Valuation for Acquisitions and Mergers

- Asset-based Valuation
- Market relative Models
- Cash flow Models

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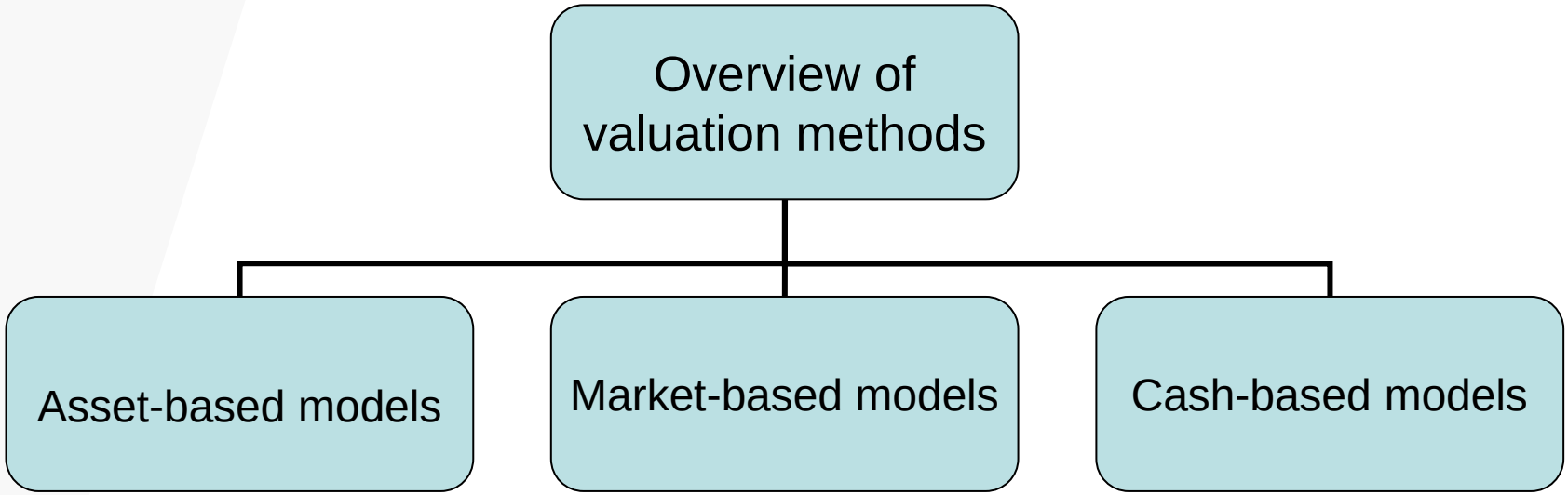
Overview of valuation methods



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Principles of business valuation

The importance of Negotiation

- None of the valuation methods give a “right answer” for the value of the firm.
- Be prepared to calculate a range of values and discuss the pros and cons of each method.
- In practice, the actual price paid will depend on the bargaining power and negotiating skills of the buyer and seller.

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Type of acquisitions

Impact of acquisition on acquirer's risk profile post-acquisition

Type of Acquisitions	Change in acquirer's Business Risk?	Change in acquirer's Financial Risk?
Type I	NO	NO
Type II	NO	YES
Type III	YES	YES

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Asset based models

Asset-based models

- Use statement of financial position as starting point
- This technique is sometimes used to estimate a **minimum value for a unquoted company that is in financial difficulties or is difficult to sell**.
- Can be used as a **starting point** for negotiating the acquisition price for a small company. A **premium** is normally negotiated based either on a multiple of the firm's profits or an estimated value of the company's intangible assets. Where the valuation is based **on book value plus a premium** this is called a '**book value-plus'** model.

Asset based Valuation

Asset valuation models

Possible bases of asset valuation

- **Historic basis –** unlikely to be realistic
- **Replacement basis –** assets used on ongoing basis
- **Realisable basis –** assets sold/business broken up

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Asset based models

Net Asset Valuation

	$
Net assets as per accounts	xx
Adjustments:	
Add increase in asset revaluation	xx
Less any decrease in asset value	(xx)
Net asset Value	xx

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Asset based Valuation

Uses of net asset valuation basis

- Measure of security in a share valuation
- Measure of comparison in scheme of merger
- Floor value in business that is up for sale

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Asset based Valuation

Problems with asset valuation models

- Need for professional valuation
- Ignores intangibles
- Ignores future profits
- Realisation of assets – could they be sold?
- Contingent liabilities
- Market for assets – again could they be sold?

