ACCT7106 – Session #11: Forecasting & Valuation

PART 1 – Background

overarching objective:

to conduct the fundamental analysis of a firm's financial statements for the purpose of estimating the 'intrinsic value' of a firm's ordinary shares

- ➡ requires an understanding of the firm's business
  - ➡ need to accumulate a 'tool kit' as the basis for developing the *pro forma Financial Statements*

⇒ ***projected*** { Balance Sheet (B/S), Income Statement (I/S), Statement of Cash Flows (SCF) }
over the forecast horizon

➡ core inputs → x g

Sessions #3 → #10

Sessions #1 → #3; #11 – #13

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

STEP 3
Valuation

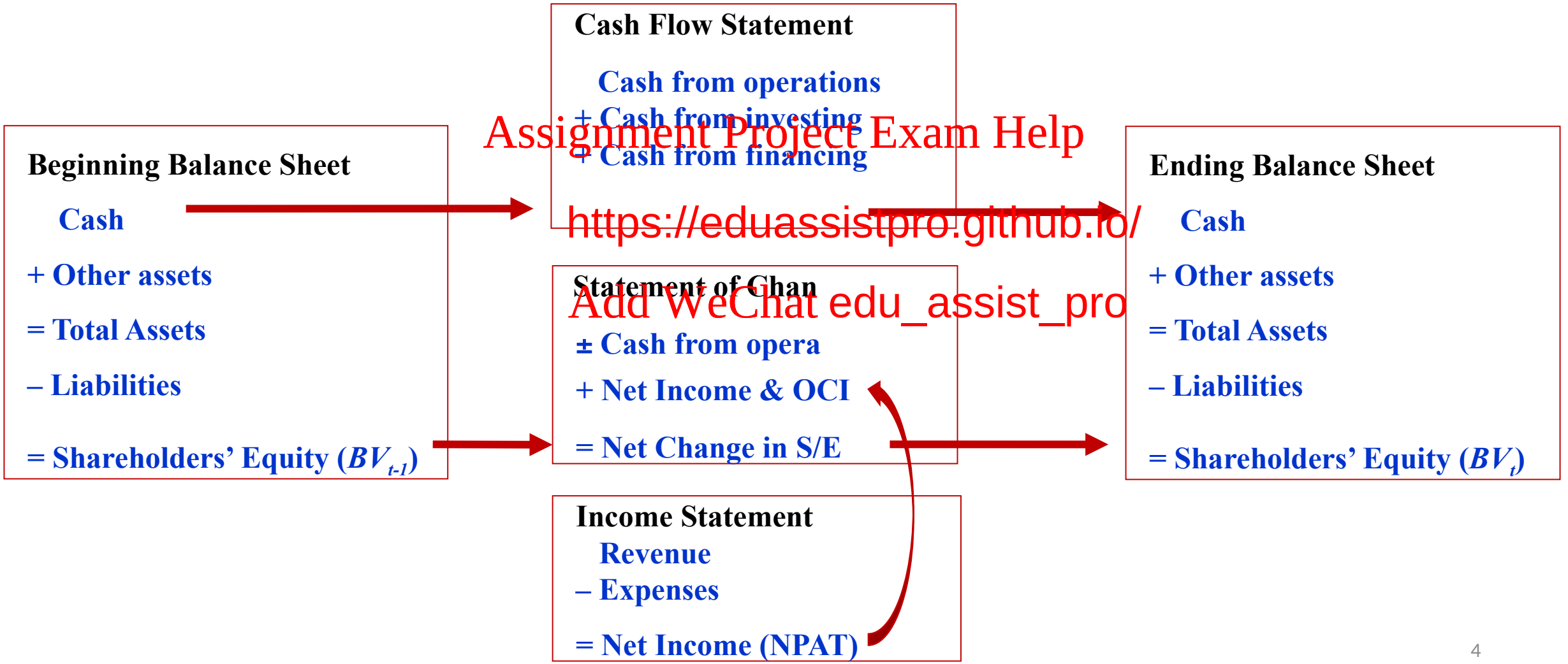
1. Cost of capital
2. Valuation models – *AE*, *FCF*, *D*
3. Valuation ratios
4. Complications
   a. Negative values
   b. Value creation and destruction

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

Sessions #10 → #11

'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

How?

- develop *pro forma* F/S conta _____ of the firm's future operating, investing, and financing activ _____ r conservative nor optimistic
- *pro forma* F/S should be comprehensive – consider the growth rate for 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, both reported and *pro forma*)
- use external information to ensure that assumptions are realistic

Steps comprising the Forecasting Exercise

Income Statement:

- Step 1: Forecast Sales
- Step 2: Forecast Core OI from Sales (before tax)
- Step 3: Forecast Core Othe
- Step 4: Calculate OI (befor
- Step 5: Forecast Income Tax Expense attri
- Step 6: Calculate OI (after tax)

Balance Sheet:

- Step 7: Forecast OA and OL to obtain a forecast of NOA

Unlevered Valuation ➔ valuing the firm

- Step 8: Calculate RNOA, FCF and residual operating income (ReOI)
- Step 9: Estimate the DCF and ReOI models with assumed terminal growth rate and firm's weighted average cost of capital (WACC) ➔ overall value of the firm
- Step 10: Forecast Leverage and NFE (after tax)
- Step 11: Calculate CI = OI (a CSE = NOA – NFO
- Step 12: Forecast Dividends (

