ACCT7106 – Session #12: Forecasting & Valuation (cont)

PART 1 – Background

overarching objective:

to conduct the fundamental valuation exercise for the purpose of estimating the 'intrinsic value' of a firm's common shares

- ➡ requires an understanding of the firm's 'value drivers'
  - ➡ need to accumulate a 'tool kit' as the basis for developing the *pro forma Financial Statements* (as an integrated system!)

$$V_0 = \sum_{t=1}^{\infty} \frac{x_t}{(1+k_t)^t} = \sum_{t=1}^{n} \frac{E(x_t)}{(1+k)^t} + \frac{E(x_n)(1+g)}{k-g} \frac{1}{(1+k)^n}$$

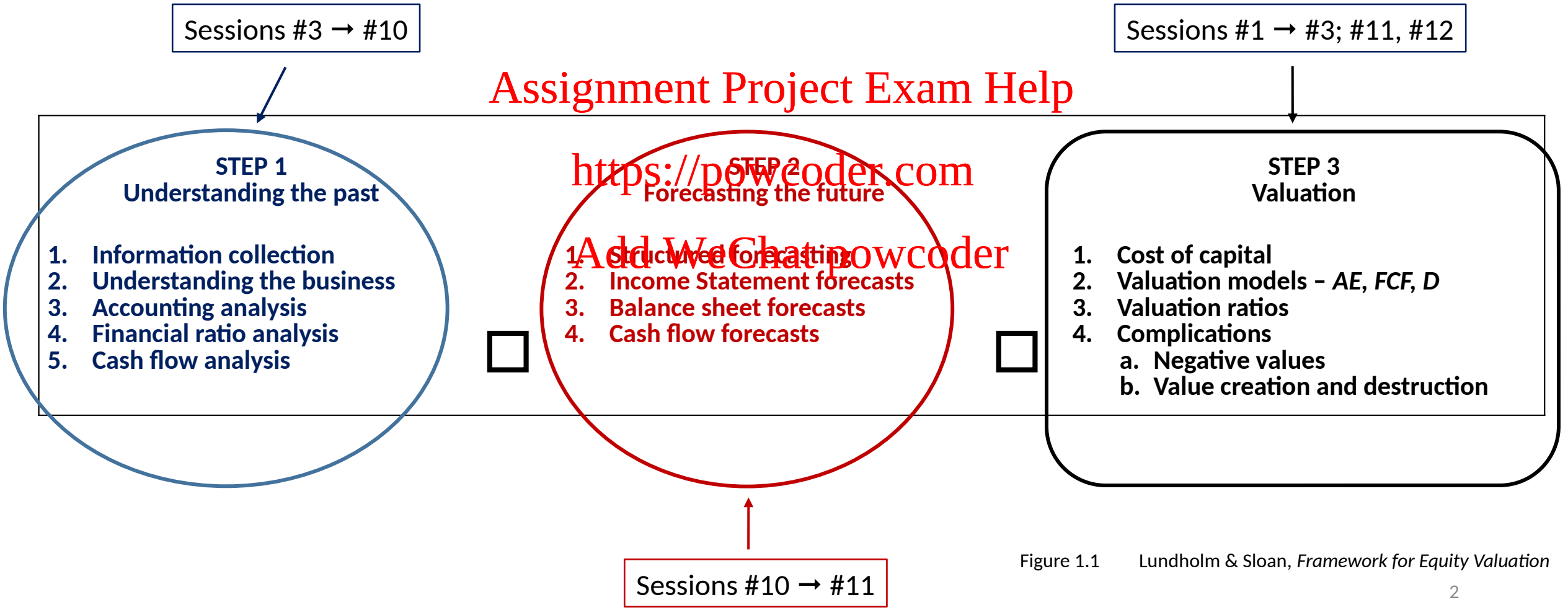
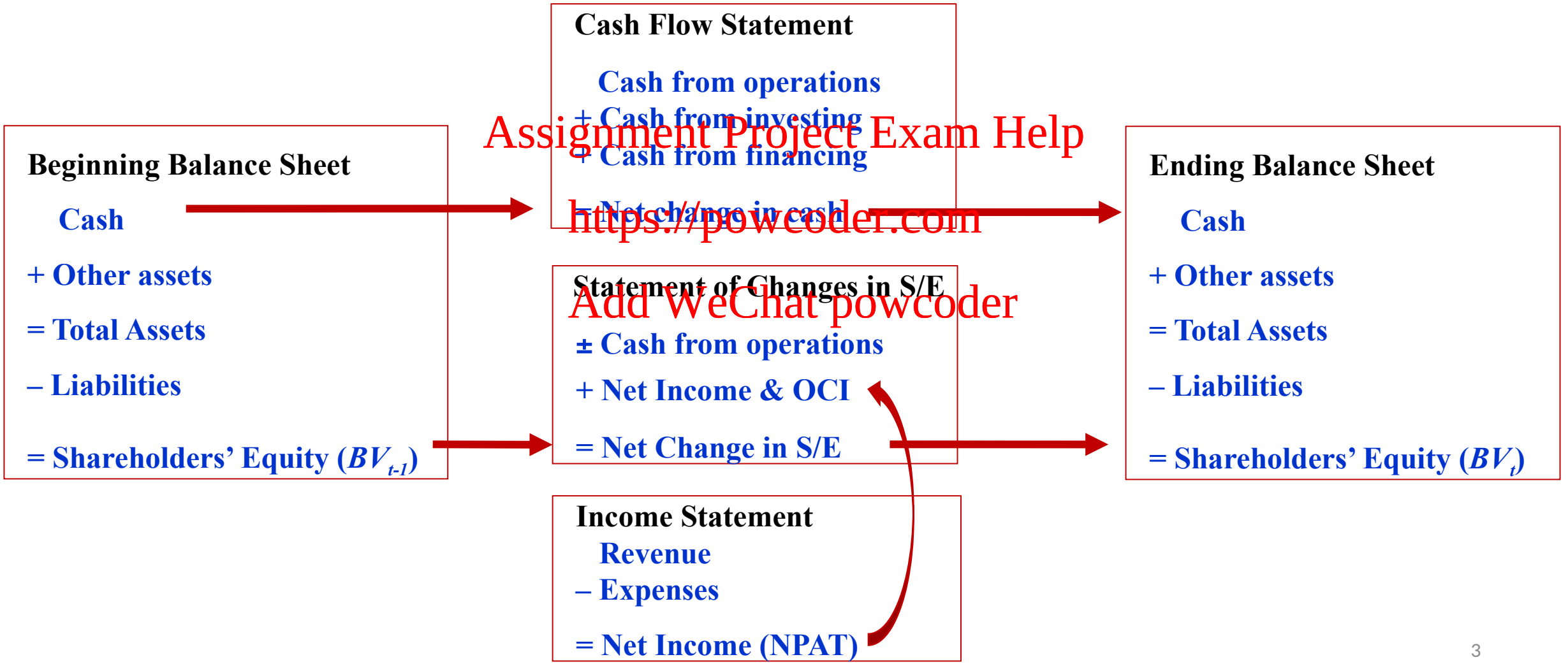


