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Cost of capital & capital structure

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Trend Analysis

Jun 2015	Dec 2015	Jun 2016	Dec 2016	Jun 2017	Dec 2017
12 marks	14 marks	18 marks	9 marks	0	19 marks

1 Principles of capital structure

- Invest in projects that yield a return greater than the minimum required rate of return (hurdle rate).
 - I. The hurdle rate should be higher for riskier projects and reflect the financing mix used - owners' funds (equity) or borrowed money (debt)
 - II. Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders by paying dividends or share repurchase.
- Objective: Maximize the value of the firm

2 Debt and equity

- Forms of equity: Owners' saving, venture capital and common stock
- Forms of debt: Bank loans and bonds

Stages	Start-up	Rapid expansion	High growth	Mature growth	Decline
External financing needs and tools	High but very limited assess	High	Moderate	Declining	Low, approach the end of project life
Internal financing	Low (even negative)	Low (even negative)	Low, relative to funding needs	High, relative to funding needs	More than funding needs
External financing	Owners' equity, bank debt, private equity	Venture capital, common stock (IPO)	Common stock (2 nd issuance), Convertibles, Warrants	Debt (Bonds)	Retire debt, Repurchase stock

Life cycle chart

Throughout the life of the project/ company, it is all about the financing mix of equity and debt and corresponding risk associated.

2.1 Characteristics of debt financing

Benefits of debt

- The use of debt can lower the company overall cost of capital (WACC) before the optimal capital structure is reached (Use debt when you can) in order to maximize the company's value;
- Tax benefit: Allow to deduct interest expenses from your income and reduce taxes. The higher the tax rate, the higher incentives to use debt as fund financing;
- Shift of business risk and financial risk to the equity holders; and
- Add discipline to management: The risk of going bankruptcy due to the inability to fulfil debt repayment will give management the discipline to select and invest in projects which at least earn enough to cover the interest expenses.

Costs of debt

- Expected bankruptcy cost: the higher the financial risk, the higher the cost;
- Agency cost: The greater separation between lender and shareholders, the higher the cost;
 - I. Invest in riskier project than the lender want them to;
 - II. Pay large dividend to shareholders; and
- Loss of future financing flexibilities (decrease in credit rating).

The risks of high gearing

- Increase the cost of financing. The upcoming lenders will request for a higher interest return from the borrowing company since the company is at a high financial risk and lenders need a higher return to compensate the risk they face;

- Increase the bankruptcy risk. The higher in debt level, the higher interest expenses and hence eventually affect the profitability of the company. The ability to repay debt will decrease and hence bankruptcy risk increases;
- Decrease the ability to raise new finance (or limit the ability to borrow/debt capacities decrease);
- High debt level will trigger the covenants in the lenders/debentures contracts:
 - I. Limit the dividend payout;
 - II. Limit the additional debt can be raised;
 - III. Limit on any major fixed assets disposal without the lenders' agreement; and
- Tax shield exhausted. Since the company is no longer making any profit, no tax liabilities will be accumulated and hence nothing to offset the high interest expenses.

2.2 Characteristics of equity financing

Benefits of equity

- No repayment obligation in place, no interest expenses incurred;
- Share the risks and liabilities of company ownership with the new investors;
- Get access to a larger financing pool, the public shares capital market; and
- Better control on the use of funds.

Cost of equity

- Equity fund raising is costly and time consuming;
- Subject to macro financial market and the domestic market factors;
- Give up some level of decision-making authority over your business; and
- Share earnings with all investors.

3 The cost of capital

- The cost of capital is the rate of return that the enterprise must pay to satisfy the providers of funds, and it reflects the riskiness of providing funds;
- It is the cost of funds that a company raises and uses, and the return that investors expect to be paid for putting funds into the company;
- It is therefore the minimum return that a company should make on its own investments, to earn the cash flows out of which investors can be paid their return;
- The cost of capital can therefore be measured by studying the returns required by investors, and then used to derive a discount rate for DCF analysis and investment appraisal;
- The cost of capital is an opportunity cost of finance, because it is the minimum return that investors require; and
- The higher the risk of the investment, the higher the required return from investors and harder to find projects that can meet investors' expectation.

3.1 Why cost of debt is lower than cost of equity

- The cost of debt is likely to be lower than the cost of equity, because debt is less risky from the debt holders' viewpoint;
- In the event of liquidation, the creditor hierarchy dictates the priority of claims and debt finance is paid off before equity;
- This makes debt a safer investment than equity and hence debt investors demand a lower rate of return than equity investors;
- Debt interest is also corporation tax deductible (unlike equity dividends) making it even cheaper to a tax paying company; and
- Arrangement costs are usually lower on debt finance than on equity share issues.

The order of priority

- Secured lenders;
- Legally-protected creditors e.g. tax authorities;
- Unsecured creditors;
- Preference shareholders; and
- Ordinary shareholders.

3.2 The Dividend Valuation Model (DVM)

Formula:

$$P_0 = 1 + \frac{d}{(1 + K_e)^1} + \frac{d}{(1 + K_e)^2} + \dots = \frac{d}{K_e}$$

$$K_e = \frac{d}{P_0}$$

Example from HKICPA Learning Pack

Cygnus has a dividend cover ratio of 4x and expects zero growth in dividends. The company has 1 million \$10 ordinary shares in issue and the market capitalization (value) of the company is \$500 million. After-tax profits for next year are expected to be \$200 million. What is the cost of equity capital?

Solution:

Total dividends = \$200m/ 4 = \$50m

$K_e = \$50M / \$500M = 10\%$

Assumptions:

- Assume the market value of shares is directly related to the expected future dividends on the shares;
- Future dividend is constant (no growth) and paid in perpetuity; and
- P_0 is an ex-dividend share price (the dividend is excluded from the price).

3.2.1 Dividend growth model

Shareholders will normally assume dividends to increase year by year and not to remain constant in perpetuity.

Formula:

$$P_0 = \frac{d_1}{K_e - g} = \frac{d_0 (1 + g)}{K_e - g}$$

Further assumptions:

- Dividends will be growing at a fixed rate;
- Share price is equal to dividends paid in perpetuity discounted at the shareholder's required rate of return.

Example from HKICPA Learning Pack

A share has a Current market value of 96c, and the last dividend was 12C. If the expected annual growth rate of dividends is 4%, Calculate the cost of equity Capital.

Solution:

$$K_e = \frac{d_0 (1+g)}{P_0} + g = \frac{12 (1+0.04)}{96} + 0.04 = 0.13 + 0.04 = 0.17 (17\%)$$

3.2.2 Estimating the growth rate (g)

Method 1: Historic growth

Example from HKICPA Learning Pack

Data for Madjek Ltd is as follows:

Year	Dividends \$m	Earnings \$m
20X1	15	40
20X2	19	51
20X3	21	55
20X4	24	65
20X5	26	70

Calculate the average growth rate, g.

Solution:

Dividend have risen from \$15 million in 20x1 to \$26 million in 20x5. The increase represents four years' growth. The average growth rate, g, may be calculated as:

$$\text{Dividend in 20x1} \times (1+g)^4 = \text{Dividend in 20x5}$$

$$(1+g)^4 = \frac{\text{Dividend in 20x5}}{\text{Dividend in 20x1}} = \frac{\$26}{\$15} = 1.733$$

$$1+g = \sqrt[4]{1.733} = 1.1474$$

$$g = 0.1474 = 14.74\%$$

The growth rate over the last four years is assumed to be expected by the shareholders of Madjek Ltd to continue into the indefinite future. If the company is financed entirely by equity and there are 100,000,000 shares in issue, each with a market value of \$3.35 ex dividend, the cost of equity, K_e , is:

$$K_e = \frac{d_0(1+g)}{P_0} + g = \frac{0.26(1+0.1474)}{3.35} = 23.64\%$$

Method 2: Gordon growth model

Formula:

$$g = bR$$

Where g is the annual growth rate in dividends
 b is the proportion of retained profit after paying dividend
 R is the rate of return on new investments

If a company retain 55% of its earnings for capital investment projects it has identified, and these projects are expected to have an average return of 10%:

$$g = bR = 55\% \times 10\% = 5.5\%.$$

3.2.3 Advantage of DVM

- It is simple to understand and applicable to stable, mature firms that have constant growth in dividends;
- It can be applied to entire market; and
- g can be estimated alternatively by using $g =$ nominal GDP (gross domestic product) growth. Flexible.

3.2.4 Weaknesses of DVM

- The model does not incorporate risk;
- It is not applicable to non-dividend-paying firms. However, companies that pay zero dividends do not have zero share values;
- It always assumes g must be constant, which is not true. Most firms have non-constant growth in dividends; and
- g is only an approximation. If the growth rate is calculated using $g = bR$, then the model assumes that b and R are constant.

- It may be better to use an adjusted trend figure, calculated on the basis of the past few years' dividends. However, dividend estimates may be made from historical trends that may not be a good guide for a future, or derived from uncertain forecasts about future earnings.
- Other influences on share prices are ignored.

3.3 Capital asset pricing model (CAPM)

The CAPM is preferred to estimate the cost of equity since it incorporates risk in the calculation. The CAPM can also calculate the **required return** of a project or a company based on the systematic risk it is facing.

3.3.1 The CAPM formula

$$K_e = r_f + \beta_e (E(r_m) - r_f)$$

Where:

K_e	is the cost of equity capital (Required return)
r_f	is the risk-free rate of return
$E(r_m)$	is the market return
β_e	is the beta factor of the individual security

- The CAPM is based on a comparison of the systematic risk of individual investments with the risks of all shares in the market. It is rewarding investors with the systematic risk they faced in the investment, unsystematic risk can be diversified.
- Risk-free rate is assumed to be the return (yield) provided by the government instruments (E.g. Bonds, notes and bills). To select the best rate, the length of the instruments should be the same as the project does.
- Market return here assumes it is stock market index performance.
- $(E(r_m) - r_f)$ can be presented as equity risk premium or market risk premium in exam.

Examples from HKICPA Learning Pack

Shares in Doe Ltd have a beta of 0.9. The expected returns to the market are 10% and the risk-free rate of return is 4%. What is the cost of equity capital for Doe Ltd.?

Solution:

$$K_e = r_f + \beta_e (E(r_m) - r_f) = 4 + 0.9 (10 - 4) = 9.4\%$$

Example from HKICPA Learning Pack

Explain whether each of the following would have an effect on a JKL Limited's cost of equity if it is solely derived using CAPM ?

- (i) An increase in the base rate by HKMA.
- (ii) An increase in the level of dividends expected to be paid by JKL.
- (iii) An increase in volatility in the Hang Seng.
- (iv) Potential significant changes to JKL's board of directors

Solution:

- (i) If the base rate is increased by the HKMA then this would be expected to lead to an increase in government bond yields. Since this is used as the risk free rate and is a component of expected return in CAPM this would increase the cost of equity.
- (ii) A change in JKL's dividends would have no impact on the cost of equity if CAPM is used for this purpose. CAPM focuses on the total return expected given the level of systematic risk.
- (iii) An increased level of volatility or risk in stock market returns would lead to an increase in the equity risk premium and thus JKL's cost of equity.
- (iv) Although board changes could be considered to increase the total risk for equity investors in JKL, this source of risk is specific to the company and would not be linked to the wider market. CAPM calculates the cost of equity based on the level of a company's systematic risk only (on the assumption that specific risk is diversified away). Therefore JKL's cost of equity calculated using CAPM would be unaffected.

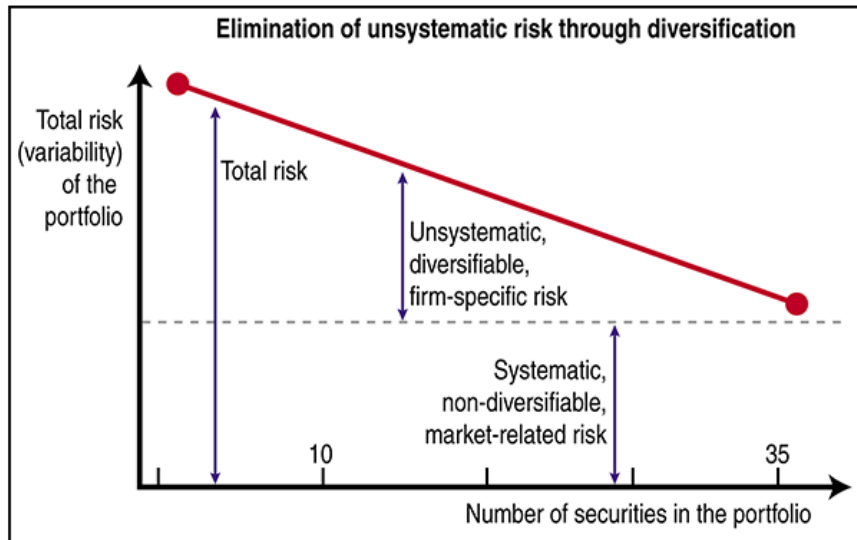
3.3.2 Systematic risk and unsystematic risk

Systematic risk (Market risk); Beta

Systematic risk is the risk due to variations in general market activity. It cannot be diversified away since investors are facing market wide factors such as the state of the economy. Investor is expected to be compensated by facing systematic risk.