Intangible assets

Intangible assets differ from tangible assets as they do not have physical substance. Examples include:

- Goodwill
- Brands
- Patents
- Customer loyalty
- Research and development

Intangible assets

Intellectual capital is knowledge that can be used to create value:

- Skills, knowledge and experience of employees
- Intellectual assets
- Intellectual property (patents and copyrights)

Calculated Intangible Value (CIV)

Calculated intangible values (CIV)

- CIV calculates an “excess return on tangible assets (ie how much more the company earns from its assets than the industry average would)

- This figure is used to determine the proportion of return attributable to intangible assets

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Calculated Intangible Value (CIV)

Calculated intangible values method

- Calculate average pre-tax earnings over a time period
- Step 1: Calculate average pre-tax earnings.
- Step 2: Calculate average year-end tangible assets.
- Step 3: Multiply the industry's % return on asset by the entity's average tangible asset. Subtract this from the entity's pre-tax earnings to calculate the excess return.
- Step 4: Adjust for tax.
- Step 5: Multiply by 1 / cost of capital.

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Calculated Intangible Value (CIV)

Below are extracts of financial information for an unlisted company operating in the biotechnology industry.

	20X3	20X2	20X1
	$m	$m	$m
Pre-tax earnings	397	370	352
Non- Current Assets	882	838	801
Current Assets	210	208	198
Share capita ($0.25/share)	300	300	300
Reserves	183	166	159
Non-current liabilities	400	400	400
Current liabilities	209	180	140

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Calculated Intangible Value (CIV)

The company pays tax at 20% per year and has an annual cost of capital estimated at 7%. The biotechnology industry's pre-tax return on capital employed is currently estimated to be 20% per year.

Calculate the CIV of the company.

Answer:Calculated Intangible Value (CIV)

Answer

Average pre-tax earnings: (397 + 370 + 352)/3 = $373·0m

Average capital employed: [(882 + 210 – 209) + (838 + 208 – 180) + (801 + 198 – 140)]/3 = $869·3m

Excess annual value/annual premium = 373m – (20% x $869·3m) = $199·1m

After-tax annual premium = $199·1m x 0·8 = $159·3m

PV of annual premium (assume perpetuity) = $159·3m/0·07 = $2,275·7m

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Calculated Intangible Value (CIV)

Problems with calculated intangible values (CIV) method

- It uses average industry return on assets as a basis for computing excess returns, which may be distorted by extreme values.
- Assumes that **past profitability** is a sound basis for evaluating the **current value** of intangibles – this will not be true if, for example, a brand has recently been weakened by a corporate scandal or changes in legislation.
- CIV also assumes that there will be **no growth** in value of the excess profits being created by intangible assets.

Market based model – P/E ratio model

Price/earnings ratio model

- P/E ratio = market value/EPS
- Therefore **market value = EPS × P/E ratio**
- **Value of company = PAT x Industry adjusted P/E ratio**
- **EPS** shows the current profitability of the company – may be affected by one-off transactions/exceptional items
- **P/E ratio** shows the market's view of the growth prospects/risk of a company
- Earnings should be maintainable future earnings, so should include any expected synergies.
- P/E ratio should be an industry average, or the P/E of a similar competitor. A non-marketability discount should be applied if valuing an unlisted company.

Market based model – P/E ratio model

Below are extracts of financial information for an unlisted company operating in the biotechnology industry.

	20X3	20X2	20X1
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Pre-tax earnings	397	370	352
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Current liabilities	209	180	140

Market based model – P/E ratio model

The current average PE ratio of the biotechnology industry is 16·4 times and it has been estimated that the company's PE ratio is 10% higher than this. The company pays tax at 20%.