Figure 1.1 Lundholm & Sloan, *Framework for Equity Valuation*

'articulation' ⇢ Financial Statements constitute an *'integrated system'*

beginning stock → *flows* → *ending stock*



Forecasting & Valuation

Objective of the forecasting exercise

- to develop objective and realistic expectations of future value-relevant payoffs
  - ⇨ unbiased predictions (neither optimistic nor pessimistic → sensitivity analysis)

    pro forma F/S should be comprehensive → need to consider each item, not just assume items will grow at a constant rate with sales

    need to make *consistent* assumptions and maintain the relation between items in the *pro forma* F/S (i.e., the F/S represent an integrated system)

- use external information to ensure that assumptions are realistic

Key Steps:

- Sales forecast
  - external environment & macroeconomic forecasts
  - Industry dynamics & forecasted changes
  - firm-specific characteristics
- Forecast of 'Core Operating Income from Sales'
  - forecast asset turnover and calculate NOA implied by forecasted sales and ATO
  - revise sales forecast (if necessary) in recognition of 'asset constraints' and iterate
  - forecast gross profit margin
  - forecast core operating expenses (e.g., SG&A, depreciation, advertising, R&D)
  - forecast the tax rate applicable to 'core operating income from sales'
- Forecasts of 'Core Other Operating Income' and 'Unusual Operating Income'
- Calculation of 'Operating Income (OI) after tax
- Forecast OA and OL to obtain (confirm) NOA
- Calculate RNOA, FCF, ReOI *and* value the firm (FCF and AE valuation models; WACC)

Key Steps (cont)

- Forecast of Comprehensive Income (CI)
  - forecast of financial leverage (FLEV) and determination of NFO
  - forecast of net borrowing cost (NBC) and determination of NFE
  - calculation of comprehensive income (CI)
- Forecast of Shareholders' Equity = NOA – NFO
- Forecast of Dividends = CI – △S/E ± NCC
- Forecast of Residual Income
  - determination of 'cost of equity capital' (k_e)
  - calculation of abnormal earnings (residual income) = CI – k_e * BV_{t-1}
- Selection and justification of terminal growth rate, g
- Valuation based on Abnormal Earnings (Residual Income) valuation model
  Discounted Dividend (DDM) valuation model
- Conduct 'sensitivity analyses'

Re: Coles *Summary of significant assumptions*

- Sales growth 2.5% 2.0% 2.25% 2.25% 2.0%
- Terminal growth rate (***g***) of 3%
- ATO constant @ 3.00 (had increased from 2.914 to 3.065) if higher → ROCE ↑
- Gross profit margin @ 0.26 (had increased from 0.234 to 0.250)
- Administrative expenses assumed to decline from 0.21 to 0.208 (had been 0.215 and 0.212)
- Financing costs assumed growth in PPE of 1.5%, NBC up 0.6%

OR

- Unchanged capital structure (FLEV)

‘unlevered valuation’ ➔ overall value of the firm

	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,343	39,110	39,990	40,890	41,708
Core OI from Sales (after tax)	**1,342**	**1,382**	**1,427**	**1,473**	**1,518**
%△		2.98%	3.26%	3.22%	3.06%
Total OI (after tax)	**1,692**	**1,732**	**1,777**	**1,823**	**1,868**
%△		2.36%	2.60%	2.59%	2.47%
NOA	12,782	13,038	13,331	13,631	13,904
RNOA	0.1324	0.1328	0.1333	0.1337	0.1344
%△RNOA	*0.0269*	0.0004	0.0005	0.0004	0.0007
FCF	1,115	1,476	1,484	1,523	1,595
%△FCF	0.0500	0.0446	0.005	2.63%	4.73%
ReOI (k = 6.25%) (to firm)	929	933	962	990	1,016
%△ReOI		0.43%	3.11%	2.91%	2.63%

Abnormal Earnings (Residual Income) valuation model

+

= 12,205 + + + + +

= $40,015 million

FCF valuation model

= + + + +

= $43,298 million

‘levered valuation’ ➔ value to common shareholder

	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,343	39,110	39,990	40,890	41,708
Gross Margin (0.26)	9,969	10,169	10,397	10,631	10,844
Administrative Expense	(8,052)	(8,194)	(8,358)	(8,526)	(8,675)
Tax Expense (30%)	(325)	(593)	(612)	(632)	(651)
Core OI from Sales (after tax)	**1,342**	**1,382**	**1,427**	**1,473**	**1,518**
Core Other OI 500@ (1 – 0.3)	**350**	**350**	**350**	**350**	**350**
Unusual Items	0	0	0	0	0
Total OI (after tax)	**1,692**	**1,732**	**1,777**	**1,823**	**1,868**
Core NFE (NFO ↑ 1.5%)	(389)	(395)	(401)	(407)	(413)
Comprehensive Income	**1,303**	**1,337**	**1,376**	**1,416**	**1,455**