Unsystematic risk (Specific risk)

Unsystematic risk is the risk that specifically faced by the company. It can be diversified away since it is the company/industry specific risk factors.



Source: www.working-money.com - Systematic & Unsystematic Risk and CAPM

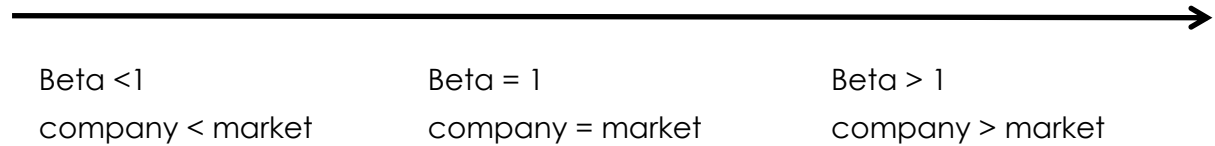
Implications:

- Investor will always require a return in excess of the risk-free rate, to compensate them for systematic risk only;
- Investors should not require a premium for unsystematic risk, because this can be diversified away by holding a wide portfolio of investments;
- Systematic risk varies between companies; investors will require a higher return from shares in those companies where the systematic risk is bigger;
- If an investor wants to avoid risk entirely, he can only invest in risk-free securities;
- If an investor holds a few shares, there will be some unsystematic risk as well as systematic risk in his portfolio, because he hasn't diversified away his unsystematic risk by holding a large enough number of shares; and
- If an investor holds a balanced portfolio, he will only incur systematic risk which is exactly equal to the average systematic risk in the stock market a whole.

3.3.3 Beta factor

Beta measures the systematic risk of a risky investment such as a share in a company.

Increasing risk



The systematic risk depends on the sensitivity of the return of the share to general economic and market factors such as periods of boom and recession.

Factors to determine the value of beta:

- The company's financial gearing (financial risk). High borrowing and interest costs will cause high variations in equity earnings compared with variations in operating profit, increasing the equity beta as equity returns become more variable in relation to the market;
- The sensitivity of the company's cash flow to economic factors (Business risk);
- The company's operating gearing (Business risk). A high level of fixed costs in the company's cost structure will cause high variations in operating profit compared with variations in sales.

3.3.4 The equity risk premium

The equity risk premium ($E(R_m) - R_f$) represents the excess of market returns over those associated with investing in risk-free assets.

For example, if the return on a government stock is 9% and market returns are 13%, the excess return on the market's shares as a whole is 4%.

The difference between the risk-free return and the expected return on an individual security can be measured as the excess return for the market as a whole multiplied by the security's beta factor.

3.3.5 Advantages of CAPM

- It provides a market-based relationship between risk and return, and assessment of security risk and rates of return given that risk;
- It focusses on systematic risk and shows why only systematic risk is important in this relationship;
- It is one the best methods of estimating a quoted company's cost of equity capital;
- It provides a basis for establishing **project specific discount rate** for capital investment project; and
- Works well in practice.

3.3.6 Problems with CAPM

- Actual data inputs are estimates and may be hard to obtain;
- Risk free rate and beta both change daily;
- It may be hard to determine the risk-free rate of return. Government securities are usually taken to be risk-free, but different terms to maturity will give different returns;
- The value of beta is not easy to obtain. Different valuation firms have different figures. Errors in the statistical analysis used to calculate beta values;
- It is hard to estimate market return under different economic environments and the probabilities of the various environments;
- Expected, rather than historical, returns should be used, although historical returns are often used in practice;
- CAPM is a single period model; the cost of equity calculated is not suitable for valuing long term projects. In theory, it should be possible to apply the CAPM for each period, therefore arriving at successive discount rates, one for each year of the project's life.

3.4 The cost of debt

3.4.1 Irredeemable debt capital (Without number of years; perpetuity)

$$\text{Cost of Debt} = \frac{\text{Interest}}{\text{Current ex - interest price}} \quad \& \quad K_d = \frac{i}{P_0} \quad \& \quad K_{dnet} = \frac{i(1-T)}{P_0}$$

$$\text{Value of perpetuity bond } (P_0) = \frac{i}{K_d}$$

Example from HKICPA Learning Pack

Lepus has issued bonds of \$1,000 nominal value with annual interest of 9% per year, based on the nominal value. The current market price of the bonds is \$900. What is the cost of the bonds?

Solution:

$$K_d = \frac{i}{P_0} = \frac{90}{900} = 10\%$$

Example from HKICPA Learning Pack

A company has issued 12% irredeemable bonds in issue with a nominal value of \$1,000. The market price is \$950 ex interest. Calculate the cost of Capital if interest is paid half-yearly.

Solution:

$$\text{Cost of loan capital} = \left(1 + \frac{60}{950}\right)^2 - 1 = 13\%$$

3.4.2 Redeemable debt capital (With defined years)

$$P_0 = 1 + \frac{i(1-t)}{(1+K_d)^1} + \frac{i(1-t)}{(1+K_d)^2} + \dots + \frac{i(1-t) + P_n}{(1+K_d)^n}$$

If the bond is redeemable, all the interest received during the life of the bond and the principal repayment are all considered. **Interpolation** or **financial calculator** can be considered.

$$\text{Interpolation to find IRR} = L + \left[\frac{NPV_L}{(NPV_L + NPV_H)} \times (H - L) \right]$$

Where L = lower cost of capital, for which the NPV is positive
 H = higher cost of capital, for which the NPV is negative
 NPV_L = NPV for the lower cost of capital
 NPV_H = NPV for the higher cost of capital

Example from HKICPA Learning Pack

Owen Ltd has in issue 10% bonds of a nominal value of \$1,000. The market price is \$900 ex interest. Ignoring taxation, calculate the cost of this capital if the bond is:

- (a) irredeemable;
- (b) redeemable at par after 10 years.

Solution

(a) The cost of irredeemable debt capital:

$$K_d = \frac{i}{P_0} = \frac{100}{900} = 11.11\%$$

(b) The cost of redeemable debt capital: The capital profit that will be made from now to the date of redemption is \$100 (\$1,000 - \$900). This profit will be made over a period of 10 years which gives an annualized profit of \$10 which is about 1% of current market value. The best trial and error figure to try first is 12%.

Year		Cash flow \$	Discount factor@12%	Present Value \$	Discount factor@11%	Present Value \$
0	Market Value	(900)	1.000	(900)	1.000	(900)
1-10	Interest Capital	100	5.650	565	5.889	589
10	repayment	1000	0.322	322	0.352	352
				(13)		41

The approximate cost of redeemable debt capital, therefore:

$$11\% + \frac{41}{41 + 13} \times 1\% = 11.76\%$$

Alternative method – Using Financial Calculator (Texas Instruments BA II Plus):

Steps	Descriptions	KEYS	DISPLAY
1	Clearing the calculator	[2 ND] [CLR WORK] & [CLR TVM]	N/A
2	Enter bond price at present	900 [+/-] [PV]	PV = -900
3	Enter redemption value	1000 [FV]	FV = 1000
4	Enter coupon payment	100 [PMT]	PMT = 100
5	Enter number of remaining coupon payments	10[N]	N=10
6	Compute yield to maturity (K_d)	[CPT] [I/Y]	I/Y=11.75

To calculate the cost of debt (IRR) either a linear interpolation or financial calculator approach can be taken-in the exam.

3.4.3 The cost of convertible debt

Depends on whether the conversion is likely to happen. If conversion is not expected, the conversion value is ignored and the bond is treated as redeemable debt, using the IRR method described earlier.

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 i.e. the market value of the shares into which the debt is to be converted.

$$\text{Conversion value} = P_0 (1 + g)^n R$$

P_0 is the current ex-dividend share price

g is the expected annual growth of the share price

n is the number of year to conversion

R is the number of shares received on conversion

Example from HKICPA Learning Pack

A company has issued 8% convertible bonds which are due to be redeemed in five years' time. They are currently quoted at \$820 per \$1,000 nominal. The bonds can be converted into 25 shares in five years' time. The share price is currently \$35 and is expected to grow at a rate of 3% pa. Assume a 16.5% rate of tax. Calculate the Cost of the Convertible debt.

Solution

Conversion value = $P_0 (1+g)^n R = 35 (1+0.03)^5 \times 25 = \$1,014$. As the redemption value is above \$1,000, investors would choose to convert the bonds so the conversion, Value is used in the IRR calculation.

Item and date	Year	Cash flow \$	Present value @ 8% \$	Present value @ 12% \$
Market Value	0	(820)	(820)	(820)
Interest (*)	1-5	67	267	241
Conversion	5	1,014	691	575
NPV			<u>233</u>	<u>(4)</u>

(*) Interest net of tax = $\$80,000 (1 - 0.165) = \$66,800$

The estimated **after-tax cost of debt** is:

$$8\% + \left(\frac{233}{233 + 4}\right) \times (12\% - 8\%) = 11.93\%$$

Example from HKICPA Learning Pack

Bond nature:	8% convertible loan stock
Current market price:	\$860
Current share price:	\$2
Conversion ratio:	400 shares per \$1000 unit of debt.
Conversion period:	7 years later

The debt holder could alternatively redeem the debt at par value.

Required:

Determine whether conversion into shares is likely to take place if the estimated growth rates are 2% and 5% and the cost of debt for each of the growth estimates.

Solutions

Find out the value of the 400 shares in 7 years' time in different growth rate:

When $g = 2\%$:

Share price in year 7 = $\$2 \times (1+0.02)^7 = \2.30

Conversion value = $\$2.30 \times 400 \text{ shares} = \920

Conversion is unlikely to happen since the value from equity is lower than the redemption value of \$1,000.

When $g = 5\%$:

Share price in year 7 = $\$2 \times (1+0.05)^7 = \2.81

Conversion value = $\$2.81 \times 400 \text{ shares} = \$1,126$

Conversion is likely to happen since the value from equity is higher than the redemption value of \$1,000.

Find cost of debt using financial calculator, $g = 2\%$:

Steps	Descriptions	KEYS	DISPLAY
1	Clearing the calculator	[2 ND] [CLR WORK] & [CLR TVM]	N/A
2	Enter bond price at present	860 [+/-] [PV]	PV = -860
3	Enter redemption value	1000 [FV]	FV = 1000
4	Enter coupon payment	80 [PMT]	PMT = 80
5	Enter number of remaining coupon payments	7[N]	N=7
6	Compute yield to maturity (K_d)	[CPT] [I/Y]	I/Y=10.96

Yield to maturity (K_d) is therefore 10.96%.

Find cost of debt using financial calculator, $g = 5\%$:

Steps	Descriptions	KEYS	DISPLAY
1	Clearing the calculator	[2 ND] [CLR WORK] & [CLR TVM]	N/A
2	Enter bond price at present	860 [+/-] [PV]	PV = -860
3	Enter redemption value	1126 [FV]	FV = 1126
4	Enter coupon payment	80 [PMT]	PMT = 80
5	Enter number of remaining coupon payments	7[N]	N=7
6	Compute yield to maturity (K_d)	[CPT] [I/Y]	I/Y=12.33

Yield to maturity (K_d) is therefore 12.33%.

3.4.4 The cost of preference shares

Preference shares pay a fixed rate dividend, which is **not tax-deductible** for the company. The current ex-dividend value P_0 , paying a constant annual dividend d and having a cost of capital K_{pref} :

$$K_{pref} = \frac{d}{P_0} = \frac{\text{Nominal value} \times \text{preference share dividend}}{\text{Preference share current price}}$$

3.5 Factors affecting the cost of capital

Controllable factors affecting the cost of capital:

Capital structure policy

As we have been discussing above, a firm has control over its capital structure, targeting an optimal capital structure. As more debt is issued, the cost of debt increases, and as more equity is issued, the cost of equity increases.

Dividend policy

The more outstanding shares issued, the higher the dividend payout if the company stays at a constant dividend policy. The dividend payout will affect the cost equity.

Investment policy

When making investment decisions, the company is making investments with similar degrees of risk. If a company changes its investment policy relative to its risk, both the cost of debt and cost of equity change.

Covenants and debt capacity

Existing debt may have covenants attached and may prevent or limit opportunities for further borrowing. Breaching covenants may trigger early repayment or other penalties.

Uncontrollable factors affecting the cost of capital:

Level of Interest Rates

The level of interest rates will affect the cost of debt and, potentially, the cost of equity. For example, when interest rate increase the cost of debt increases and increases the cost of capital.

