates that the beta of the stock is currently 1.5 and that the expected risk premium on the market is 6%. The Treasury bill rate is 4%. Assume for simplicity that ABC's debt is risk-free. The company pays 30% tax. What is the required return on ABC stock? Estimate the cost of capital. Suppose the company wants to diversify into the manufacture of a totally different product. The unleveraged beta of this project is 0.95. Estimate the required return on this new venture.



- › The WACC with **no taxes**:

$$WACC = (r_d \times w_d) + (r_e \times w_e)$$

- › The WACC **with taxes**:

$$WACC (A/T) = [(1 - t_c)(r_d \times w_d)] + (r_e \times w_e)$$

- › The weights of the instruments should be based on **market values** – not issue costs or historical values.
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Tax and the WACC

› There are two widely used taxation systems:

1. The **classical** tax system

- Companies pay tax at the corporate level on their income.
- Shareholders pay tax at their personal (marginal) rates on the dividends that are paid out.

2. The **imputation** tax system

- Companies pay tax at the corporate level on their income.
 - Dividends are paid out with franking credits, representing the amount of company tax that has already been paid.
 - Shareholders pay tax at their personal (marginal) rates on the sum of the cash dividend and franking credits (i.e. a “grossed up” dividend).
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Tax and the WACC

	Classical	Imputation
Corporate level		
Taxable income	\$100	\$100
Company tax (30%)	30	30
Net profit after tax	70	70
Shareholder level		
Cash dividend	\$70	\$70
Taxable income	70	100
Personal tax liability (45%)	31.50	45
Franking credit	-	30
Personal tax paid	31.50	15
After-tax income	38.50	55



Tax and the WACC – Classical

› The WACC needs to be adjusted to reflect differences in tax systems:

1. The **classical** tax system

a. CF are discounted **before** tax:

$$WACC = (r_d \times w_d) + \left[\left(\frac{r_e}{1 - t_c} \right) \times w_e \right]$$

b. CF are discounted **after** tax:

$$WACC (A/T) = [(1 - t_c)(r_d \times w_d)] + (r_e \times w_e)$$



Tax and the WACC – Imputation

› The WACC needs to be adjusted to reflect differences in tax systems:

2. The **imputation** tax system

a. CF are discounted **before** tax:

$$WACC = (r_d \times w_d) + \left[\left(\frac{r_e}{1 - t_c(1 - \gamma)} \right) \times w_e \right]$$

b. CF are discounted **after** tax:

$$WACC (A/T) = [(1 - T)(r_d \times w_d)] + \left[\left(\frac{r_e(1 - T)}{1 - T(1 - \gamma)} \right) \times w_e \right]$$

where:

γ = proportion of franking credits utilised by shareholder

T = effective corporate tax rate



Tax and the WACC – Imputation

Example

Using the following information for Tabcorp Holdings Ltd, estimate the after-tax company cost of capital:

- Estimated cost of debt = 8.11%
- 10 year government bond rate = 0.04
- Number of shares = 688 million
- Market risk premium = 0.128
- Net debt = \$1729.9m
- Share price = \$7.72
- Estimated beta = 0.8984
- Effective corporate tax rate = 30%
- 100% of franking credits are utilised by domestic investors





Tax and the WACC – Imputation

- › The CAPM also needs to be redefined so that the value of franking credits is included in the returns on both the stock and the market:

$$E(r'_i) = r_f + [E(r_m + \tau_m) - r_f] \beta_i$$

where:

$E(r'_i)$ = expected return on stock i before personal income tax including the value of franking credits

r_f = risk-free rate of return

$E(r_m)$ = expected return on the market

$E(\tau_m)$ = expected value of franking credits paid on stocks in the market

β_i = beta of stock i

Free Cash Flows

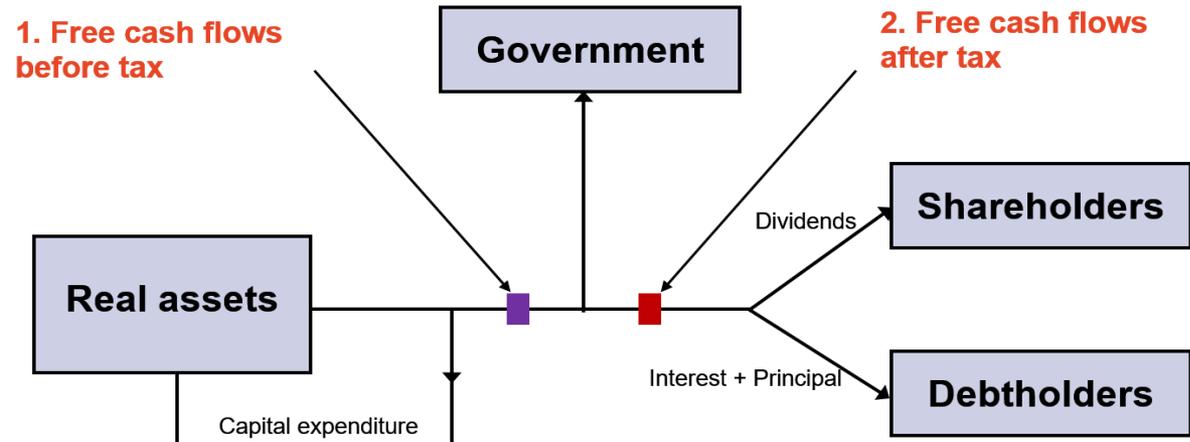
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Free cash flows

$$V = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}$$



- › The cash flows of a company after reinvestment costs (capital expenditure) are distributed to the government, shareholders and debtholders of the company.
- › The value of a company is determined by the cash flows distributed to its shareholders and debtholders – **the free cash flows after tax.**



Statement of cash flows

› The cash flow statement is divided into three sections:

**Cash flows from
operating activities**



Cash flows used in
investment activities

Cash flows used in
financing activities

Examples:

- Cash receipts and payments in the course of operations
 - Income tax paid or refunded
 - Dividends received
 - Interest received or paid
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Statement of cash flows

- › The cash flow statement is divided into three sections:

Cash flows from
operating activities

**Cash flows used in
investment activities**

Cash flows used in
financing activities



Examples:

- Purchases and sales of property, plant and equipment
- Purchases and sales of intangible assets
- Purchases and sales of businesses, subsidiaries and other investments



Statement of cash flows

› The cash flow statement is divided into three sections:

Cash flows from
operating activities

Cash flows used in
investment activities

**Cash flows used in
financing activities**



Examples:

- Proceeds from and repayments of interest bearing liabilities
- Proceeds from share issues
- Funds used for share buybacks
- Dividends paid



Conclusion

- › Company valuation.
- › Cost of capital.
 - Cost of debt
 - Cost of preference shares
 - Cost of equity
 - Weighted average cost of capital
 - Taxation effects on the WACC (classical and imputation)
- › Free cash flows.
 - Free cash flows calculations

› **Next lecture: Equity Capital Markets**

The End

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