** assumes OCI = 0

	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,343	39,110	39,990	40,890	41,708
Comprehensive Income	**1,303**	**1,337**	**1,376**	**1,416**	**1,455**
%△CI		2.61%	2.92%	2.91%	2.75%
NOA	12,782	13,038	13,331	13,631	13,904
NFO (↑ 1.5%)	9,734	9880	10,028	10,179	10,331
S/E	**3,048**	**3,158**	**3,303**	**3,452**	**3,573**
%△S/E		3.61%	4.59%	4.51%	3.51%
Dividends	870	1,227	1,231	1,267	1,334
%△Div			0.36%	2.92%	5.29%
ReCI (k = 7.4%) (to S/E)	1,109	1,111	1,142	1,172	1,200
%△ReOI		0.20%	2.79%	2.63%	2.39%

Abnormal Earnings (Residual Income) valuation model

+

= 2,615 + + + + +

= $26,905.0 million

(** all calculations carried through using an Excel spreadsheet)

DDM valuation model

= + + + +

= $26,625.3 million

PART 2 – Sensitivity Analyses: 1st stage = one item at a time, leaving all else as forecasted

	AE Valuation	DDM Valuation	
'as forecasted'	26,905.0	26,625.3	
Terminal growth rate = 2.5% (instead of 3%) Terminal growth rate = 2.0%	24,814.3 23,110.7	24,929.4 22,402.3	**
Sales growth = constant 2% Sales growth = constant 1.75%	26,802.3 26,477.6	26,499.9 27,260.7	
ATO = 3.1 (instead of 3.0) ATO = 2.9	27,536.5 26,230.2	27,180.5 26,030.8	
Gross Margin = 0.25 (instead of 0.26)	20,989.8	20,708.9	**
Admin Exp = 0.215 (instead of 0.210 → 0.208)	25,841.0	25,560.2	
Net borrowing cost = 5.0% (instead of 4.0%) Net borrowing cost = 3.0%	24,806.7 29,003.7	24,525.8 28,722.8	
FLEV = 3.67 (instead of NFO @ 1.5%) ***	27,184.5	27,683.0	
Discount rate = 8.5% (instead of 7.4%)	25,794.4	25,394.9	

*** *re:* leverage (FLEV) and net borrowing cost (NBC)

as calculated in Session #10 from Coles reformulated F/S (Slides #44 – 47):

2020: NOA = 12,205 NFO = 9,590 S/E = 2,615 NFE = 322

FLEV = 3.6673 NBC = 0.0336 PM = 0.0344 ATO = 3.065

NOA	12,782	13,038	13,331	13,631	13,904
NFO (@ 1.5%)	9,734	9,880	10,028	10,179	10,331
S/E = NOA - NFO	3,048	3,158	3,303	3,452	3,573
Core NFE	389	395	401	407	413
Comprehensive Income	1,303	1,337	1,376	1,416	1,455
ReCI (k = 7.4%)	1,109	1,111	1,142	1,172	1,200

re: leverage (FLEV) and net borrowing cost (NBC)

what if alternatively assumed FLEV constant at 3.67 and NBC = 4%

FLEV = = 3.67 ⇒ NFO = 3.67 * S/E

S/E = NOA – NFO ⇒ S/E = NOA – 3.67 * S/E ⇒ S/E = NOA ÷ 4.67

ATO = 3.0 = sales ÷ NOA → NOA = sales ÷ 3 → S/E = sales ÷ (3 * 4.67)

⇒ **NFO = NOA – S/E = – = 0.26196 * sales**

NOA	12,782	13,038	13,331	13,631	13,904
NFO (based on FLEV = 3.67)	10,004	10,245	10,476	10,712	10,926
S/E = NOA - NFO	2,738	2,793	2,855	2,919	2,978
Core NFE	402	410	419	428	437
Comprehensive Income	1,290	1,323	1,359	1,396	1,431
ReCI (k = 7.4%)	1,097	1,120	1,152	1,184	1,215

NOA	12,782	13,038	13,331	13,631	13,904
NFO (@ 1.5%)	9,734	9,880	10,028	10,179	10,331
S/E = NOA - NFO	**3,048**	**3,158**	**3,303**	**3,452**	**3,573**
Core NFE③	389	395	401	407	413
Comprehensive Income	1,303	1,337	1,376	1,416	1,455
ReCI (k = 7.4%)	**1,109**	**1,111**	**1,142**	**1,172**	**1,200**

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ReCI (k = 7.4%)	**1,097**	**1,120**	**1,152**	**1,184**	**1,215**

Sensitivity Analyses – terminal growth rate gross margin (appear to be the greatest sensitivities)

		Terminal Growth Rate			
		1.5%	**2.0%**	**2.5%**	**3.0%**
	0.265	24,019.6 23,151.4	25,606.6 24,898.3	27,517.5 27,001.6	29,862.7 29,583.0
	0.260	21,695.8 20,827.7	23,110.7 22,402.3	24,814.3 24,298.4	26,905.0 26,625.3
Gross Margin	**0.255**	19,372.1 18,503.9	20,614.7 19,906.4	22,111.0 21,595.1	23,947.3 23,667.6
	0.250	17,048.3 16,180.2	18,118.8 17,410.5	19,407.8 18,891.8	20,989.6 20,709.9
	0.245	14,724.6 13,856.4	15,622.9 14,914.5	16,704.5 16,188.6	18,031.9 17,752.2

PART 3 – Alternative Approach to Valuation: Use of 'Heuristics'

⇨ 'multiplier approach'

Implementation of the formal AE valuation model (and also the DDM and FCF models) is a relatively involved and complex process

The alternative, both less rigorous and less demanding, is to focus on multipliers such as the P/E or M/B ratios.