Tax Rates

Tax rates affect the after-tax cost of debt. As tax rates increase, the cost of debt decreases, decreasing the cost of capital.

4 The weighted average cost of capital (WACC)

4.1 Formula

A general formula for the WACC is as follows:

$$WACC = K_e \frac{E}{D + E} + K_d(1 - t) \frac{D}{D + E}$$

Example from HKICPA Learning Pack

A company has the following information in its statement of financial position.

	\$m
Ordinary shares of \$5	250
12% unsecured bonds	100

The ordinary shares are currently quoted at \$13 each and the bonds are trading at \$720 per \$1,000 nominal. The ordinary dividend of \$1.50 has just been paid with an expected growth rate of 10%. Assume corporation tax is currently 16.5%.

Calculate the WACC for this company.

Solution

Market values:

	\$m
Equity (V_e): $\frac{\$250m}{\$5} \times \$13$	650
Bonds (V_d): $\$100m \times 0.72$	<u>72</u>
	<u>722</u>

Cost of equity:

$$K_e = \frac{d_o(1+g)}{P_o} + g = \frac{1.50(1+0.1)}{13} + 0.1 = 0.2269 = 22.69\%$$

Cost of debt:

$$k_d \text{ (before tax)} = \frac{i}{P_o} = \frac{0.12}{0.72} = 0.1667 = 16.67\%$$

$$k_d \text{ (after tax)} = 16.67\% \times (1 - 0.165) = 13.92\%$$

Weighted average cost of capital:

<i>Capital</i>	<i>Cost</i>	<i>Market value</i> (\$m)	<i>Market value × cost</i>
Equity	0.2269	650	147.485
Debt	0.1392	<u>72</u>	<u>10.022</u>
		<u>722</u>	<u>157.507</u>

$$WACC = 157.507/722 = 0.2182 = 21.82\%$$

4.2 Weighting

Two methods of valuation weighting could be used for capital: market value or book value. Market values should always be used for equity and debt if data is available.

Although book values are often easier to obtain, they are based on historical costs and their use will seriously understate the impact of the cost of equity finance on the average cost of capital. If the WACC is underestimated, unprofitable projects will be accepted.

4.3 Limitations of WACC

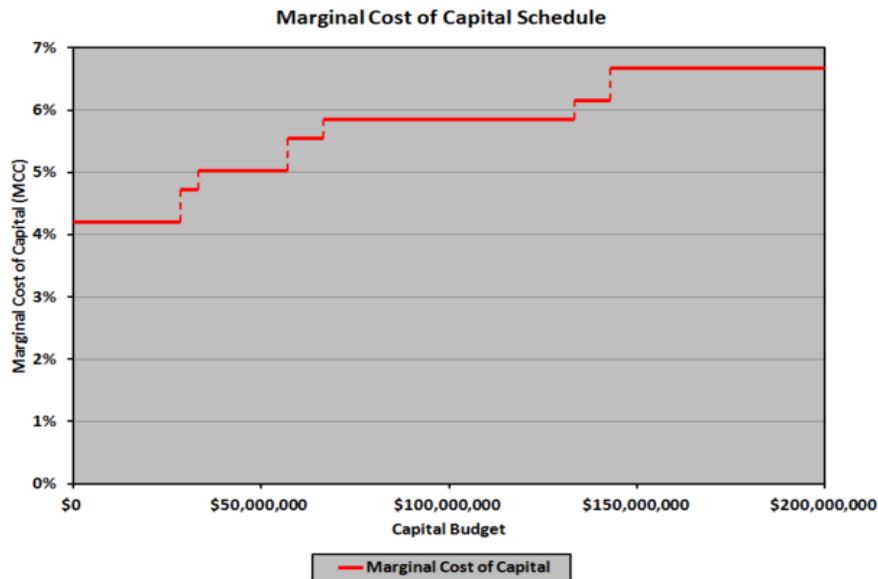
- New investments may have different business risk characteristics from the company's existing operations. It is inappropriate to evaluate a project by using the existing beta which didn't truly representing the risk of the project.
- New investments may have a different funding combination which may affect the existing capital structure substantially. The perceived financial risk may change. However, it is not taken into account into the calculation.
- The terms of risk-free bonds used in determining cost of debt may not always adequately match the terms of the company's debt.
- Floating rate financing is difficult to incorporate into a WACC calculation. A substitution like an "equivalent" fixed interest rate may be used.

4.4 Marginal cost of capital

Marginal cost of capital is the cost of raising one more unit of capital. The more capital to rise, the higher the cost of capital per additional dollar raised.

Suppose your WACC is 4.1% for rising from all sources of financing. But if you are interested to raise one more dollar, you have to pay extra cost and this cost will be marginal cost of capital.

Source: www.financialexamhelp123.com



Example from HKICPA Learning Pack

A company has the following capital structure:

<i>Finance source</i>	<i>After tax cost %</i>	<i>Market value \$m</i>	<i>After tax cost × market value</i>
Equity	12.00	10	1.20
Preference	10.00	2	0.20
Bonds	7.50	8	0.60
		<u>20</u>	<u>2.00</u>

$$\text{Weighted average cost of capital} = \frac{2 \times 100\%}{20} = 10\%$$

The directors have decided to embark on major capital expenditure, which will be financed by a major issue of funds. The estimated project cost is \$3 million, one-third of which will be financed by equity, two-thirds of which will be financed by bonds. As a result of undertaking the project, the cost of equity (existing and new shares) will rise from 12% to 14%. The cost of preference shares and the cost of existing bonds will remain the same, while the after tax cost of the new bonds will be 9%.

Calculate the company's new weighted average cost of capital, and its marginal cost of capital.

Solution

New weighted average cost of capital:

<i>Finance source</i>	<i>After tax cost %</i>	<i>New market value \$m</i>	<i>After tax cost × market value</i>
Equity	14.00	11	1.54
Preference	10.00	2	0.20
Existing bonds	7.50	8	0.60
New bonds	9.00	2	0.18
		<u>23</u>	<u>2.52</u>

$$\text{Weighted average cost of capital} = \frac{2.52 \times 100\%}{23} = 10.96\%$$

$$\text{Marginal cost of capital} = \frac{(2.52 - 2.00) \times 100\%}{(23 - 20)} = 17.33\%$$

4.5 CAPM in investment appraisal

The CAPM produces a required return based on the expected return of the market $E(R_m)$, the risk-free interest rate (R_f) and the variability of project returns relative to the market returns (β).

Its main advantage when used for investment appraisal is that it produces a discount rate which is based on the systematic risk of the individual investment.

It can be used to compare projects of all different risk classes and is therefore superior to an NPV approach which uses only one discount rate for all projects, regardless of their risk.

The model was developed with respect to securities; by applying it to an investment within the firm, the company is assuming that the shareholder wishes investments to be evaluated as if they were securities in the capital market and therefore assumes that all shareholders will hold diversified portfolios and will not look to the company to achieve diversification for them.

Example from HKICPA Learning Pack

Panda is all-equity financed. It wishes to invest in a project with an estimated beta of 1.5. The project has significantly different business risk characteristics from Panda's current operations. The project requires an outlay of \$10,000 and will generate expected returns of \$12,000. The market rate of return is 12% and the risk-free rate of return is 6%. Estimate the minimum return that Panda will require from the project and assess whether the project is worthwhile, based on the figures you are given.

Solution:

Required return of Panda: $E(r) = r_f + \beta_e (E(r_m) - r_f) = 6 + 1.5(12 - 6) = 15\%$

Expected return from the new project = $(12,000 - 10,000)/10,000 = 20\%$

Therefore the project is worthwhile, as expected return exceeds required return.

Example – HKICPA (Cost of capital – Sep 09)

Alfred Sim has recently joined Callimed as the Finance Director. Callimed is a privately-held company selling specialized medical equipment to clinics and hospitals in Hong Kong. When attending his first investment Committee Meeting in Callimed, Alfred noticed that the company does not conduct formal quantitative analysis on investment proposals, and nobody in the committee seems to have any idea about the Company's WACC.

As the Finance Manager of Callimed, you have been requested by the Finance Director to work out the WACC. You have gathered the following financial information about the company.

In Callimed's balance sheet, total asset (\$462M) comprises \$387M of fixed assets and \$75M of current assets. For the liabilities totaling \$165M, the proportion of long-term liabilities (interest bearing) and current liabilities (non-interest bearing) are 80:20, Equity amounts to \$297M.

Companies of a similar business nature and financial position as Callimed have to pay 8.5% to raise long-term financing and are of a beta of 1.18.

The Corporate tax rate is 16%, the yield on a 10-year government bond is 5.5% and the equity risk premium is 8%.

Required:

- (a) Based on the above information, calculate the WACC of Callimed. (10 marks)
- (b) Alfred has asked you to attend the next investment Committee meeting to explain to the committee members about best practices in the estimation of WACC. What would be the points that you will highlight? (8 marks)

Answers (a)

$$K_e = R_f + (\beta_e \times R_P) = 5.5\% + 1.18 \times 8\% = 14.94\%$$

$$K_d (1-t) = 8.5\% \times (1-0.16) = 7.14\%$$

<u>Weighting of debt/equity</u>	<u>HK\$M</u>	<u>%</u>
Long-term debt (165x 0.8)	132	30.8%
Shareholders' equity	297	69.2%
	<u>429</u>	<u>100.0%</u>
<u>WACC</u>		<u>%</u>
Debt (7.14 % x 30.8%)	2.20%	
Equity (14.94 % x 69.2%)	10.34%	
	<u>12.54%</u>	

Answers (b)

1. Weights should be based on market values of debt and equity;
2. The after-tax costs of debts should be estimated from Corporate pre-tax costs;
3. CAPM is currently the preferred model for estimating the cost of equity;
4. Betas are drawn substantially from published sources;
5. The risk-free rate should match the tenor of the cash flows being valued;
6. Although choice of an equity market risk premium is the subject of considerable controversy, most best-practice companies use a premium of 6% or lower while many textbooks and financial advisers use higher figures;
7. Monitoring for changes in WACC should be linked to major changes in financial market conditions, but should be done at least annually; and
8. The WACC should be risk-adjusted to reflect substantive differences among different businesses in a corporation.

Business Valuations

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Trend Analysis

Jun 2015	Dec 2015	Jun 2016	Dec 2016	Jun 2017	Dec 2017
7 marks	6 marks	0	0	0	20 marks

1 Business valuation

For different companies with different corporate actions, different valuation method will be utilized.

In exam, you have to identify the circumstances you are facing:

1. Listed company: Calculate the "fair value" in excess of the current market price of the shares. Takeover acquisition is buying a company's control interest.
2. Unlisted company: No market value can be obtained like listed company. Need to find industry or comparable company's financial data as benchmark.
3. Subsidiary companies: Holding company is selling its subsidiary to a management buyout team or to an external buyer.
4. Disposal of shareholdings.
5. Liquidation, obtain additional finance or re-finance current debt

1.1 Factors to determine the appropriate valuation method

An acquisition can be valued with different valuation method. Prepare to compare the results between different methods and determine the most appropriate methods and state out why.

- Asset combination: high tangible asset or intangible asset;
- Listed or unlisted;
- Buy existing businesses or start from ground zero;
- Relative size; and
- Information availability.

1.2 Range of values

<p>Maximum value (new business, merger and acquisition)</p>	<p>NPV (discount cash flow)</p>	<ul style="list-style-type: none"> ➤ Includes expected synergies ➤ Using cash flows (forecast) instead of profit margin ➤ Incorporate risk by using WACC to discount cash flow
	<p>P/E method or Comparable</p>	<ul style="list-style-type: none"> ➤ In lack of cash flows forecast ➤ Need to find comparable P/E and adjust ➤ Earnings is used instead
<p>Fair value</p>	<p>Dividend valuation (DVM)</p>	<ul style="list-style-type: none"> ➤ Most suitable for valuing a minority interest
<p>Minimum value</p>	<p>Net asset basis</p>	<ul style="list-style-type: none"> ➤ Most suitable for a capital intensive business

2 Asset based valuation method

2.1 Net asset basis

- The net asset value of a share is equal to the net tangible assets divided by the number of shares (net asset value per share).
- Intangible assets (including goodwill) should be excluded, unless they have a market value (for example, patents and copyrights, which could be sold).
- Goodwill, if shown in the accounts, is unlikely to be shown at a true figure for purposes of valuation, and the value of goodwill should be reflected in another method of valuation (for example, the earnings basis method).
- Development expenditure, if shown in the accounts, would also have a value that is related to future profits rather than to the worth of the company's physical assets.

2.2 Choices of asset basis

- **Historical basis** – When assets are valued at historical cost (less depreciation), this is unlikely to give a realistic value as it is dependent upon the business's depreciation and amortization policy.
- **Replacement basis** – This is the cost that would be required to replace the assets and continue using them to operate the business. This method of valuation may be appropriate if the assets are to be used on an **on-going basis**.
- **Realizable basis** – If the assets are to be sold, or the business as a whole **broken up**, it would be appropriate to value them at their net realizable value (= disposal value less costs of disposal). This won't be relevant if a minority shareholder is selling his stake, as the assets will not be disposed of and will continue to be used by the business.