Calculate the value of the company and hence the value per share

Market based model – P/E ratio model

Factors to consider when deciding suitable P/E ratio

- Industry
- Status
- Marketability
- Shareholders
- Asset backing and liquidity
- Nature of assets
- Gearing

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Market based model – P/E ratio model

Advantages of earnings valuation models

- Can be used to value a controlling stake in an organisation
- Easily understood methods

Market based model – P/E ratio model

Disadvantages of earnings valuation models

- Difficult to identify a suitable P/E ratio for an unlisted entity
- Valuation is based on accounting profits rather than cash flows
- Difficult to establish a realistic sustainable level of earnings

Cash-based models

- **Dividend Valuation Model (DVM)**
- **Free cash flow methodology**

Value of the firm	=	Present value over the forecast period	+	Terminal value of cash flows beyond the forecast period

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Dividend valuation model

Dividend valuation model

The method is commonly used to value parcels of shares that do not give control over the company, typically holdings of up to 20%.

Value of equity = PV of future dividend streams discounted at the cost of equity capital (Ke)

$$\text{Value} = \frac{D(1+g)}{Ke - g}$$

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Dividend valuation model

Constant growth rate g

$$\text{Value of equity} = \frac{D(1+g)}{Ke - g}$$

Where:

D = most recent dividend

Ke = cost of equity

g = projected growth rate in dividends

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Dividend valuation model

Variable growth rate g

Forecast each element dividend separately using appropriate rate

				g
Year	**1**	**2**	**3**	**4 onwards**
Dividends	D_1	D_2	D_3	
Ke (10%)	0.909	0.826	0.751	
PV	PV_1	PV_2	PV_3	
				$
PV (1 -3)		$=(PV_1 + PV_2 + PV_3) =$		XX
PV from year 4 onwards		$= \frac{D_3\ (1+g)}{Ke\ -g} \text{ x } 0.751$		XX
Value of Equity				**XX**

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Dividend Valuation Model

Two main ways to estimate g:

- Historical estimates: extrapolate past values.

  $g = (\text{latest dividend}/\text{oldest dividend})^{1/n} - 1$

- Use the company's return on equity (r) and retention rate of earnings (g = br), Retention rate (b)= retained earnings / total earnings

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Question: Dividend Valuation Model

The following dividend history is available. It is expected that the dividends will grow at the historic rate

Year to end	20X3	20X4	20X5	20X6
No. of $1 equity shares in issue	60,000	60,000	80,000	80,000
Total dividends paid	12,832	13,602	19,224	20,377

The cost of equity capital is estimated to be 12%

Required

Using the DVM, calculate the value the company

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Question: Dividend Valuation Model

Answer

Year to end	20X3	20X4	20X5	20X6
No. of $1 equity shares in issue	60,000	60,000	80,000	80,000
Total dividends paid	12,832	13,602	19,224	20,377
DPS	0.214	0.227	0.240	0.255

Question: Dividend Valuation Model

A company has just paid a total dividend of $4m representing 40% of total earnings and this is set to continue for the next three years then reduce to 50% for the foreseeable future.

The company's return on equity is estimated to be 10%

Required

Using the DVM, calculate the value of the company.

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Question: Dividend Valuation Model

Answer

Year	1	2	3	4
Dividend	4.24	4.50	4.76	
Ke = 10%	0.909	0.826	0.751	
PV	3.85	3.72	3.57	
PV (1-3)				11.15
PV 4 onwards	4.76*(1.03)*0.751/(0.1-0.03)			52.60
Value of Co				**63.75**
g	br	60% x 10% =	0.06	0.03

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Dividend Valuation Model

Assumptions of dividend valuation model

- Dividends from new projects of same risk type as existing operations
- Dividends and their growth rates are the sole drivers of corporate value
- No change in cost of equity capital
- Perfect information
- Ignore tax and issue expenses

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Dividend Valuation Model

Limitations of the DVM

- The assumption of constant dividend growth rate is too simplistic and could be wrong since in reality, the growth rate does vary.
- The model also assumes that investors / shareholders are basic tax payers, where as in reality, the composition of shareholders vary and as such have different tax positions.
- It also assumes that investors are rational and risk averse (ie make their decisions about share transactions on the basis of financial evaluation.
- The model assumes dividends are paid once in a year (annually)
- The model ignores the investors' preference for capital gains or dividend yield.