In general terms, the "multiplier approach" can be represented as:

$$P_0 = x \quad M$$

where M is the multiplier and x is the valuation basis (e.g., earnings, book value)

The two most commonly cited multipliers are:

- Market-to-Book (*M/B*) ratio (price-to-book ratio)
- Price-Earnings (*P/E*) ratio

The *P/E ratio* is clearly a flows-based (income statement) measure whereas the *M/B ratio* is a stock-based (balance sheet) measure.

Of these, the *P/E* ratio typically receives the greater attention

	Coles (price ≈ $18)	Woolworths (price ≈ $40)
Market-to-Book (M/B)	= = 9.18	= = 5.70
Price-Earnings (P/E)	= 24.56	

❑ Market-to-Book (M/B) ratio (price-to-book ratio)

Abnormal Earnings Valuation Model

+

$(CI - k * BV_{t-1}) = (CI - k * BV_{t-1})$ = (– k) = (ROCE – k)

=

Market-to-Book ratio driven by ***combined effects*** of

- profitability
- growth in book value

> ⇒

since from the AE valuation model +

> ⇒

> does ***not*** required 'abnormal earnings growth' (AEG), although it does not preclude it either

where *AEG* → $AE_t > AE_{t-1}$

PART 4 – Heuristics (cont)

❑ Price-Earnings (P/E) ratio (price-to-book ratio)

- initially assume the firm's earnings are expected to remain constant in perpetuity

  $\Rightarrow \quad P_0 = \quad \rightarrow \quad = \quad$ *or* $\quad P_0 = E_0$

- alternatively, assume that the earnings will grow at a constant rate, g

  $\Rightarrow \quad P_0 = \quad = E_0 \quad \rightarrow \quad =$

➞ reveals immediately that in these two 'simplistic worlds', the P/E ratio is related to

- risk as reflected in the firm's cost of equity capital (*k*)
- growth in future earnings (*g*)

However, these two factors (risk and growth) have been found by empirical studies to explain only slightly more than 50% of the difference in P/E ratios across firms.

➞ in the empirical domain, other factors clearly influence the magnitude of the P/E ratio.

additional factors often advanced as potentially influencing the P/E ratio include **earnings persistence** and choice of **accounting policy**

re: risk

in equilibrium, investors will impose a greater risk premium on firms they perceive to have greater business risk.

as such, k_e will be higher for firms with greater risk and the P/E ratio (related to $1/k_e$) will be lower, all else held equal.

re: growth

as is also clear from the theoretical models above, firms with greater earnings growth will have higher P/E ratios, all else held equal, because market price will reflect the anticipated higher future earnings.

note, however, the market only prices *anticipated permanent growth*

re: earnings persistence

- a firm's P/E ratio will deviate from its the theoretical model if current period earnings are a poor predictor of expected future (permanent) earnings e.g., if the current period earnings include either an extraordinary gain or an extraordinary loss.
- these transitory components should lead to only a temporary change in the P/E ratio.
- alternatively, a permanent change in earnings should not significantly affect the P/E ratio because both the earnings figure and the market price will be affected in the same direction

re: accounting policy choice

- when otherwise identical firms select different accounting policies for *cosmetic reasons alone*, these differences will be reflected in P/E ratios e.g., a firm selecting a more conservative accounting policy (accelerated depreciation) will report lower earnings than a firm using less conservative policies (straight-line depreciation).
- if the market assesses the only difference between the two firms to be their choice of accounting policies, the firm selecting the more conservative policies will have the higher P/E ratio (since the market prices will be the same)

Application of the multiplier approach:

Valuation developed through 'fundamental analysis' and implemented through the 'abnormal earnings', 'DDM, and 'FCF' valuation models requires detailed, multi-year forecasts

An alternative approach is to base valuation on multipliers such as the P/E and M/B ratios

Such an approach simply requires the investor (analyst) to estimate the appropriate value for the selected multiplier and for the estimation base (earnings or book value)

Perhaps the greatest advantage of using the "multiplier approach" to valuation is that the *P/E* and *M/B* ratios of comparable firms can be used as the basis of the valuation

Having selected the appropriate comparable firm, the investor (analyst) implicitly assumes that the pricing of the comparable is applicable to the firm of interest

Unfortunately, application of pricing multiples is not as simple as it might seem. Reasons for the difficulty include:

- the need to identify an appropriate comparable(s)
- the question of whether valuation should be based on actual figures (past performance) or forecasted figures (expected future performance)
- the need to understand why multiples vary across firms, and of the determinants of the multiples, in order to make adjustments, if deemed appropriate

re: choice of comparable firms

- empirical research suggests that industry membership is the best basis for selecting comparable firms
- one reason advanced as to why industry membership provides the most effective comparisons is that firms in the same industry usually experience similar profitability, face similar risks, and grow at similar rates
- one problem however, is that many large firms operate within many different industry segments
- one way of dealing with this problem is to use industry average multiples. Another is to search for the firm within the industry that is most similar

re: forecasts versus realized

- market prices reflect future expected performance by definition.
- use of historical data in the denominator of a price multiple is justified only if history is viewed as a reasonable indicator of the future (*trailing P/E*)
- if a reliable forecast is available, it would generally be preferred as the basis for a multiple (*forward P/E*)
- *trailing P/E* multiples can be distorted by transitory gains or losses or other unusual performance.
- *forward* multiples (based on forecasts) can also be distorted but are less likely to include one-time gains/losses

re: adjustments

- P/E and M/B ratios can vary substantially across apparently similar firms for a number of reasons e.g.,
  - P/E ratios can vary because of differences in risk, expected future (abnormal) earnings, and accounting policy choice
  - M/B ratios can vary because of differences in future ROEs, growth in book value, and risk
- the differences that exist across firms, even apparently closely related firms, render pricing based on multiples an inherently crude technique.
- the investor (analyst) can attempt to mitigate the effect of the differences either through using industry averages or by attempting to make "informed" adjustments

PART 5 – Heuristics (cont)

Finally, returning to the key issue of 'growth', as discussed it is 'growth in residual income (abnormal earnings) that matters for valuation.

where abnormal earnings growth (AEG_t)= AE_t – AE_{t-1}

Note – growing earnings is not enough; it must be growth in abnormal earnings!