Example from HKICPA Learning Pack

The summary statement of financial position of Cactus Ltd is shown below:

	\$'000	\$'000	\$'000
<i>Non-current assets</i>			
Land and buildings			160,000
Plant and machinery			80,000
Motor vehicles			20,000
			<u>260,000</u>
Goodwill			20,000
<i>Current assets</i>			
Inventory		80,000	
Receivables		60,000	
Short-term investments		15,000	
Cash		5,000	
		<u>160,000</u>	
<i>Current liabilities</i>			
Payables	80,000		
Taxation	<u>20,000</u>		
		<u>(100,000)</u>	
			<u>60,000</u>
			340,000
Provisions for deferred taxation			(10,000)
12% bonds			(60,000)
4.9% preference shares			(50,000)
			<u>220,000</u>
			\$,000
Share capital (8 million shares)			75,000
Reserves			<u>145,000</u>
			<u>220,000</u>

If the figures given for asset values were not questioned, the valuation would be as follows:

	\$'000	\$'000
Total value of assets less current liabilities		340,000
Less intangible asset (goodwill)		<u>(20,000)</u>
Total value of assets less current liabilities		320,000
Less: preference shares	50,000	
bonds	60,000	
deferred taxation	<u>10,000</u>	
		<u>120,000</u>
Net asset value of equity		<u>200,000</u>

Net asset value per share: $\$200,000,000 / 8 \text{ million} = \25

Note. Alternatively, Net asset value of equity = Net assets \$220m less Goodwill \$20m = \$200 million

Reminder: The above sample is a good example showing how to get an appropriate NAV. Preference shares, goodwill, bonds and deferred taxation are being taken away under the calculation of NAV per ordinary shares.

2.3 Factors to consider when acquiring valuation

- The cost incurred for professional asset valuation;
- The accuracy of quantifying the liabilities, e.g., deferred taxation; the existence of contingent liabilities; and any balancing tax charges arise on disposal;
- Current assets proper valuation (e.g. receivables and inventories);
- Retrieve hidden liabilities which are not shown on financial statements (e.g. environmental problems, unresolved tax issues, pending legal issues);
- The availability of the market value of all assets and whether the estimation reported on the financial statement is correct; and
- An appropriate valuation of the shareholdings being sold.

2.4 Use of net asset basis

The net assets basis of valuation might be used in the following circumstances:

- As a “**floor value**” for a business that is up for sale – shareholders will be reluctant to sell for less than the net asset valuation.
- As a measure of the “**security**” in a share value or the **asset backing value** per share of a company.

If the company went into liquidation, the investor could not expect to receive the full value of his shares that is estimated on earnings basis since the company has no more future expectation.

- As a measure of comparison in a scheme of merger. Higher asset backing company can exchange more new company shares than lower does on a per share basis to reflect their difference in asset value.

3 The Dividend Valuation Model (DVM)

The dividend valuation method is based on the future expected stream of income from the security and discounted at a suitable cost of capital.

Example from HKICPA Learning Pack

Stam Ltd paid a dividend of \$2.5 million this year. The current return to shareholders of companies in the same industry as Stam is 12%, although it is expected that an additional risk premium of 2% will be applicable to Stam, being a smaller and unlisted company. What is the expected valuation of Stam if:

- the current level of dividend is expected to continue into the foreseeable future, or
- the dividend is expected to grow at a rate of 4% pa into the foreseeable future,
- the dividend is expected to grow at a 3% annual rate for three years and 2% each year afterwards?

Cost of equity $k_e = 12\% + 2\% = 14\%$ (0.14)

Current year dividend $d_0 = \$2.5$ million

Solution

Scenario 1

$$P_0 = \frac{d_0}{k_e} = \frac{\$2.5\text{m}}{0.14} = \$17.857 \text{ million}$$

Scenario 2

$g = 4\%$ or 0.04

$$P_0 = \frac{d_0(1+g)}{(k_e - g)} = \frac{2.5(1+0.04)}{(0.14 - 0.04)} = \$26 \text{ million}$$

Scenario 3

$g = 3\%$ Time 0 to Time 3

$g = 2\%$ (0.02) from Time 3 to infinity

	<i>Time 1</i>	<i>Time 2</i>	<i>Time 3</i>	<i>Time 4 onwards</i>
Dividend (\$m)	2.580	2.660	2.740	2.790
Annuity to infinity $\frac{1}{(k_e - g)}$				8.333
Present value at year 3				23.25
Discount factor @ 14%	0.877	0.769	0.675	0.675
	<u>2.260</u>	<u>2.050</u>	<u>1.850</u>	<u>15.690</u>

Total = \$21.85 million

Make sure you are familiar with the assumptions and limitations of the DVM which are discussed in detail in Chapter 13.

4 Earnings valuation bases

4.1 P/E ratios

$$P/E \text{ ratio} = \frac{\text{Market value}}{EPS}$$

Market value per share = EPS x P/E ratio

Market capitalization (i.e. total share value) = P/E ratio × Total earnings

$$\text{Earnings per share (EPS)} = \frac{\text{Profit or loss attributable to ordinary shareholders}}{\text{Weighted avg. \# of outstanding shares}}$$

The EPS could be a **historical EPS** or a **prospective future EPS**. For a given EPS figure, a higher P/E ratio will result in a higher price.

4.2 Significance of high P/E ratio

- Expectations that the EPS will grow rapidly: A high price is being paid for future profit prospects. Usually small and fast growing companies will have high P/E.
- Security of earnings: A well-established low-risk company would be valued on a higher P/E ratio than similar company whose earnings are subject to greater uncertainty.
- Listed or unlisted: If a listed company (the bidder) made a share-for-share takeover bid for an unlisted company (the target), it would normally expect its own shares to be valued on a higher P/E ratio than the target company's shares.

This is because a listed company ought to be a lower-risk company and it has shares that are listed on a stock market that can be readily sold.

The P/E ratio of an unlisted company's shares might be around 50% to 60% of the P/E ratio of a similar public company with a full stock exchange listing.

4.3 Problems with using listed company P/E ratio to value unlisted company

- Finding a listed company with a similar range of activities may be difficult. MNCs usually are diversified and may not appropriate for unlisted company;
- Different companies may have different size, range of products, and growth;
- The listed company may have a different capital structure to the unlisted company. (e.g. debt ratio);
- A single year's P/E ratio may not be a good basis, if earnings are volatile, or the listed company's share price is at an abnormal level; and
- Lagging P/E only reflect the past. It is a wrong estimation to use historical data to value how the unlisted company will do in the future.

4.4 Factors affecting the use of P/E ratio

- General economic and financial conditions;
- The type of industry and the prospects of that industry. Use of current P/E ratios may give an unrealistically low valuation if these ratios are affected by a lack of confidence throughout the industry;
- Marketability. The market in shares, which do not have a stock exchange listing, is always a restricted one and a higher yield is therefore required;
- The reliability of profit estimates and the past profit record. Use of profits and P/E ratios over time may give a more reliable valuation, especially if compared with industry levels over that time;
- Gearing. A relatively high gearing ratio will generally mean greater financial risk for ordinary shareholders and call for a higher rate of return on equity; and
- The bidder may need to be particularly careful when valuing an unlisted company of using a P/E ratio of a "similar" listed company. The bidder should obtain reasonable evidence that the listed company does have the same risk and growth characteristics.

4.5 Use of a bidder's P/E ratio

A bidder company may sometimes use their higher P/E ratio to value a target company. This assumes that the bidder can improve the target's business, which may be a dangerous assumption to make. It may be better to use an adjusted industry P/E ratio, or some other method.

4.6 Use of forecast earnings

When one company is thinking about taking over another, it should look at the target company's forecast earnings, not just its historical results. Forecasts of earnings growth should only be used if:

- there are good reasons to believe that earnings growth will be achieved;
- a reasonable estimate of growth can be made;
- forecast supplied by the target company's directors are made in good faith and using reasonable assumptions and fair accounting policies.

Example from HKICPA Learning Pack

Flycatcher Public Company wishes to make a takeover bid for the shares of an unlisted company, Mayfly Company. The earnings of Mayfly over the past five years have been:

	\$m
20X1	5.0
20X2	7.2
20X3	6.8
20X4	7.1
20X5	7.5

The average P/E ratio of listed companies in the industry in which Mayfly operates is 10. Listed companies which are similar in many respects to Mayfly are:

- Bumblebee Public Company, which has a P/E ratio of 15, but is a company with very good growth prospects
- Wasp Public Company, which has had a poor profit record for several years, and has a P/E ratio of 7

What would be a suitable range of valuations for the shares of Mayfly?

What earnings to use?

Average earnings over the last five years have been \$6.72 million, and over the last four years \$7.15 million. There might appear to be some growth prospects, but estimates of future earnings are uncertain.

A low estimate of earnings in 20X6 would be, perhaps, \$7.15 million.

A high estimate of earnings might be \$7.5 million or more. This solution will use the most recent earnings figure of \$7.5 million as the high estimate.

What P/E ratio to use?

A P/E ratio of 15 (Bumblebee's) would be much too high for Mayfly, because the growth of Mayfly's earnings is not as certain, and Mayfly is an unlisted company.

On the other hand, Mayfly's expectations of earnings are probably better than those of Wasp.

A suitable P/E ratio might be based on the industry's average (10) but since Mayfly is an unlisted company and therefore more risky, a lower P/E ratio might be more appropriate, perhaps 60% to 70% of 10 (i.e. 6 or 7) or conceivably even as low as 50% of 10 (i.e. 5).

The valuation of Mayfly's shares might therefore range between:

- high P/E ratio and high earnings: $7 \times \$7.5\text{m} = \52.5 million
- low P/E ratio and low earnings: $5 \times \$7.15\text{m} = \35.75 million

4.7 The earnings yield valuation method

$$\text{Earnings yield (EY)} = \frac{\text{EPS}}{\text{Market price per share}} \times 100\%$$

$$\text{Market value} = \frac{\text{Earnings}}{ET} \text{ or } = \frac{\text{Earnings} \times (1 + g)}{(K_e - g)} \quad (g = \text{growth})$$

Example from HKICPA Learning Pack

A company has the following results:

	20X1	20X2	20X3	20X4
	\$m	\$m	\$m	\$m
Profit after tax	6.0	6.2	6.3	6.3

The company's cost of capital is 12%.

$$\text{Market value} = \frac{\text{Earnings} \times (1 + g)}{(K_e - g)}$$

Earnings = \$6.3 million

$K_e = 12\%$

$$g = \sqrt[3]{\frac{6.3}{6.0}} - 1 = 0.0164 \text{ or } 1.64\%$$

$$\text{Market value} = \frac{6.3 \times 1.0164}{0.12 - 0.0164} = \$61.81 \text{ million}$$

5 Discounted Cash Flow (DCF) based valuation method

Free cash flow to firm (FCFF; Business Enterprise Value) represents cash flow that is available to pay interest and principal to lenders and dividends to shareholders.

FCFF = Net profit + Depreciation + Amortization – Capital expenditure +/- Change in net working capital

Net working capital which is defined as non-cash current assets less non-interest bearing current liabilities (an increase in net working capital is subtracted and a decrease in net working capital is added).

Free cash flow to equity (FCFE; Equity Value) = FCFF – debt repayments and lease obligations

Equity share value = Value of firm – Net debt, where net debt is defined as interest-bearing debt less cash.

5.1 Using FCFF

Since FCFF represents cash flows to all investors (debt and equity) in the firm, the discount rate used to compute the present value of future expected FCFF must be the “average” required return of these investors. The appropriate discount rate is the WACC.

The FCFF formula **with constant growth**:

$$PVCF = \frac{FCFF_0 (1 + g)}{WACC - g} = \frac{FCFF_1}{WACC - g}$$

Assume cash flow no change over time or **perpetuity model**, $g=0$:

$$PVCF = \frac{FCFF_0}{WACC}$$

Two stage growth model, initial period of very high growth and followed by a period of much lower growth

$$PVCF = \sum_{t=1}^n \left(\frac{FCFF^t}{(1+WACC)^t} + \frac{P_n}{(1+WACC)^n} \right) \text{ and } P_n = \frac{FCFF_{n+1}}{(WACC - g)}$$

g is the long-run growth rate in $FCFF_t$ in the two-stage growth model

P_n is the present value of the price at which the share is expected to be sold at year n .

The above formulas can be explained by 2 components:

- The present value of cash flows to shareholders paid in the high growth period that lasts until year n
- The present value of the price (P_n) at which the share is expected to be sold at year n (usually called the "terminal value").