Dividend Valuation Model

Limitations of the DVM

- Companies that do not pay dividends do not have zero values
- Need enough profitable projects to maintain dividends
- Dividend policy likely to change on takeover

Free cash flows

Free cash flow = Cash available to providers of capital

- Free cash flow to the firm (FCF) = Cash available to providers of both equity and debt capital.
- Free cash flow to Equity (FCFE) = Cash available to providers of equity capital.

- FCF = PBIT(1 – t) + Depn (+Non-cash expenses) – CAPEX

- FCFE = PBIT – interest – tax + Depn (+Non-cash exp) - CAPEX

CAPEX = Investment in non-current assets and working capital

Where depreciation equals amount needed to maintain current productive capacity then **DO NOT ADD BACK**

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Free cash flows

Two methods of valuing Equity using Free cash flow

A valuation is obtained by estimating the future free cash flows over a specified period and discounting at an appropriate cost of capital.

Direct method

Discount future free cash flow to equity (FCFE) using cost of equity **(Ke)**

Indirect method

Discount the future free cash flow to the firm (FCF) using the **(WACC)** and then deduct debt value. This is known as the free cash flow to the firm methodology.

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Free cash flows

Constant growth in free cash flow (assuming perpetuity)

Direct method	$
Value of equity = $\frac{FCFE_0\ (1+g)}{Ke - g}$	XX
Indirect method	$
Value of firm (Ve + Vd) $= \frac{FCF_0\ (1+g)}{WACC - g}$	XX
Less value of debt Vd	(XX)
Value of equity	XX
Note:	
$FCFE_0$ or FCF_0 is the free cash flow at beginning of year	

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Question: Free cash flows – constant growth

The following financial information is available on a company

Extract from the most recent state of profit or loss	**$'000**
Sales revenue	8,780
Profit before interest and tax	1,230
Interest	(455)
Tax	(155)
Profit after tax	620
Extract from the most recent statement of financial position	**$'000**
Share capital (40c per share par value)	960
Reserves	1,400
Non-current liabilities: Variable rate loans	6,500
Current liabilities	1,890
Total liabilities and capital	10,750

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Question: Free cash flows – constant growth

The following other information is also available:

- In arriving at the profit after tax amount, the company deducted tax allowable depreciation and other non-cash expenses totalling $1,206,000.
- It also requires an annual cash investment of $1,010,000 in non-current assets and working capital to continue its operations.
- The company's profits before interest and tax in its first year of operation were $970,000 and have been growing steadily in each of the following three years, to their current level. The company's cash flows grew at the same rate as well, but it is likely that this growth rate will reduce to 25% of the original rate for the foreseeable future.
- The company pays tax of 20% on its profit after tax and has an overall cost of capital of 11%.

Calculate the value per share using the free cash flow to the firm methodology

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Free cash flow to equity – variable growth rates

Year	1	2	3	4 onwards
PBIT = (Revenue x OPM)	XX	XX	XX	
Interest	(XX)	(XX)	(XX)	
Profit before tax	XX	XX	XX	
Tax	(XX)	(XX)	(XX)	
CAPEX	(XX)	(XX)	(XX)	
FCFE	$FCFE_1$	$FCFE_2$	$FCFE_3$	
Ke (10%)	0.909	0.826	0.751	
PV	PV_1	PV_2	PV_3	
				$
PV (1 -3)		$=(PV_1 + PV_2 + PV_3) =$		XX
PV year 4 onwards		$\frac{FCFE_3\ (1+g)}{Ke\ -g} \text{ x } 0.751$		XX
Value of Equity				XX

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Free cash flow to firm – variable growth rates

Year	1	2	3	4 onwards
PBIT = (Revenue x OPM)	XX	XX	XX	
Tax	(XX)	(XX)	(XX)	
CAPEX	(XX)	(XX)	(XX)	
FCF	FCF_1	FCF_2	FCF_3	
WACC (10%)	0.909	0.826	0.751	
PV	PV_1	PV_2	PV_3	
				$
PV (1 -3)	$=(PV_1 + PV_2 + PV_3) =$			XX
PV year 4 onwards	$\frac{FCF_3\ (1+g)}{WACC\ -g} \text{ x } 0.751$			XX
Value of firm (Ve + Vd)				XX
Less value of debt Vd				(XX)
Value of equity				XX

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Question: Free cash flows

The following financial information is available on a company for its just ended year 20X9.