To illustrate:

consider a firm with S/E of $100 million that current earns $12 million per year, pays dividends of $12 million per year, and has a COEC of 10%

suppose it raises additional equity capital of $20m and invests it in a project that produces $1.5m earnings per year and then increases it dividend to $13.5 million

What will happen to earnings and the value of the firm after the issuance?

Current	Revised
Earnings = 12	Earnings = 12 + 1.5 = 13.5
BV = 100	BV = 120
AE = 12 – 0.10(100) = 2	AE = 13.5 -0.10(120) = 1.5
V = 100 +	V = 120 +

The firm's earnings have grown but its abnormal earnings have not – the new investment does not promise a return equal to COEC

→ 'value added' has been reduced 100 → 120 *versus* 120 → 135

note: *normal forward P/E =* but the *trailing P/E =*

why? the trailing P/E is taken one year earlier and has one extra year of return i.e.,

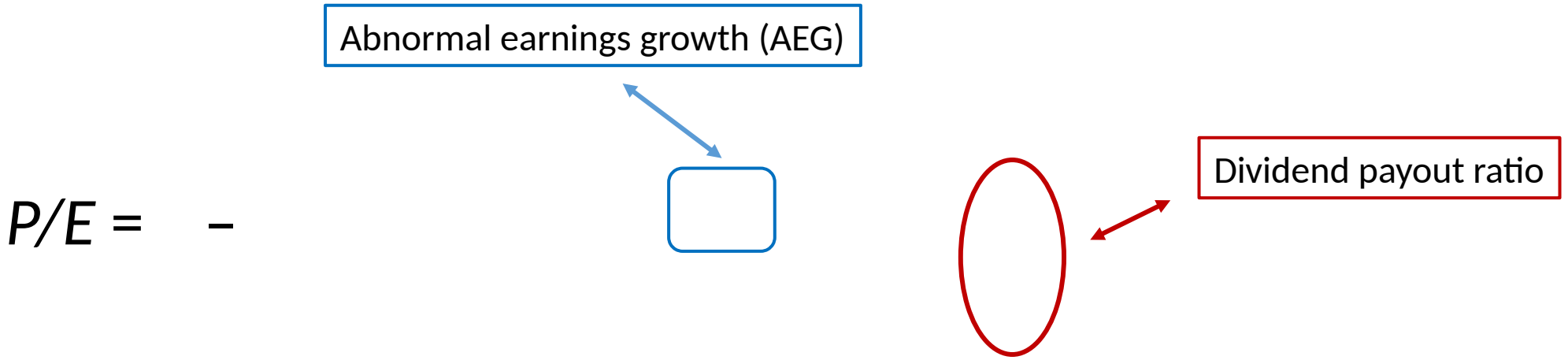
trailing P/E = = assumes that dividends are reinvested to earn k

Ultimately, the 'abnormal earnings valuation model' can be recast in terms of 'abnormal earnings growth'

V_0 =

and

P/E = –



Price-Earnings ratio driven by ***combined effects*** of

- abnormal earnings growth
- dividend payout ratio

Returning to the Market-to-Book (M/B) ratio

from the Abnormal Earnings valuation model +

M/B > 1 → AE > 0

Alternatively, for the Price-Earnings (P/E) ratio

trailing P/E = if P/E > *trailing* P/E → AEG > 0

M/B > 0 → *AE* > 0

P/E > normal P/E → *AEG* > 0 i.e., $AE_t > AE_{t-1}$

Interpretations include –

high (above normal) PB and PE:

➞ future abnormal earnings are expected to be positive and increase

i.e., AE > 0 *and* AEG > 0

high PB and low PE (below normal):

➞ future abnormal earnings are expected to be positive but decrease

i.e., AE > 0 *but* AEG < 0 ($AE_t < AE_{t-1}$)

'confusion' surrounding M/B as an indication of a 'growth stock' …….. *BUT* ……..

M/B relates to whether AE is positive or not

P/E relates to whether AE are growing (i.e., $AE_t > AE_{t-1}$ ➞ $AEG > 0$)

our interest is in 'abnormal earnings growth', not just 'earnings growth' !