The constant growth model provides this terminal value, which is then discounted to a present value and added to the present value of the cash flows earned up to and including year n .

5.2 Select an appropriate cost of capital

- The business risk of the new investment may not be the same as the investing company.
- The method of finance of the new investment may not match the current debt/equity mix of the investing company. And hence affect the new WACC to be used.

5.3 Drawbacks of cash flow methods

- Appropriate cost of capital may prove difficult.
- Future cash flow may be difficult to estimate.
- Cash flows are only most appropriate for valuing controlling interests.

Examples from HKICPA Learning Pack

A company's sales in the previous year (just ended) were HK\$150 million. It is expected that the growth rate in sales will be 16% per year for the next four years and from year 5 onwards, expected sales growth will be 5% per annum in perpetuity.

The pre-tax operating profit margin will be 25%. A one-off after tax cost of \$8 million will be required in year 1 for a special marketing programme. Depreciation will be 10% of EBIT. Annual capital expenditure will be 11% of sales each year. The weighted average cost of capital of the company is 11%. The tax rate is 17.5% of annual earnings.

The outstanding debt level is currently at \$20 million. Assume that there will be no increase in working capital in spite of the increase in sales.

Required

Assuming that it is now the end of year 0, calculate the equity value of the company using the discounted cash flow model. (Work in HK \$million, to 1 decimal place)

Year	0	1	2	3	4	5 <i>onwards</i>
Sales growth		16.0%	16.0%	16.0%	16.0%	5.0%
Sales	150.0	174.0	201.8	234.1	271.6	285.2
<i>Cash flows:</i>		\$m	\$m	\$m	\$m	\$m
EBIT (Sales × 25%)		43.5	50.5	58.5	67.9	71.3
Less: tax (EBIT × 17.5%)		(7.6)	(8.8)	(10.2)	(11.9)	(12.5)
Less: One-off cost		(8.0)				
Add back depreciation (EBIT × 10%)		4.4	5.1	5.9	6.8	7.1
Capital expenditure (Sales × 11%)		(19.1)	(22.2)	(25.8)	(29.9)	(31.4)
Free Cash Flow		13.2	24.6	28.4	32.9	34.5
Year 4 value of cash flows from year 5 (see Working)					<u>575.0</u>	
Total		13.2	24.6	28.4	607.9	
Discount factor: 11%		0.901	0.812	0.731	0.659	
NPV		<u>11.9</u>	<u>20.0</u>	<u>20.8</u>	<u>400.6</u>	

Total NPV = 453.3m

	HK\$m
NPV of free cash flows	453
Less: debt	(20)
Value of equity	<u>433</u>

WORKING

Given that cash flows will increase by 5% each year in perpetuity from year 4 onwards, the PV of cash flows from year 5 in perpetuity can be calculated in terms of year 4 PV as follows:

$$PV = \frac{\text{Cash flow at T5}}{(WACC - g)} = \frac{\$34.50}{(0.11 - 0.05)} = \$575$$

6 The comparable method

The comparable method examines data on comparable firms. In many industries there are well recognized benchmarks that are used for valuation purposes such as the price/earnings (P/E) ratio and Enterprise Value/EBITDA ratio.

6.1 P/E method for comparable

$$P_0 = P \times \frac{EPS_{firm}}{EPS_{industry}}$$

This model estimates the share price of a firm as the product of a price/earnings per share ratio and the firm's earnings per share.

The P/E ratio to be used is typically determined by taking the average of the P/E ratios for similar companies within the same industry. A similar company is one that has comparable growth, risk, financial leverage and dividend payout.

The P/E ratio and EPS can be measured on a "trailing" basis using current EPS or on a "forward" basis using expected (or next year's) EPS.

6.2 Enterprise value using EBIT and EBITDA

$$EV_0 = EV \times \frac{EBIT_{firm}}{EBIT_{industry}} \text{ or } = EV \times \frac{EBITDA_{firm}}{EBITDA_{industry}}$$

Enterprise Value (EV) is the sum of the market value of equity plus the book value of interest-bearing debt less cash.

The EV/EBIT (or EV/EBITDA) ratio is typically determined by taking the average of the EV/EBIT (or EV/EBITDA) ratios of similar firms within the same industry.

The choice between the EV/EBIT and EV/EBITDA multiples is usually not critical, although the EV/EBITDA multiple is preferred if either depreciation or amortization charges distort earnings or make comparisons difficult. Again EBIT or EBITDA can be measured on either a "trailing" or a "forward" basis.

6.3 Using the comparable approach

The process for valuing the equity stake in a firm involves the following steps:

Step 1: Choose a set of comparable firms.

Step 2: Choose the most appropriate multiple for the firm.

Step 3: Compute the average multiple across the comparable firms.

Step 4: Estimate the base for the firm being valued. For example, if using the P/E ratio, we need to estimate EPS for the firm being valued.

Step 5: Where the total firm has been valued, rather than just the equity stake, subtract the value of other claims such as debt and preference shares.

7 The valuation of debt

7.1 Irredeemable debt

For irredeemable bonds where the company will go on paying interest every year in perpetuity, without ever having to redeem the loan.

Market value is determined by what investors are prepared to pay and is found by discounting the interest received by the investor at the investor's required return (K_d).

An alternative approach is to apply the post-tax cost of debt for the company (K_{dnet}) to the post-tax interest

$$P_0 = \frac{I}{K_d} \text{ \& } = \frac{I(1 - tax)}{K_{dnet}}$$

For any perpetuity bonds issued at par value (sell at \$1000 per unit to the market), the **before tax cost of debt** is equal to the **coupon rate**.

7.2 Redeemable debt

The valuation of redeemable debt depends on future expected receipts.

The market value is the discounted present value of future interest receivable, up to the year of redemption, plus the discounted present value of the redemption payment.

$$P_0 = \frac{I}{(1 + K_d)^1} + \frac{I}{(1 + K_d)^2} + \dots + \frac{I + P_n}{(1 + K_d)^n}$$

P_n = redemption value of the bond at maturity (often par value of the bond)

7.3 Convertible debt

The current market value of a convertible bond where conversion is expected is the sum of the present values of the future interest payments and the present value of the bond's conversion value.

$$\text{Conversion value} = P_0 (1 + g)^n R$$

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

7.4 Preference shares

Preference shares pay a fixed rate dividend, which is not tax-deductible for the company. The current ex-dividend value P_0 , paying a constant annual dividend d and having a cost of capital K_{pref} :

$$P_0 = \frac{d}{K_{pref}}$$

Examples from HKICPA Learning Pack

GHI Limited has 5% convertible bonds in issue. Under the terms of the issue, in 4 years time, the bonds can be redeemed at par or converted by the holder into ordinary shares on the basis of 40 EFG shares for each \$1000 of nominal value. The EPS of GHI Ltd is 85c and GHI shares currently trade on a P/E of 20. Earnings are expected to grow at 4% per annum in real terms and inflation is expected to be 3% per annum. Assuming GHI shares continue to trade on a P/E of 20, calculate the value of GHI convertible bonds per \$1,000 of nominal value.

Nominal growth in earnings is expected to be $= 1.04 \times 1.03 - 1 = 7.12\%$

In 4 years earnings will be $1.0712^4 \times 85c = 111.92c$

So if P/E is unchanged, shares will be worth \$22.38 ($111.92c \times 20$).

Shares if converted would be worth \$895.2 ($40 \times \22.38).

Other Examples: Multistage growth

Consider a stock with dividends that are expected to grow at 25% per year for three years. After three years they are expected to grow at 6% per year to perpetuity. The last dividend paid was \$ 1.50, and $k_e = 11\%$. Calculate the value of this stock using the multistage growth model.

Answer:

Calculate the dividends over the high-growth period:

$$D1 = D0(1 + g) = 1.50(1.25) = \$ 1.875$$

$$D2 = D1(1 + g) = 1.875(1.25) = \$ 2.34 \text{ (rounded up)}$$

$$D3 = D2(1 + g) = 2.34(1.25) = \$ 2.93$$

$$D4 = D3(1 + g) = 2.93(1.25) = \$ 3.66$$

Although we increase $D3$ by the high growth rate of 25% to get $D4$, $D4$ will grow at the constant growth rate of 6% for the foreseeable future. Use the constant growth model formula with $D4$ to get $P3$, a $T = 3$ value for all the (infinite) dividends expected from end of year 3 onward.

$$P3 = \frac{D4}{K_e - g} = \frac{3.66}{0.11 - 0.06} = 73.2$$

Finally, we can sum the present values of dividends 1, 2, and 3 and of $P3$ to get the present value of all the expected future dividends during both the high- and constant growth periods:

$$\frac{1.875}{(1.11)} + \frac{2.34}{(1.11)^2} + \frac{2.93}{(1.11)^3} + \frac{73.2}{(1.11)^3} = 59.25$$

Mergers and acquisitions

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Trend Analysis

Jun 2015	Dec 2015	Jun 2016	Dec 2016	Jun 2017	Dec 2017
0	0	0	20 marks	0	14 marks

1 Mergers and acquisitions (M&A)

1.1 Definitions

Merger describes a combination of two companies of roughly equal size.

Acquisition describes the purchase of a smaller company by a larger company.

Reverse takeover: the smaller company takes over the larger one, so that the predator (acquirer) has to increase its equity by over 100% to complete the takeover.

Horizontal merger is one in which one company acquires another company in the same line of business. Acquiring the competitor's company can reduce competition and dominant in market shares.

Vertical merger (backward/ forward) is merger between firms that operate at different stages of the same production chain, or between firms that produce complementary goods.

Conglomerate merger is merger which is neither vertical nor horizontal; a company acquires another company in an unrelated line of business.

Synergy is where the value of the combined company is greater than the sum of the value of the individual firms. It is a $1+1 = 3$ effect.

1.2 Advantages

- **Speed.** The acquisition of another company is a quicker way of implementing a business plan or enters a market.
- **Synergy and lower cost.** An acquisition may be a cheaper way of acquiring productive capacity than starting a new business. The initial cost could be huge. A combined organization may be able to use equipment capacity, warehouse space or office space more efficiently, so that costs can be saved.

Management synergy occurs when the management of the acquiring company can manage the assets of the target company better than the incumbent management, so creating additional value for the new owners over

and above the current market value of the company.

- An acquisition can take place, for instance, through an exchange of shares which does not have an impact on the financial resources of the firm.
- **Acquisition of intangible assets.** A firm through an acquisition will acquire not only tangible assets but also intangible assets, such as brand recognition, reputation, customer loyalty and intellectual property.
- **Access to overseas markets and increase market power.** When a company wants to expand its operations in an overseas market, acquiring a local firm may be the only option of breaking into that market.

1.3 Disadvantages

- **Exposure to business risk.** Acquisitions normally represent large investments by the bidding company and account for a large proportion of their financial resources. If the acquired company does not perform as well as it was envisaged, then the effect on the acquiring firm may be catastrophic.
- **Exposure to financial risk.** During the acquisition process, the acquiring firm may have less than complete information on the target company, and there may exist aspects that have been kept hidden from outsiders.
- **Acquisition premium.** When a company acquires another company, it normally pays a premium over its present market value.
- **Managerial competence.** When a firm is acquired, which is large relative to the acquiring firm, the management of the acquiring firm may not have the experience or ability to deal with operations on the new larger scale, even if the acquired company retains its own management.
- **Integration problems.** Most acquisitions are beset with problems of integration, as each company has its own culture, history and ways of operation.

2 Criteria for choosing an appropriate target for acquisition

- **Benefit of acquiring undervalued company.** The target firm should trade at a price below the estimated value of the company when acquired.
- **Diversification.** The target firm should be in a business which is different from the acquiring firm's business and the correlation in earnings should be low to avoid increased exposure to the same market.
- **Operating synergy.** The target firm should be in the same business in order to create cost savings through economies of scale, or it should be able to create a higher growth rate through increased monopoly power.
- **Increase the debt capacity.** The target firm should have capital structure such that its acquisition will reduce insolvency risk and will result in increasing its debt capacity.
- **Access to cash resources.** A company with significant cash resources or highly cash generative product lines.
- **Control of the company.** In this case the objective is to find a target firm which is badly managed and whose stock has underperformed the market. The bidding company therefore believes that the assets of the target company will generate for them a greater return than for their current owners.
- **Access to key technology.** Some companies do not invest significantly in R&D but acquire their enabling technologies by acquisition.
- **Disposal of cash slack.** This is where a cash rich company seeks a development target.
- **Tax savings.** The target company should have large claims to be set off against taxes and not sufficient profits.

3 Synergies

3.1 Sources of operating synergy

3.1.1 Revenue synergy

Revenue synergy exists when the acquisition of the target company will result in higher revenues for the acquiring company, higher return on equity or a longer period of growth.

