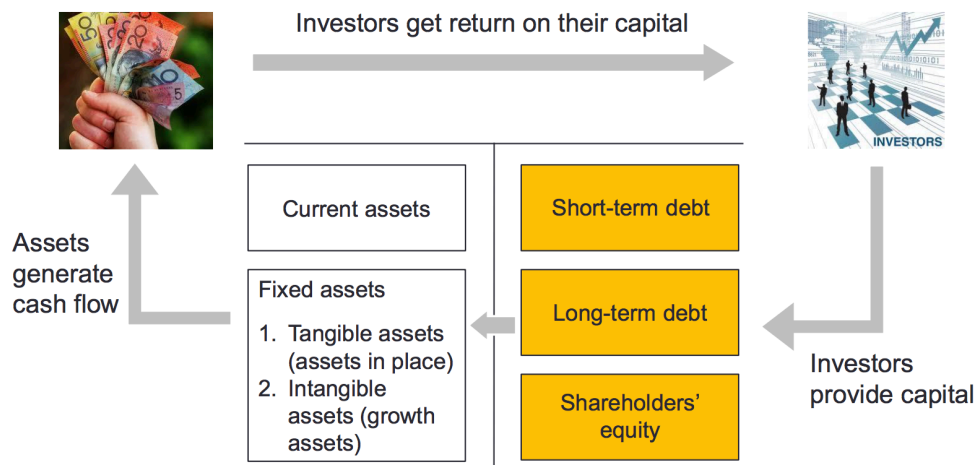# Lecture 3 - Issues with WACC and Capital Structure Policy

● **Weighted Average Cost of Capital (WACC)**

- <u>Cost of Capital</u>

- Projects have to earn at least a benchmark rate of return (minimum acceptable hurdle rate) to be accepted [evaluation].

- The benchmark return should actually <u>take into account the risk of the project</u> and be higher for riskier projects than for safer ones.

- Different terminology reflects different viewpoints of the same thing

  => From investors' viewpoint: required rate of return or market-determined opportunity cost on projects with similar risk

  => From the firm (issuer)'s viewpoint: cost of (raising) capital [because needs to provide return to investors]

- <u>WACC Formula</u>

- *Weighted average of the return required by debt-holders and equity-holders* [i.e. cost of debt and cost of equity]

$$WACC = k' = k_d\left(1 - t_e\right)\left(\frac{D}{V}\right) + k_e\left(\frac{E}{V}\right)$$

where k_d- cost of debt, k_e- cost of equity, t_e- effective company tax rate, D, E– debt & equity market values, firm value $V = D + E$

* Cost of equity could be obtained from the information in the secondary market.

- Interpretations

  => The overall return the firm must earn on its existing assets to maintain the value of its securities [otherwise investors would sell the company's securities].

  => The required return on any investments by the firm that essentially <u>has the same risks as existing operations</u> [the risk of some new projects are not captured by WACC].

- **Each component in WACC - k_d**

  <u>Market interest rate that the firm has to pay on its long term borrowing today</u>

  k_d = Risk-free rate + Default spread (depend on company's rating)

  o **If the firm is rated**, use the rating and a typical default spread on bonds with that rating

Company	S&P Rating	Risk-Free Rate	Default Spread	Cost of Debt
Disney	A	2.75% (US $)	1.00%	3.75%
Deutsche Bank	A	1.75% (Euros)	1.00%	2.75%
Vale	A-	2.75% (US $)	1.30%	4.05%

  o **If not rated**, use the interest rate on a bank loan or estimate a proper default spread based on a <u>synthetic rating</u>

  ➢ Can be estimated by ***using one or a collection of financial ratios***

  ➢ A simple, a common ratio that seems to work best is

  Interest coverage ratio = EBIT/Interest Expenses

If ICoverage Ratio is	Estimated Bond Rating	Default Spread
> 8.50	**AAA**	**0.20%**
6.50 - 8.50	AA	0.50%
5.50 - 6.50	A+	0.80%
4.25 - 5.50	A	1.00%
3.00 - 4.25	A–	1.25%
2.50 - 3.00	BBB	1.50%
2.00 - 2.50	BB	2.00%
1.75 - 2.00	B+	2.50%
1.50 - 1.75	B	3.25%
1.25 - 1.50	B –	4.25%
0.80 - 1.25	CCC	5.00%
0.65 - 0.80	CC	6.00%
0.20 - 0.65	C	7.50%
< 0.20	D	10.00%

- **Each component in WACC - t_e**

  $(1 - t_e)k_d$ reflects tax savings associated with debt

  Under an **imputation tax system**, corporate tax is reimbursed to resident shareholders as tax credits attached to dividends i.e. franking credits.

  Thus, the effective corporate tax rate can be lower than the statutory corporate tax rate (t_c = 30%) *[Small effective tax rate => Small benefits of borrowing]*:

$$t_e = t_c \, (1 - \lambda)$$

where λ is the proportion of corporate tax claimed by shareholders

➤ $\lambda = 0$, a classical tax system; $\lambda = 1$, a pure imputation tax system

➤ λ depends on a proportion of overseas operations/shareholders and whether to distribute profits as fully franked dividends or not

* The WACC equation is from the shareholders' perspective.

- **Each component in WACC - k_e**

=> Two methods to calculate k_e

➤ <u>Discounted cash flow (DCF) approach (Gordon Growth model)</u>

$$P_0 = \frac{D_1}{k_e - g} \Longrightarrow k_e = \frac{D_0(1 + g)}{P_0} + g$$

where D_0 = current period dividend per share

Limitation: - Restriction on the dividend growth rate

- Many companies actually do not pay dividends

- Fail to capture the risks borne by shareholders

➤ <u>Capital asset pricing model (CAPM)</u>

$$k_e = R_f + \beta_e [E(R_M) - R_f]$$

Beta reflects how the underlying stock moves with the market (correlation or diversification measure) => captures the sensitivity of the company's stock return to the market return

Stocks contributing more risk (high β) require a higher expected rate of return for an investor who holds the overall stock market (a fully diversified portfolio)

- **Each component in WACC - Weights**

Weights should be calculated <u>using market values rather than book values</u> [as information regarding cost of equity and cost of debt are obtained from market]

Ideally, use the firm's <u>target (or optimal) capital structure</u> otherwise the calculated WACC would not be optimal and thus helpless

The firm's current capital structure can be used if it's optimally chosen and will not change following the acceptance of the project

- **Single WACC for diversified firm**

=> The problem of using the companywide WACC:

- Likely to accept negative NPV projects

- Likely to have a natural bias towards riskier projects

=> The companywide WACC should **only** be used as a benchmark rate of return for a new project if the project has <u>the same basic risk as the rest of the company</u>. If not, the company needs to find publicly-traded companies in the same industry as the project and obtain their average info.