M/B is not an indication of AEG growth ! (even though high M/B firms are often labelled as 'growth stocks')

A **High P/B; High P/E** Nike, Inc. The market gave Nike a P/B of 4.1 and a P/E of 21 in 2005, both high relative to normal ratios. Current residual earnings were $642 million and analysts were forecasting earnings that indicated higher residual earnings in the future.	**B** **Normal P/B; High P/E** Westcorp Westcorp, a financial services holding company, reported earnings for 1998 of 0.65 per share and an ROCE of 5.4%. Analysts in 1999 forecasted earnings of $1.72 for 1999 and $2.00 for 2000, which translate into an ROCE of 13.6% and 14.1% respectively. With a forecasted ROCE at about the (presumed) cost of capital but increasing from the current level this is a cell B firm. The market gave the firm a P/B of 1.10 and a P/E of 24.	**C** **Low P/B; High P/E** Rocky Shoes & Boots, Inc. Like Nike, a footwear manufacturer, Rocky Shoes reported an ROCE of 1.8% for 1998 with earnings of 0.21 per share. Analysts forecast an ROCE of 6.2% for 1999 and 7.8% for 2000, on earnings of 0.72 and 0.95 respectively. The market gave the firm a P/B of 0.6 and a P/E of 33, appropriate for a firm with forecasted ROCE less than the (presumed) cost of capital but with increasing ROCE.
D **High P/B; Normal P/E** Whirlpool Corp. Whirlpool, with a positive but constant RE was a cell D firm in 1994. Whirlpool was priced at 11 times earnings (cum-dividend), as we saw, and at 1.8 times book value.	**E** **Normal P/B, Normal P/E** Horizon Financial Corp. Horizon Financial Corp., a bank holding company, reported an ROCE of 10.3% for fiscal 1999. Analysts forecasted that ROCE would be 9.6% for 2000 and after, roughly at the same level. If the equity cost of capital is 10%, this firm should have a normal P/B and a normal P/E. The stock traded at 11 times earnings and 1.0 times book value	**F** **Low P/B; Normal P/E** Rainforest Cafe, Inc. In 1999, analysts covering Rainforest Cafe, the theme restaurant ("a wild place to eat"), forecasted earnings of $0.62 per share for 1999 and $0.71 for 2000, or an ROCE of 6.8% and 7.2%. The stock traded at a P/B of 0.6, reflecting the low anticipated ROCE. The ROCE for 1998 was 6.5%. With 1998 profitability similar to forecasted profitability, the stock should sell at a normal P/E ratio. And indeed it did: the P/E at the time of the forecasts was 11.
G **High P/B; Low P/E** US Airways Group US Airways reported an ROCE of 81% in 1998. Analysts deemed 1998 to be a particularly good year and forecast ROCE for 1999 and 2000 down to 29% and 33%. The stock traded at 12.6 times book value, consistent with high ROCE in the future, but at a P/E of only 4.	**H** **Normal P/B; Low P/E** America West Holdings America West Holdings, the holding company for America West Airlines had an ROCE of 15.0% in 1998. Analysts forecasted in 1999 that the ROCE would decline to 11.7% by 2000. The market gave the stock a P/B of 1.0 in 1999, in line with the forecasted ROCE equaling the cost of capital. But the P/E was 7, consistent with the expected drop in the ROCE.	**I** **Low P/B; Low P/E** UAL Corporation United Airlines' holding company traded at a P/B of 0.7 in mid-1999 and a P/E of 6. It reported an ROCE of 29.2% for 1998, but its ROCE was expected by analysts to drop to 10.6% (before a special gain) in 1999 and to 9.1% in 2000.

PART 6 – Additional Worked Examples

⇨ E14.1 E14.4 E14.5 E14.7

E16.1 E16.10 E16.11

Nike 2005 – 2009 *illustration of the 'forecasting & valuation' process*

E14.1. Residual Earnings and Residual Operating Income (Easy)

Here are summary financial statements for a firm (in millions of dollars):

Income Statement, 2012		Balance Sheet, End of 2011	
Operating income	1,400	Net operating assets	10,000
Interest expense	500	Financing debt	5,000
Net income	900	Common equity	5,000

The required return for equity is 12 percent, the required return for operations is 11 percent, and the required return for debt is 10 percent. The firm pays no taxes.

$k_e = 12\%$ $k_{debt} = 10\%$ WACC = 11%

ReOI = 1,400 – 0.11 * 10,000 = 300

E14.4. Residual Operating Income and Abnormal Operating Income Growth (Easy)

Here are financial statements for a firm (in millions of dollars):

Income Statement			Balance Sheet, End of Year		
	2012	2011		2011	2010
Operating income	2,700	2,300	Net operating assets	20,000	18,500
Interest expense	800	500	Financing debt	10,000	6,250
Net income	1,900	1,800	Common equity	10,000	12,250

The firm has a required return of 10 percent for operations. Calculate residual operating income for 2012 and 2011 using beginning-of-year balance sheet numbers. Then calculate abnormal operating income growth (in dollars) for 2012.

2011: ReOI = 2,300 – 0.10 * 18,500 = 450

2012: ReOI = 2,700 – 0.10 * 20,000 = 700

→ growth in ReOI = 250 → 55.56% (250 / 450)

E14.5. Cost of Capital Calculations (Easy)

From the following data, calculate the cost of capital for operations (WACC). Use the capital asset pricing model to estimate the cost of equity capital.

U.S. Government long-term bond rate	4.3%
Market risk premium	5.0%
Equity beta	1.3
Per-share market price	$40.70
Shares outstanding	58 million
Net financial obligations on balance sheet	$1,750 million
Weighted-average borrowing cost	7.5%
Statutory tax rate	36.0%

Explain why the cost of capital for operations is different from that for equity.

$R_f = 4.3\%$ mkt price of risk = 5.0% beta = 1.3 $k_e = 0.043 + 1.3(0.05) = 0.108$

NBC = 7.5% → 0.075 (1 – 0.36) = 4.8% after tax

$V_{equity} = 40.70 * 58 = 2,360.6$ $V_{NFO} = 1,750$ → $V_{firm} = 2,360.6 + 1,750 = 4110.6$

WACC = = 0.0825 → 8.25%

E14.7. Residual Operating Income Valuation (Easy)

The following forecasts were made at the end of 2012 for a firm with net operating assets of $1,135 million and net financial obligations of $720 million (in millions of dollars):

	2013E	2014E	2015E	2016E
Operating income	187.00	200.09	214.10	229.08
Net operating assets	1,214.45	1,299.46	1,390.42	1,487.75

The required return for operations is 10.1 percent. Forecast residual operating income for these years and, from these forecasts, value the operations and the equity.