- Increased market power by cross-selling into a new customer base
- Marketing synergies by sharing distribution channels
- Strategic synergies by accessing to new markets (diversification)
- Reduce competition

Revenue synergies are more difficult to quantify relative to financial and cost synergies. Usually estimated by quantitative analysis or compare with last year performance, not the most appropriate but still can explain most of the changes.

3.1.2 Cost synergy

Cost synergy results primarily from the existence of economies of scale.

- Headcount reduction
- Elimination of surplus facilities
- Reduced overheads (e.g. Accounting, IT and marketing)
- Increased purchasing power (greater bargaining power with suppliers)

As the level of operation increases, the marginal cost falls and this will be manifested in greater operating margins for the combined entity.

3.2 Sources of financial synergy

3.2.1 Lower cost of capital

Reduce in business risk and financial risk (assume the target has a healthy financial status) can significantly reduce the cost of capital of a combined company.

3.2.2 Increased debt capacity

By combining two firms, each of which has little or no capacity to carry debt, it is possible to create a firm that may have the capacity to borrow money and create value.

Diversification will lead to an increase in debt capacity and an increase in the value of the firm.

3.2.3 Utilize cash slack

When a firm with significant excess cash acquires a firm, with great projects but insufficient capital, the combination can create value.

The additional value of combining these two firms lies in the present value of the projects that would not have been taken if they had stayed apart, but can now be taken because of the availability of cash.

3.2.4 Tax benefits

The tax paid by two firms combined together may be lower than the taxes paid by them as individual firms.

If one of the firms has tax deductions that it cannot use because it is losing money, while the other firm has income on which it pays significant taxes, the combining of the two firms can lead to tax benefits that can be shared by the two firms.

The value of this synergy is the present value of the tax savings that accrue because of this merger.

The assets of the firm being taken over can be written up to reflect new market value, in some forms of mergers, leading to higher tax savings from depreciation in future years.

4 Due diligence

Due diligence is the process of investigation into a potential investment, usually involves an examination of operations and management and the verification of material facts.

SFC requires that the management of a company performs the necessary due diligence, prior to any merger or acquisition.

Purpose: determine that the information about the company to be acquired is correct, accurate, and properly disclosed.

Due diligence is not just about checking the financials. These other areas include the people, IT systems, the environment and intellectual property.

The scope of a due diligence project needs to be defined carefully in an engagement letter. The process of due diligence is usually carried out by a team whose members have expertise in various relevant functional areas.

4.1 Different dimensions in due diligence

Commercial due diligence

- Top down analysis
- Understanding the stage of the organization in its life cycle
- The link with strategy
- Strategic analysis, including SWOT and Porter's five forces
- The changing environment: environmental, social and political risks

Financial due diligence

- The statement of financial position
- Contingencies, capital commitments, leases, etc.
- Intangibles - measuring and managing IP, brands, goodwill, etc.
- Forecasts - identifying variables most at risk

Legal due diligence

- Getting the corporate legal structure right
- Understanding legal documents, such as Sale & Purchase agreements
- The legal environment: Takeovers Code, Employment Law, etc.
- Tax implications: Capital gains, assessed losses, etc.

Other areas: Corporate culture, IT, Intellectual property and Environmental due diligence

- Understanding the people perspective
- Identifying environmental risks
- Quantifying the costs of meeting any continuing and/or future obligations.

4.2 Due diligence and the SFC

Due diligence processes in Hong Kong have come under increasing scrutiny in the last few years, with suspicions that due diligence was not always as rigorous as it should be.

After several listed companies experienced high-profile financial difficulties, in 2012, the SFC published proposals for changes to the rules on due diligence, following a period of consultation.

Among the SFC proposals is a recommendation that the law should be clarified so that sponsor firms have criminal as well as civil liability for defective prospectuses.

Criminal liability should depend on whether a sponsor firm knowingly or recklessly approved a prospectus containing an untrue statement (including an omission) which was materially adverse from an investor's perspective.

5 Payment methods

5.1 Cash purchases

A cash offer can be financed in the following ways:

- Retained earnings
- Raise cash through equity market – this will increase the number of shares of the predator company
- Divest existing assets
- A loan facility from a bank – medium term and secured.
- Bond issuance - the act of issuing bonds will alert the markets to the intentions of the company to bid for another company and it may lead investors to buy the shares of potential targets, raising their prices.
- **Mezzanine finance** - are short-to-medium term and unsecured; have a much higher rate of interest than secured debt (typically 3% to 5% above HIBOR); often give the lender the option to exchange the loan for shares after the takeover.

Illustration from HKICPA Learning Pack

For example, suppose that there are two companies:

	<i>Big Co.</i>	<i>Small Co.</i>
Net assets (book value)	\$1,500,000	\$200,000
Number of shares	100,000	10,000
Earnings	\$2,000,000	\$40,000

Big Co. negotiates a takeover of Small Co. for \$400,000 in cash.

As a result, Big Co. will end up with:

- (a) Net assets (book value) of
 $\$1,500,000 + \$200,000 - \$400,000 \text{ cash} = \$1,300,000$
- (b) 100,000 shares (no change)
- (c) Expected earnings of \$2,040,000, minus the loss of interest (net of tax) which would have been obtained from the investment of the \$400,000 in cash which was given up to acquire Small Co.

5.2 Share exchange

One company can acquire another company by issuing shares to pay for the acquisition. The new shares might be issued:

- in exchange for shares in the target company. Therefore, if A Inc. acquires B Co., A Inc. might issue shares which it gives to B Co.'s shareholders in exchange for their shares.

The B Co shareholders therefore become new shareholders of A Inc. This is a takeover for a "paper" consideration. Paper offers will often be accompanied by a cash alternative.

5.3 Use of convertible bonds

Alternative forms of paper consideration, including debentures, loan stock and preference shares, are not so commonly used, due to:

- difficulties in establishing a rate of return that will be attractive to target shareholders
- the effects on the gearing levels of the acquiring company
- the change in the structure of the target shareholders' portfolios
- the securities being potentially less marketable, and possibly lacking voting rights

Issuing convertible bonds will overcome some of these drawbacks, by offering the target shareholders the option of partaking in the future profits of the company if they wish.

5.4 The choice between a cash offer and a share offer

The choice between cash and paper offers (or a combination of both) will depend on how the different methods are viewed by the company and its existing shareholders, and on the attitudes of the shareholders of the target company.

- Firms which believe that their stock is undervalued will not use stock to do acquisitions.
- Firms which believe that their stock is over or correctly valued will use stock to do acquisitions.
- The premium paid is larger when an acquisition is financed with stock rather than cash.
- There might also be a tax rationale for using stock. Cash acquisitions create tax liabilities to the selling firm's stockholders.
- The use of stock to finance a merger may be a sign of an agency problem, trying to exploit the information advantage the acquirer has over the target firm's shareholders.

Company and existing shareholders	
Dilution of EPS	Fall in EPS attributable to existing shareholders may occur if purchase consideration is in equity shares
Cost to the company	Use of loan stock to back cash offer will attract tax relief on interest and have lower cost than equity. Convertible loan stock can have lower coupon rate than ordinary stock
Gearing	Highly geared company may not be able to issue further loan stock to obtain cash for cash offer
Control	Control change considerably if large number of new shares issued
Authorized share capital increase	May be required if consideration is in form of shares. This will involve calling a general meeting to pass the necessary resolution
Borrowing limits increase	General meeting resolution also required if borrowing limits have to change

Shareholders in target company	
Taxation	If consideration is cash, many investors may suffer immediate liability to tax on capital gain
Income	If consideration is not cash, arrangement must mean existing income is maintained, or be compensated by suitable capital gain or reasonable growth expectations
Future investments	Shareholders who want to retain stake in target business may prefer shares
Share price	If consideration is shares, recipients will want to be sure that the shares retain their values

5.5 Earn-out arrangements

The purchase consideration may not all be paid at the time of acquisition. Part of it may be deferred, payable upon the target company reaching certain performance targets.

The consideration can be structured like an initial amount payable at the time of acquisition, with a minimum amount of deferred consideration in, e.g., 3 years' time.

6 Valuation of a M&A

6.1 Market capitalization

Market capitalization or market share price can be very important during a takeover bid.

Companies that make takeover bids with a share exchange offer are always concerned that the market value of their shares should not fail during or after the takeover.

6.2 EPS before and after a takeover

If one company acquires another by issuing shares, its EPS will **go up or down** according to the P/E ratio at which the target company has been bought.

- If the target company's shares are valued at a **lower P/E ratio**, the **predator company's shareholders** will benefit from a **rise in EPS**.
- If the **target company's shares** are **bought** at a **higher P/E ratio** than the predator company's shares, the predator company's shareholders will suffer a **fall in EPS**.

Examples from HKICPA Learning Pack

Giant Inc. takes over Tiddler Co. by offering two shares in Giant for one share in Tiddler. Details about each company are as follows:

	<i>Giant Inc.</i>	<i>Tiddler Co.</i>
Number of shares	2,800,000	100,000
Market value per share	\$4	–
Annual earnings	\$560,000	\$50,000
EPS	20c	50c
P/E ratio	20	

By offering two shares in Giant worth \$4 each for one share in Tiddler, the valuation placed on each Tiddler share is \$8, and with Tiddler's EPS of 50c, this implies that Tiddler would be acquired on a P/E ratio of 16. This is lower than the P/E ratio of Giant, which is 20.

If the acquisition produces no synergy, and there is no growth in the earnings of either Giant or its new subsidiary Tiddler, then the EPS of Giant would still be higher than before, because Tiddler was bought on a lower P/E ratio. The combined group's results would be as follows:

Number of shares (2,800,000 + 200,000)	<i>Giant group</i> 3,000,000
Annual earnings (560,000 + 50,000)	610,000
EPS	20.33c

If the P/E ratio is still 20, the market value per share would be \$4.07 (20.33 × 20), which is 7c more than the pre-takeover price.

Examples from HKICPA Learning Pack

Redwood Inc. agrees to acquire the shares of Hawthorn Co. in a share exchange arrangement. The agreed P/E ratio for Hawthorn's shares is 15.

	<i>Redwood Inc.</i>	<i>Hawthorn Co.</i>
Number of shares	3,000,000	100,000
Market price per share	\$2	–
Earnings	\$600,000	\$120,000
P/E ratio	10	

The EPS of Hawthorn Co. is \$1.20, and so the agreed price per share will be $\$1.20 \times 15 = \18 . In a share exchange agreement, Redwood would have to issue nine new shares (valued at \$2 each) to acquire each share in Hawthorn, and so a total of 900,000 new shares must be issued to complete the takeover.

After the takeover, the enlarged company would have 3,900,000 shares in issue and, assuming no earnings growth, total earnings of \$720,000. This would give an EPS of:

$$\frac{\$720,000}{3,900,000} = 18.5c$$

The pre-takeover EPS of Redwood was 20c, and so the EPS would fall. This is because Hawthorne has been bought on a higher P/E ratio (15 compared with Redwood's 10).

Examples from HKICPA Learning Pack

Buying companies with a higher P/E ratio will result in a fall in EPS unless there is profit growth to offset this fall. For example, suppose that Starving Inc. acquires Bigmeal Inc., by offering two shares in Starving for three shares in Bigmeal. Details of each company are as follows:

	<i>Starving Inc.</i>	<i>Bigmeal Inc.</i>
Number of shares	5,000,000	3,000,000
Value per share	\$6	\$4
Annual earnings		
Current	\$2,000,000	\$600,000
Next year	\$2,200,000	\$950,000
EPS	40c	20c
P/E ratio	15	20

Starving Inc. is acquiring Bigmeal Inc. on a higher P/E ratio, and it is only the profit growth in the acquired subsidiary that gives the enlarged Starving group its growth in EPS.

Number of shares $(5,000,000 + 3,000,000 \times \frac{2}{3})$	<i>Starving group</i> 7,000,000
---	------------------------------------

Earnings

If no profit growth $(2,000,000 + 600,000) = \$2,600,000$ EPS would have been 37.14c

With profit growth $(2,200,000 + 950,000) = \$3,150,000$ EPS will be 45c

If an acquisition strategy involves buying companies on a higher P/E ratio, it is therefore essential for continuing EPS growth that the acquired companies offer prospects of strong profit growth.

6.3 Net assets per share (APS)

There are circumstances where a dilution of earnings is acceptable if any of the following benefits arise as a result of:

- Earnings growth
- Quality of earnings acquired is superior
- Dilution of earnings compensated by an increase in net asset backing

Examples from HKICPA Learning Pack

Intangible Inc. has an issued capital of 2,000,000 ordinary shares. Net assets (excluding goodwill) are \$2,500,000 and annual earnings average \$1,500,000. The company is valued by the stock market on a P/E ratio of 8. Tangible Co. has an issued capital of 1,000,000 ordinary shares. Net assets (excluding goodwill) are \$3,500,000 and annual earnings average \$400,000. The shareholders of Tangible Co. accept an all-equity offer from Intangible Inc. valuing each share in Tangible Co. at \$4.