	20X9	20X8	20X7
	$m	$m	$m
Revenue	389.1	366.3	344.7
Operating profit	58.4	54.9	51.7
Net interest cost	17.5	17.7	18.0
Profit before tax	40.9	37.2	33.7
Taxation	10.2	9.3	8.4
Profit after tax	30.7	27.9	25.3

The company pays tax at 25% on its profit after tax and has an overall cost of capital of 11% with debt to equity ratio of 40:60.

Question: Free cash flows

The following other information is also available:

It is expected that recent deployment of new strategies will boost the company's future sales revenue and, for the next four years, the annual growth rate will be 120% of the previous two years' average growth rate. After the four years, the annual growth rate of the free cash flows to the company will be 3·5%, for the foreseeable future.

Operating profit margins are expected to be maintained in the future.

Although it can be assumed that the current tax-allowable depreciation is equivalent to the amount of investment needed to maintain the current level of operations, the company will require an additional investment in assets of 30c per $1 increase in sales revenue for the next four years.

Calculate the value of the company using the free cash flow to the firm methodology

Free cash flows

Answer

Value based on future free cash flows

Historic mean sales revenue growth = $(389{\cdot}1/344{\cdot}7)^{1/2} - 1 = 0{\cdot}625$ or 6·25%
Next four years annual growth rate of sales revenue = 120% of 6·25% = 7·5%
Thereafter 3·5% of cash flows per annum
Operating profit margin (approx) = 58·4/389·1 = 54·9/366·3 = 51·7/344·7 = 15%

Year (in $ millions)	1	2	3	4
Sales revenue	418·3	449·7	483·4	519·7
Operating profit	62·7	67·5	72·5	78·0
Less taxation (25%)	(15·7)	(16·9)	(18·1)	(19·5)
Less additional capital investment (30c per $1 change in sales revenue)	(8·8)	(9·4)	(10·1)	(10·9)
Free cash flows	38·2	41·2	44·3	47·6
PV of free cash flows (11%)	34·4	33·4	32·4	31·4

PV first four years	$131·6m
PV after four years $(47{\cdot}6 \times 1{\cdot}035)/(0{\cdot}11 - 0{\cdot}035) \times 1{\cdot}11^{-4}$	$432·7m
Value of company	$564·3m

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Free cash flows

Problems with discounted cash flow method

- Difficult to select appropriate cost of capital
- Unreliable estimates of future cash flows
- Not best method for minority interests who lack influence on cash flows
- The assumption of an indefinite planning horizon may lead to overvaluation

Type II Acquisitions – change in financial risk

Adjusted present value (APV)

Acquisition is valued by discounting free cash flows by ungeared cost of equity, then adding PV of tax shield

Deduct debt of target company to obtain value of equity

If **APV is +ve**, acquisition should be undertaken

Type II Acquisitions – change in financial risk

Steps:

1. Calculate Free Cash flow - FCF (if necessary)
2. Estimate the business risk (base) discount rate Keu using CAPM or M+M
3. Discount FCF with the business risk discount rate to obtain the NPV (Base case) value of the firm.
4. Calculate the PV of interest tax shield
5. Calculate the APV = Base case NPV + PV of interest tax shield – issue cost debt finance

Type III - Change in financial and business risk

Steps:

1. Calculate the asset beta of both companies.
2. Calculate the average asset beta for the group post-acquisition using their pre-acquisition values as weights.
3. Regear the beta to reflect the gearing of the group post-acquisition.
4. Calculate the group's new combined WACC.
5. Discount the group's post-acquisition free cash flows at this WACC.
6. Calculate the revised NPV of the group and subtract debt to calculate the value of equity.