	2013	2014	2015	2016
$ReOI = OI - k^*NOA_{t-1}$	72.365	77.431	82.855	88.648
%△ReOI		7.0%	7.0%	7.0%

⇒ assume terminal growth rate = 7%

V_{firm} = 1,135 + 2,334.29 = 3,469.29 based on the 'abnormal earnings' valuation model

$V_{equity} = V_{firm} - NFO$ = 3,469.29 – 720 = 2,749.29

E16.1. A One-Stop Forecast of Residual Operating Income (Easy)

An analyst predicted the following:

1. Sales of $1,276 million.
2. Core profit margin of 5 percent.
3. Asset turnover of 2.2.
4. Core other operating income and unusual items are zero.

The firm's required return for operations is 9 percent.

a. Apply formula 16.1 to calculate the residual operating income (ReOI) implied by these forecasts.
b. How would ReOI change if the analyst dropped her forecast of the core profit margin to 4.5 percent?
c. Given a 5 percent profit margin forecast, what level of asset turnover would yield negative residual operating income?

$OI = 0.05(1,276) = 63.8$ $NOA = 1,276 / 2.2 = 580$

a) ReOI = 63.8 – (0.09*580) = 63.8 – 52.2 = **11.6**

b) ReOI = 0.045(1,276) – (0.09*580) = 57.42 – 52.2 = 5.22 → **ReOI ↓ 6.38**

c) ReOI = 0 = 0.05(1,276) – (0.09*NOA) → NOA = 708.889 → ATO = 1,276 / 708.889 = 1.8

⇒ **ATO < 1.8** (if ATO < 1.8 → NOA > 708.889)

PART 7 – Additional Worked Examples (cont)

E16.10. Forecasting and Valuation for General Mills, Inc. (Easy)

The following are from the financial statements for General Mills (in millions):

	2010	2009
Net operating assets	$11,461	$11,803
Common equity	5,403	5,173
Sales	14,797	
Core operating income (after tax)	1,805	

At the end of fiscal year 2010, 656.5 million shares were outstanding, and they traded at $60 each. The following forecasts were prepared:

Sales growth rate, 2011–2012	7% per year
Sales growth rate, 2013–2014	6% per year
Sales growth rate after 2014	4% per year

Prepare a pro forma for the years 2011–2014 with a forecast that core profit margins and asset turnovers will be the same as in 2010. Then calculate the per-share value at the end of fiscal year 2010 with the forecast that residual operating income will grow after 2014 at the sales growth rate. Use a required return for operations of 8 percent.

2010: OI profit margin = 1,805 / 14,797 = 0.12198 ATO = 14,797 / 11,461 = 1.29107

given "core profit margins and asset turnovers will be the same as 2010"

	2010	2011E	2012E	2013E	2014E
Sales growth (%)		7%	7%	6%	6%
→ Sales	14,797	15,832.79	16,941.09	17,957.55	19,035.00
→ NOA @ ATO = 1.29107	11,461	12,263.31	13,121.74	13,909.04	14,743.59
→ OI @ PM = 0.12198	1,805	1,931.28	2,066.47	2,190.46	2,321.89
ReOI = OI – 0.08*NOA		1,014.46	1,085.41	1,140.72	1,209.17

$$11{,}461 + \ + \ + \ + \ = \$38{,}233.245$$

$\text{NFO} = 11{,}461 - 5{,}403 = 6{,}058$ $\Rightarrow$

$38{,}233.245 - 6{,}058 = 32{,}175.245$

$\Rightarrow$ $= 32{,}175.245 / 656.5 =$ **$49.01 per share**

E16.11. Pro Forma Analysis and Valuation: Nike, Inc. (Medium)

At the end of fiscal year 2008, Nike reported $5,806 million in net operating assets and common shareholders' equity of $7,797 million. Develop a pro forma and valuation at the end of fiscal year 2008 with the following forecasts. Then calculate the per-share value of the 491.1 million shares outstanding at the end of fiscal year 2008. Use a required return for operations of 8.6 percent and forecast that residual operating income will grow at an annual rate of 4 percent after 2012. Sales for 2008 were $18,627 million.

Forecast	2009E	2010E	2011E	2012E
Sales growth rate	10.0%	9.0%	8.0%	7.0%
Core profit margin	9.0%	8.5%	8.0%	7.5%
Asset turnover	3.4	3.4	3.5	3.6

2008: NOA = 5,806 S/E = 7,797 → ***NFA*** = 7,797 – 5,806 = 1,991

given k_{firm} = 8.6% terminal growth rate (***g***) = 4%

ATO = 18,627 / 5,806 = 3.2 → ***assume*** 2009 ATO = 3.3

	2010	2009E	2010E	2011E	2012E
Sales growth (%)		10%	9%	8%	7%
→ Sales	18,627	20,489.70	22,333,77	24,120.47	25,808.91
ATO		*assumed 3.3*	3.4	3.5	3.6
→ NOA @ ATO	5,806	6,209.00	6,568.76	6,891.56	7,169.14
Core profit margin		9.0%	8.5%	8.0%	7.5%
→ OI @ PM		1,844.07	1,898.37	1,929.64	1,935.67
ReOI = OI – 0.086*NOA		1,344.76	1,364.40	1,364.72	1,342.99

Notes: OI consistently increasing *will it continue to grow?*

if trends continue into 2013 i.e., sales growth =

6% & PM = 7.0% → *OI = 1,915.02*

ReOI initially increases and then starts to decrease

(i.e., *AEG* < 0) *why?*

2011 – 2012: growth in OI =

5,806 + + + +

= $32,060.9514

NFA = 7,797 – 5,806 = 1,991

⇒ 32,060.9514 + 1,991 = $34,051.9514

⇒ 34,051.9514 / 491.1 = $65.28 per share

Comprehensive Illustration: Nike

After reformulating Nike's financial statements for 2004, an analyst prepares a series of forecast in order to value Nike's shares.