Required

Calculate Intangible Inc.'s earnings and assets per share before and after the acquisition of Tangible Co..

Answer

- (a) Before the acquisition of Tangible Co., the position is as follows:

$$\text{Earnings per share (EPS)} = \frac{\$1,500,000}{2,000,000} = 75\text{c}$$

$$\text{Assets per share (APS)} = \frac{\$2,500,000}{2,000,000} = \$1.25$$

- (b) Tangible Co.'s EPS figure is 40c ($\$400,000 \div 1,000,000$), and the company is being bought on a multiple of 10 at \$4 per share. As the takeover consideration is being satisfied by shares, Intangible Inc.'s earnings will be diluted because Intangible Inc. is valuing Tangible Co. on a higher multiple of earnings than itself. Intangible Inc. will have to issue 666,667 ($4,000,000/6$) shares valued at \$6 each (earnings of 75c per share at a multiple of 8) to satisfy the \$4,000,000 consideration. The results for Intangible Inc. will be as follows:

$$\text{EPS} = \frac{\$1,900,000}{2,666,667} = 71.25\text{c} \text{ (3.75c lower than the previous 75c)}$$

$$\text{APS} = \frac{\$6,000,000}{2,666,667} = \$2.25 \text{ (\$1 higher than the previous \$1.25)}$$

If Intangible Inc. is still valued on the stock market on a P/E ratio of 8, the share price should fall by approximately 30c ($8 \times 3.75\text{c}$, the fall in EPS) but because the asset backing

$\left(\frac{\text{Net assets excluding goodwill}}{\text{Shares}} \right)$ has been increased substantially the company will probably now be valued on a higher P/E ratio than 8.

The shareholders in Tangible Co. would receive 666,667 shares in Intangible Inc. in exchange for their current 1,000,000 shares, that is, two shares in Intangible for every three shares currently held.

The shareholders in Tangible Co. would receive 666,667 shares in Intangible Inc. in exchange for their current 1,000,000 shares, that is, two shares in Intangible for every three shares currently held.

(a) **Earnings**

	\$
Three shares in Tangible earn ($3 \times 40c$)	1.200
Two shares in Intangible will earn ($2 \times 71.25c$)	1.425
Increase in earnings, per three shares held in Tangible	<u>0.225</u>

(b) **Assets**

	\$
Three shares in Tangible have an asset backing of ($3 \times \$3.5$)	10.50
Two shares in Intangible will have an asset backing of ($2 \times \$2.25$)	4.50
Loss in asset backing, per three shares held in Tangible	<u>6.00</u>

The shareholders in Tangible Co. would be trading asset backing for an increase in earnings.

Examples from HKICPA Learning Pack

Roytel Inc. is a ready-meal preparing company for schools in Gooland. The market for school meals is satiated and there are few profitable investment opportunities for the company in its current line of business. The board has decided to look outside the ready-meal sector into other sectors for possible candidates for acquisition. They have narrowed down the potential candidates to two: Quinnon Co. which owns a number of hotels in the south east of Gooland, and Geranium Co. which owns a number of leisure centres for children in the area of Katycille, which is the capital of Gooland.

The current return on assets and the expected future growth rate in annual earnings for the three companies are shown below:

	<i>Roytel</i>	<i>Quinnon</i>	<i>Geranium</i>
Return on assets (%)	25	17	20
Growth rate in annual earnings (%)	2	6	5

The income statements and the statements of financial position of the three companies are:

INCOME STATEMENTS (all figures in \$)

	<i>Roytel</i>	<i>Quinnon</i>	<i>Geranium</i>
Net operating income	23.71	8.91	18.4
Interest on debt	1.50	1.20	1.20
Profit before taxation	22.21	7.71	17.2
Taxes	6.66	2.31	5.16
Net income	15.55	5.40	12.04
Number of shares (millions)	5	1	2
Earnings per share	3.11	5.40	6.02

STATEMENTS OF FINANCIAL POSITION

	<i>Roytel</i>	<i>Quinnon</i>	<i>Geranium</i>
Debt	15	12	12
Equity	80	40	80
Total assets	95	52	92

The directors of Quinnon have indicated that they would be prepared to support a takeover bid from Roytel on the basis of 5 Roytel shares for every 2 shares in Quinnon.

The directors of Geranium have indicated that they would be prepared to support a takeover bid from Roytel on the basis of 2 Roytel shares for every 1 share in Geranium.

Required

Calculate the expected effect on the EPS of Roytel if either takeover (but not both) were to occur on the basis of share-for-share exchange as indicated.

Answer

This analysis is based on the following assumptions:

- EPS is calculated for the current year, to indicate what EPS would have been if the takeover had occurred last year.
- EPS is also calculated for next year, on the assumption that total earnings for the businesses of the three companies grow at the rate indicated.

EPS based on current year performance

	<i>Roytel acquiring Quinnon</i>	<i>Roytel acquiring Geranium</i>
Number of new shares in the combined company	7.5	9
Total earnings of the combined company:		
Roytel business	15.55	15.55
Quinnon/Geranium business	5.40	12.04
Total	<u>20.95</u>	<u>27.59</u>
EPS in the combined company	2.79	3.07
Change in EPS of Roytel shareholders	-0.32	-0.04

EPS based on next year performance

	<i>Roytel acquiring Quinnon</i>	<i>Roytel acquiring Geranium</i>
Number of new shares in the combined company	7.5	9
Total earnings of the combined company:		
Roytel business (+ 2%)	15.86	15.86
Quinnon/Geranium business (+ 6%/5%)	5.72	12.64
Total	<u>21.58</u>	<u>28.50</u>
EPS in the combined company	2.88	3.17
Change in EPS of Roytel shareholders	-0.23	+0.06

The acquisition of Geranium would have the least effect on Roytel's EPS.

7 Effect of offer on financial position and performance

7.1 Effects on earnings

Failures of takeovers often result from inadequate integration of the companies after the takeover has taken place.

There is a tendency for senior management to devote their energies to the next acquisition rather than to the newly-acquired firm.

The higher the P/E ratio of the acquiring firm compared to the target company, the greater the increase in earnings per share (EPS) to the acquiring firm.

Dilution of EPS occurs when the P/E ratio paid for the target exceeds the P/E ratio of the acquiring company.

The size of the target's earnings is also important; the larger the target's earnings are relative to the acquirer, the greater the increase to EPS for the combined company.

The following examples will illustrate these points.

Examples from HKICPA Learning Pack

Greer Company has plans to acquire Holt Company by exchanging stock. Greer will issue 1.5 shares of its stock for each share of Holt. Financial information for the two companies is as follows:

	<i>Greer</i>	<i>Holt</i>
Net income	\$400,000	\$100,000
Shares outstanding	200,000	25,000
Earnings per share	\$2.00	\$4.00
Market price of stock	\$40.00	\$48.00

Greer expects the P/E Ratio for the combined company to be 15.

Required

What is the expected share price after the acquisition?

Answer

Combined earnings = \$400,000 + \$100,000 = \$500,000

Combined shares = 200,000 shares + (25,000 × 1.5) = 237,500

Combined EPS = $\frac{\$500,000}{237,500} = \2.11

Expected price of stock = expected P/E ratio × combined EPS = 15 × \$2.11 = \$31.65

Examples from HKICPA Learning Pack

Romer Company will acquire all of the outstanding stock of Dayton Company through an exchange of stock. Romer is offering one of its shares for every two shares in Dayton. Financial information for the two companies is as follows:

	<i>Romer</i>	<i>Dayton</i>
Net income	\$50,000,000	\$12,000,000
Shares outstanding	5,000,000	2,000,000
Earnings per share	\$10.00	\$6.00
Market price of stock	\$150.00	
P/E ratio	15	

Required

- Calculate the number of shares to be issued by Romer.
- Calculate combined EPS after the acquisition, assuming no synergy.
- Calculate the P/E ratio valuation of shares in Dayton
- Compare the P/E ratio valuation of Dayton with the pre-acquisition P/E ratio of Romer
- Calculate maximum price that Romer could pay before dilution of its EPS occurred

Answer

- Shares to be issued by Romer: 2 million shares in Dayton $\times \frac{1}{2} = 1$ million shares in Romer.

- Combined EPS: $\frac{\$50,000,000 + \$12,000,000}{5,000,000 + 1,000,000} = \10.33

- P/E ratio valuation of shares in Dayton: $\frac{\$12,000,000}{1,000,000 \text{ shares}} = 12$

- Dayton is acquired on a P/E ratio valuation of 12, which is less than the pre-acquisition P/E ratio of Romer. Consequently the P/E ratio after the acquisition will increase, even without any synergy effect on annual profitability.

- Maximum price before dilution of EPS:

There will be no dilution of EPS if Dayton is purchased on a P/E ratio multiple of 15, which is the P/E ratio of Romer before the acquisition (and assuming no synergy effect on post-acquisition profits).

Combined earnings after the acquisition = \$62,000,000

EPS (no change): \$10

Number of shares = \$62,000,000/\$10 per share = 6,200,000

Romer has 5,000,000 shares in issue before the acquisition, and there would be no dilution in EPS if it issued 1,200,000 new shares to acquire Dayton. This would involve a share exchange of 3 new shares in Romer for every 5 shares in Dayton.

Examples from HKICPA Learning Pack

In this example we investigate the effects of a takeover of the financial position of a company. ABC Co. is planning to bid for DEZ Company. The acquisition will be funded by cash which ABC will borrow.

STATEMENT OF FINANCIAL POSITION OF ABC

	<i>Assets</i>		<i>Liabilities</i>
	\$m		\$m
Non-current assets	600	Short-term liabilities	30
Equity investments	20	Long-term liabilities	100
Receivables	15	Share capital	50
Cash	45	Reserves	500
	<u>680</u>		<u>680</u>

STATEMENT OF FINANCIAL POSITION OF DEZ COMPANY

	<i>Assets</i>		<i>Liabilities</i>
	\$m		\$m
Non-current assets	80	Short-term liabilities	10
Equity investments	5	Long-term liabilities	10
Receivables	25	Share capital	50
Cash	10	Reserves	50
	<u>120</u>		<u>120</u>

This is a cash offer funded entirely by the issue of debt. The company makes an offer of \$120 million which is raised by issuing corporate bonds worth \$120 million.

STATEMENT OF FINANCIAL POSITION OF ABC AFTER THE OFFER

	<i>Assets</i>		<i>Liabilities</i>
	\$m		\$m
Non-current assets	600	Short-term liabilities	30
Equity investments	20	Long-term liabilities	220
Receivables	15	Share capital	50
Cash	45	Reserves	500
Investment	<u>120</u>		<u>800</u>
	<u>800</u>		<u>800</u>

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	<i>Assets</i>		<i>Liabilities</i>
	\$m		\$m
Non-current assets	680	Short-term liabilities	40
Equity investments	25	Long-term liabilities	230
Receivables	40	Share capital	50
Cash	55	Reserves	500
Goodwill	<u>20</u>		<u>820</u>
	<u>820</u>		<u>820</u>

8 The global regulatory framework

8.1 Introduction

Takeover regulation is an important corporate governance device in protecting the interests of all stakeholders, as the agency problem can have a significant potential impact on mergers and acquisitions.

Takeover regulation is an important corporate governance device that seeks to protect the interests of minority shareholders and other types of stakeholders and ensure a well- functioning market for corporate control.

8.2 Potential conflicts of interest

Takeover regulation seeks to regulate the conflicts of interest between the management and shareholders of both the target and the bidder.

There are two main agency problems that emerge in the context of a takeover that regulation seeks to address:

- The first is the protection of minority shareholders. In addition to existing minority shareholders, transfers of control may turn existing majority shareholders of the target into minority shareholders.

- The second is the possibility that the management of the target company may implement measures to prevent the takeover even if these are against stakeholder interests.

9 Key aspects of takeover regulation

9.1 The mandatory bid rule

The aim of this rule is to protect minority shareholders by providing them with the opportunity to exit the company at a fair price once the bidder has accumulated a certain percentage of the shares.

The bidder is normally required to offer to the remaining shareholders a price not lower than the highest price for the shares already acquired during a specified period prior to the bid.

9.2 The principle of equal treatment

In general terms, the principle of equal treatment requires the bidder to offer to minority shareholders the same terms as those offered to earlier shareholders from whom the controlling block was acquired.

9.3 Transparency of ownership and control

The disclosure of information about major shareholdings is an important element of investor protection and a well-functioning corporate market.

The transparency enables the regulator to monitor large shareholders, minimize potential agency problems and investigate insider dealing.

It also enables both minority shareholders and the market to monitor large shareholders who may be able to exercise undue influence or exact benefits at the expense of other shareholdings.

9.4 The squeeze-out and sell-out rights

Squeeze-out rights gives the bidder who has acquired a specific percentage of the equity (usually 90%) the right to force minority shareholders to sell their shares.

Sell-out rights enable minority shareholders to require the majority shareholder to purchase their shares.

9.5 The one share-one vote principle

Where the one share-one vote principle is upheld, arrangements restricting voting rights are forbidden.

Differentiated voting rights, such as non-voting shares and dual-class shares with multiple voting rights, enable some shareholders to accumulate control at the expense of other shareholders and could provide a significant barrier to potential takeovers.

The effect of the break-through rule, where this is allowed by corporate law, is to enable a bidder with a specified proportion of the company's equity to break-through the company's multiple voting rights and exercise control, as if one share-one vote existed.

9.6 Board neutrality and anti-takeover measures

Seeking to address the agency issue where management may be tempted to act in their own interests at the expense of the interests of the shareholders, several regulatory devices propose board neutrality.

For instance, the board would not be permitted to carry out post-bid aggressive defensive tactics (such as selling the company's main assets, known as crown jewels defense, or entering into special arrangements giving rights to existing shareholders to buy shares at a low price, known as poison pill defense), without the prior authority of the shareholders.

10 Hong Kong specific takeover regulation

The Codes on Takeovers and Mergers and Share Buy-Backs (together 'the Codes') have been issued by the SFC in consultation with the Takeovers and Mergers Panel (the Panel).

10.1 The purpose of the Codes

The primary purpose of the Codes is to afford fair treatment for shareholders who are affected by takeovers, mergers and share buy-backs. The Codes seek to achieve fair treatment by requiring equality of treatment of shareholders, mandating disclosure of timely and adequate information to enable shareholders to make an informed decision as to the merits of an offer and ensuring that there is a fair and informed market in the shares of companies affected by takeovers, mergers and share buy-backs. The Codes also provide an orderly framework within which takeovers, mergers and share buy-backs are to be conducted.

The Codes are non-statutory and although the Codes are not laws, the courts will look at the procedures to ensure that they operate fairly.

(Note: In a takeover, there could be a risk that some shareholders will not be informed about a bid for their company, so that they cannot make an informed decision about whether or not to accept the offer. There is also a risk that some shareholders might be treated more favorably than others, for example by receiving a better price for their shares than others. The Codes set out standards of conduct and behavior for everyone involved in a takeover or merger, including the directors of the companies concerned, their professional advisers, and other participants in the financial markets.)

The Takeovers Code does not apply to offers for non-voting, non-equity capital unless required by the hearings of the Panel and The Takeovers Appeal Committee (LP 15 Regulatory).

10.2 The general principles

- 1) All shareholders are to be treated even-handedly and all shareholders of the same class are to be treated similarly.

- 2) If control of a company changes or is acquired or is consolidated, a general offer to all other shareholders is normally required. Where an acquisition is being considered as a result of which a person may incur an obligation, he must, before making the acquisition, ensure that he can and will continue to be able to implement such an offer.
- 3) During the course of an offer, or when an offer is in contemplation, neither an offeror company ("Offeror"), nor the Offeree ("Offeree"), nor any of their respective advisers may furnish information to some shareholders which is not made available to all shareholders. This principle does not apply to the furnishing of information in confidence by the Offeree to a bona fide potential Offeror, or vice versa.
- 4) An Offeror should announce an offer only after careful and responsible consideration. The same applies to making acquisitions which may lead to an obligation to make a general offer. In either case the Offeror and its financial advisers should be satisfied that it can and will continue to be able to implement the offer in full.
- 5) Shareholders should be given sufficient information, advice and time to reach an informed decision on an offer. No relevant information should be withheld. All documents must, as in the case with a prospectus, be prepared with the highest possible degree of care, responsibility and accuracy.
- 6) All persons concerned with offers should make full and prompt disclosure of all relevant information and take every precaution to avoid the creation or continuance of a false market. Parties involved in offers must take care that statements are not made which may mislead shareholders or the market.
- 7) Rights of control should be exercised in good faith and the oppression of minority or noncontrolling shareholders is always unacceptable.
- 8) Directors of an Offeror and the Offeree must always, in advising their shareholders, act only in their capacity as directors and not have regard to their personal or family shareholdings or to their personal relationships with the companies. They should only consider the shareholders' interests taken when they are giving advice to shareholders. Directors of the Offeree should give careful consideration before they enter into any commitment with an Offeror (or anyone

else) which would restrict their freedom to advise their shareholders. Such commitments may give rise to conflicts of interest or result in a breach of the directors' fiduciary duties.

- 9) At no time after a bona fide offer has been communicated to the board of the Offeree, or after the board of the Offeree has reason to believe that a bona fide offer might be imminent, may the board of the Offeree take any action in relation to the affairs of the company, without the approval of shareholders in general meeting, which could effectively result in any bona fide offer being frustrated or in the shareholders being denied an opportunity to decide on its merits.
- 10) All parties concerned with transactions subject to the Codes are required to cooperate to the fullest extent with the Executive, the Panel and the Takeovers and Mergers Appeal Committee, and to provide all relevant information.

10.3 Rules of the Codes

A takeover or merger begins with an offer to the board of the Offeree. The offer should be made to the board of the Offeree (or its advisers) before it is announced to the public. The board of the Offeree has a right to satisfy itself that the bidder (Offeror) will be in a position to implement its bid in full. It is then usually the responsibility of the **Offeree to make the public announcement** about the offer and its details.

On receiving the offer, the board of the Offeree is required, in the interests of the shareholders, to set up **a committee of independent non-executive directors** which should make a recommendation about whether the offer appears to be fair and reasonable and a recommendation about acceptance. The Offeree **should also appoint an independent financial adviser**. The recommendation of the independent committee and the written advice of the financial adviser should be **included in a circular** that the board of the Offeree is required to send to shareholders about the bid.

After receiving a bid, the board of the Offeree **must not take any measures that may frustrate the bid**, such as issue more shares or sell some of the company's assets. During the offer, information about the companies involved must be made equally available to all shareholders, as nearly as possible at the same time.

The Offeror is required to post an offer document to the shareholders in the Offeree within 21 days of the announcement of the offer. Within the next 14 days, the directors of the Offeree must send a **circular** to the shareholders, containing information to help them reach a decision. Documents must also be filed with the Executive (The Codes are administered by the Executive, that is the Executive Director of the Finance Division of the SFC and his staff.) before they are released or published, and cannot be released or published until the Executive states that it has no further comments to make.

An offer is often conditional, which means that the Offeror will only buy shares in the target company if certain conditions are met. A condition as to acceptances is that the offer will not proceed unless acceptances of the offer are received from holders of over 50% of the shares. The offer must be kept open for 21 or 28 days, during which time shareholders in the Offeree can send in their acceptances. If the offer is then declared unconditional as to acceptances, it must then be kept open for a further 14 days to give the other shareholders time to submit acceptances. Except with the consent of the Executive, the board of the Offeree cannot announce any material new information (such as trading results, a profit forecast or a proposal to make a dividend payment) after the 39th day following the posting of the offer document to the Offeree shareholders. This is called the 39-day rule.

Dealings in shares of the Offeree may take place during the offer period. Details of **any shares purchased in the market by the Offeror** must be publicly disclosed. If the Offeror buys shares in the Offeree after the public announcement of the offer at a price that is more favorable than the offer price, it must **raise its offer price** to not less than the highest price paid for any of the shares it has acquired. In addition, the Offeror cannot buy shares in the Offeree from some shareholders on more favorable terms than it has offered to other shareholders. These rules are designed to prevent an Offeror from offering a better deal to some shareholders than to others.

The offer period cannot last longer than 7:00 pm on the 60th day after the offer document was posted. The results of the bid are announced and if acceptances are sufficient, the offer is declared unconditional and the Offeror buys the shares of the shareholders who have accepted the offer. If the Offeror acquires at least 90% of the shares it is trying to acquire, it has a right of compulsory purchase of the remaining minority still held by other shareholders.

10.4 Mandatory general offer

Under Rule 26 of the Code, the SFC requires a mandatory offer to be made to all the shareholders of the Offeree by the Offeror in the following circumstances, unless a waiver is granted by the Executive:

- (i) when any person (or two or more persons acting in concert) acquires, whether by a series of transactions over a period of time or not, 30% or more of the voting rights of a company; and
- (ii) when any person (or two or more persons acting in concert) holding not less than 30% and not more than 50% of the voting rights of a company, acquires additional voting rights that increase his or their holding of voting rights by more than 2% from the lowest percentage holding by that person (or the concert group) in the preceding 12 months period. This is commonly referred to as the 'creeper' provision.

10.5 Waiver of mandatory offer

When the issue of new securities as consideration for an acquisition, or a cash subscription, or the taking of a scrip dividend, would otherwise result in an obligation to make a general offer under Rule 26 of the Code, the Executive will usually waive the obligation if there is an independent vote, on a poll, at a shareholders' meeting (which is commonly known as the 'whitewash' procedure). Independent vote means a vote by shareholders who are not involved in, or interested in, the transaction in question. However, the Executive will not normally grant a waiver if:

- (i) the person to whom the new securities are to be issued or any person acting in concert with him has acquired voting rights in the company (save for subscriptions for new shares which have been fully disclosed in the whitewash circular) in the 6 months prior to the announcement of the proposals but subsequent to negotiations or discussions with the directors of the company in relation to the proposed issue of new securities; or
- (ii) voting rights have been acquired or disposed of by such persons without the Executive's prior consent in the period between the announcement of the proposals and the completion of the subscription.

11 Defensive tactics

Target company may decide to contest an offer on several grounds:

- The terms are poor and unacceptable
- No obvious advantages
- Founder members, existing management and employees may be strongly opposed to the bid.

11.1 Summary of defensive tactics

Tactic	Explanation
Golden parachute	Large compensation payments made to the top management of the target firm if their positions are eliminated due to hostile takeover. This may include cash or bonus payments, stock options.
Poison pill	This is an attempt to make a company unattractive by giving the right to existing shareholders to buy shares at a very low price.
White knights	The white knight would act as a friendly counter-bidder.
Crown jewels	Selling The firm's most valuable assets or sale and leaseback, the firm is making itself less attractive as a target.
Pacman defense	This defense is carried out by mounting a counter-bid for the attacker. It is aggressive and will only work where the original acquirer is a public company with diverse shareholdings. This tactic also appears to suggest that the company's management is in favor of the acquisition but they disagree about which company should be in control.
Litigation or regulatory defense	The target company can challenge the acquisition by inviting an investigation by the regulatory authorities or through the courts. The target may be able to sue for a temporary order to stop the predator from buying any more of its shares.

12 The role of the financial adviser in M&A

While the SFC Codes on Takeovers and Mergers and Share Buy-backs do not have the force of law in Hong Kong, they do have some important provisions regarding the role of financial advisers in mergers and takeovers (M&A).

Among other things, the Code states; "Financial and other professional advisers must have the competence, professional expertise and adequate resources to fulfil their role and to discharge their responsibility under the Code. Financial advisers must also be mindful of conflicts of interest.

At present the majority of M&A advice is provided by full service investment banks. There is likely to be more than one financial adviser involved on a given M&A transaction. Both the bidder and the target will retain at least one financial adviser.

The actual role performed by financial advisers will differ from deal to deal, but on acquisition of a large listed public company, might include:

- advice on the approach to the deal, including strategy and negotiation tactics;
- assistance with the assembly of a team of advisers including legal adviser, financiers, management consultants; and other independent experts;
- advice on the valuation of the target company;
- advice on the optimal capital structure for the deal, which will then impact how the deal may best be financed;
- advice on the proposed arrangements to finance the deal, including working with the proposed financier or brokerage firm;
- assistance with the co-ordination of due diligence, but not actually performing of the due diligence exercise;
- advice on the likely stock market reaction to the proposed deal, in conjunction with other professional firms (such as a brokerage firm); and
- coordinate with the legal advisers in the documentation for the deal.

13 Reasons of high failure rate of acquisitions

- Agency problems: It suggests that takeovers are primarily motivated by the self-interest of the acquirer's management.

The common idea of these explanations is that acquisitions is a process that results in value being transferred from the shareholder of the acquiring firm to the managers of the acquiring firm.

- Management of the acquiring company is over-confidence and acquires too many companies at high price level. As a result, the merger fails as the subsequent performance cannot compensate for the high price paid.
- Managers make mistakes in the evaluation of the target value.
- The acquiring firm didn't perform a comprehensive due diligence.
- Managers only want to present a better financial picture in the short term.
- **Market overvaluation:** If a firm's stocks are overvalued in the short run, he has an incentive to exchange the overvalued stocks to real assets before the market corrects the overvaluation. It is not related to either synergies or better management.
- **Pre-emptive theory:** An acquiring firm pursue value-decreasing horizontal merger if it fears that one of its rivals will gain large cost savings or synergies from taking over some other value-decreasing firms.