With a thorough knowledge of the business, its customers and the outlook for athletic and fashion footwear, the analyst first prepares a sales forecast.

Then, understanding the production process and the components of cost of good sold, they forecast Nike's gross profit margin.

Adding forecasts of expense ratios – particularly the all-important driver, the advertising-to-sales ratio – they finalise their pro forma income statements with a forecast of operating income.

Finally, the forecasted balance sheet models accounts receivable, inventory, PPE, and other net operating assets based on their assessment of turnover ratios for these items.

From this process, the analyst arrives at the following forecasts:

Income statement forecasts:

1. Sales for 2005 will be $13,500 million, followed by $14,600 for 2006. For 2007-2009, sales are expected to grow at a rate of 9 percent per year.
2. The gross margin of 42.9 percent in 2004 is expected to increase to 44.5% in 2005 and 2006 with the benefits of off-shore manufacturing, but then to decline to 42% in 2007 and subsequently to 41% as labor costs increase and more costly, high-end shoes are brought to market.
3. Advertising, standing at 11.25% of sales in 2004, will increase to 11.6% of sales to maintain the ambitious sales growth. The recruitment of visible sports stars to promote the brand will also add to advertising costs.
4. Other before-tax expenses are expected to be 19.6% of sales, the same level as in 2004.
5. The effective tax rate on operating income will be 34.6%.
6. No unusual items are expected or their expected value is zero.

Balance sheet forecasts:

1. To maintain sales, the carrying value of inventory will be 12.38 cents per dollar of sales (an inventory turnover ratio of 8.08).
2. Receivables will be 16.5 cents per dollar of sales (a turnover ratio of 6.06)
3. PPE will fall to 12.8 cents per dollar of sales in 2005 and 2006, from the 13.1 cents in 2004, because of more sales from existing plant. However, with new production facilities coming on line, at higher construction costs, to support sales growth, PPE will increase to 13.9 cents on a dollar of sales (a turnover ratio of 7.19).
4. Holdings of other net operating assets, dominated by OL, will be – 6.0% of sales.

Additional Information:

- 2004 NFO = 743
- Terminal growth rate for AE $g = 5\%$
- # Common shares outstanding = 263.1 million

Pro forma Income Statements

	2004A	2005E	2006E	2007E	2008E	2009E
Sales	**12,253**	**13,500**	**14,600**	**15,914**	**17,346**	**18,907**
Cost of sales	(7,001)	(7,492)	(8,103)	(9,230)	(10,234)	(11,155)
Gross margin	5,252	6,008	6,497	6,684	7,112	7,752
Advertising	(1,378)	(1,566)	(1,694)	(1,846)	(2,012)	(2,193)
Operating expenses	(2,400)	(2,646)	(2,862)	(3,119)	(3,400)	(3,706)
Operating income before tax	1,474	1,796	1,941	1,719	1,700	1,853
Tax at 34.6 %	(513)	(621)	(672)	(595)	(588)	(641)
Operating income after tax	**961**	**1,175**	**1,269**	**1,124**	**1,112**	**1,212**
Core profit margin	7.84%	8.69%	8.69%	7.06%	6.41%	6.41%

Pro forma Balance Sheets

	2004A	2005E	2006E	2007E	2008E	2009E
Accounts receivable	2,120	2,228	2,409	2,626	2,862	3,120
Inventory	1,634	1,671	1,807	1,970	2,147	2,341
PPE	1,587	1,728	1,869	2,212	2,411	2,628
Other NOA	(790)	(810)	(876)	(955)	(1,041)	(1,134)
Net operating assets	4,551	4,817	5,209	5,853	6,379	6,955
Asset turnover (ATO)		2.803	2.803	2.719	2.719	2.719

	2004A	2005E	2006E	2007E	2008E	2009E
Operating income after tax	**961**	**1,175**	**1,269**	**1,124**	**1,112**	**1,212**
Net operating assets	**4,551**	**4,817**	**5,209**	**5,853**	**6,379**	**6,955**
ReOI = OI – 0.086*NOA		783.614	854.738	676.026	608.642	663.406
FCF = OI – △ NOA		909	877	480	586	636

AE valuation model

NFO = 749

Common shares = 263.1 *P* = 19,461.9 / 263.1 = $73.97

aside: FCF valuation model 15,077.6 → has not reached 'steady state'

→ require a different 'g' for FCF

PART 8 – Summary

overarching objective:

to conduct fundamental value for the purpose of estimating the 'intrinsic value' of a firm's common shares

➔ requires an understanding of the firm's 'value drivers'

➔ need to accumulate a 'tool kit' as the basis for developing the *pro forma Financial Statements*

STEP 1
Understanding the past

1. Information collection
2. Understanding the business
3. Accounting analysis
4. Financial ratio analysis
5. Cash flow analysis

STEP 2
Forecasting the future

1. Structured forecasting
2. Income Statement forecasts
3. Balance sheet forecasts
4. Cash flow forecasts

STEP 3
Valuation

1. Cost of capital
2. Valuation models – *AE*, *FCF*, *D*
3. Valuation ratios
4. Complications
   a. Negative values
   b. Value creation and destruction

external environment ✓

- economic prospects
- macroeconomic factors
- socio-cultural forces
- political / regulatory

Industry dynamics ✓

➔ **Porter's five forces**

(suppliers, buyers, new entrants, substitutes, rivalry)

Analysis of Financial Statements ✓

- understanding current F/S
- re-formulating the F/S
- accounting quality
- ratio analysis

- analysts' reports
- management forecasts
- financial press
- ???

Forecasts and Valuation