Levered Valuation ➔ valuing common equity (value of common shares)

- Step 13: Calculate RI (residual income or abnormal earnings)
- Step 14: Estimate the DDM and RI models with assumed terminal growth rate (g) and cost of equity capital (k) ➔ value of the firm to the common shareholder

PART 2 – Foundation for Forecasting

- ✓ central focus – estimation of intrinsic value
- ✓ selected approach to 'valuation' – fundamental analysis
- ✓ core valuation model – residual income (abnormal earnings) based on the 'reformulated F/S'

+

where <u>now</u> residual earnings = (ROCE – cost of equity capital BV_{t-1})

= ($ROCE_t$ – COEC) BV_{t-1} (dividing both terms by S/E and then multiplying by S/E)

→ **value driven by growth in 'abnormal' earnings = AE_t – AE_{t-1}**

residual earnings = $(ROCE_t - COEC)\ BV_{t-1}$

→ support growth in abnormal earnings arises from

- growth in ROCE (i.e., profitability)
- growth in S/E

beginning with **ROCE** (profitabilit

informed by the 'financial levera ont System' i.e.,

ROCE = RNOA + FLEV x (RNOA – NBC) = {profit t turnover} + {FLEV spread}

⇒ **drivers**

- **operating profit margin**
- **asset turnover**
- **leverage**
- **spread**

further, in terms of the ‘income’ measures

*Comprehensive Income (**CI**) = Operating Income (**OI**) – Net Financing Expenses (**NFE**)*

where further

OI = core operating income from sales
+ core other operating income
ncome

sustainable (core) earning ≡ earnings that can re future and grow

➡ form the basis for growth

transitory earnings (unusual items) ≡ earnings based on temporary factors

➞ have no bearing on future earnings or earnings growth

➔ central focus on **'sustainable (core) earning'** as the basis for growth

→ core operating income & core net borrowing costs

⇒ need to identify items that will have no bearing on the future so that they can be removed and the focus returned to the 'core items'

EXHIBIT 13.1

Identifying sustainable earnings: Items to consider

1. **Deferred revenue** – timing of recognition can be 'manipulated' and hence apparent growth may not be sustainable
2. **Restructuring charges, asset impairments & special charges –** typically 'unusual' but effects can be ongoing (e.g., impairments → lower future expenses, needing adjustment)
3. **R&D** – reductions increase current income *but* impact future earnings
4. **Advertising** – reductions incr mpact future earnings
5. **Pension expense** – each of th an opportunity for 'manipulation', especially expected returns t really a part of core earnings
6. **Changes in estimates** – 'poor' estimates will be adjusted in future earnings
7. **Realised gains & losses** – timing and details
8. **Unrealised gain & losses on equity investments** – timing and details; 'transitory'
9. **Unrealised gains & losses from applying fair value accounting –** typically 'transitory'
10. **Income taxes** – one-time items; special incentives
11. **Other income** – confirm whether it includes interest income

Deferred Revenue: Microsoft

firms may defer revenue into a "cookie jar" and then dip into the cookie jar later, often to "smooth" earnings

	2009	2008	2010
Unearned revenue	$29,374	$24,409	$24,332
Recognition of unearned revenue	(28,813)	(25,426)	(21,944)

Does this provide the scope for 'false' earning growth in the future?

note: core OI from sales

Merger & Restructuring Charge

Year	Restructuring Charges ($B)
1991	3.7
1992	11.6
1993	8.9
1994	(2.8)
1995	(2.1)
1996	(1.5)
1997	(0.5)
1998	(0.4)

Does this provide the scope for 'false' earning growth in the future?

note: unusual items

R&D Expenditures: Merck & Co

(In billions of dollars)	2010	2009	2008
Sales	46.0	27.4	23.8
R&D	11.0	5.8	4.8
R&D-to-Sales	23.9%	21.2%	20.2%

Will the increase in R&D result in future sales?

note: core OI from sales

Advertising Expenditures: Coca-Cola

(In billions of dollars)	2010	2009	2
Revenues	35.1	31.0	31.9
Cost of goods sold	12.7	11.1	11.4
Gross profit	22.4	19.9	20.5
Selling, administrative and general	14.0	11.7	12.1
Operating income (before tax)	8.4	8.2	8.4
Advertising expenses	2.9	2.8	3.0
Advertising expenses/Sales	8.3%	9.0%	9.4%

Is the drop temporary?

Will it affect future sales?

note: core OI from sales

Pension Costs: IBM

International Business Machines (IBM)
Components of pension expense, 2001-2004
(In millions of dollars)

	2004	2003	2002	2001
Service cost	1,263	1,113	1,155	1,076
Interest cost	4,071	3,995	3,861	3,774
Expected return on plan assets	(5,987)	(5,931)	(6,253)	(6,264)
Amortization of transition asset	(82)	(159)	(156)	(153)
Amortization of prior service cost	66	78	89	80
Actuarial losses (gains)	764	101	105	(24)
Net pension expense	95	(803)	(1,199)	(511)

Net pension expense comprised of 6 components

notes:

- net pension expense can be negative plan assets → need to consider the assumed rate of return; core other OI, not core OI from sales
- evaluate gains on pension fund assets

Gains & losses on sale of shares

- gains often recorded to operating income but Statement of Cash Flows reveals true nature (unusual item)
- timing e.g., realise 'winners'; hold 'loosers'

PART 3 – Growth in Residual Income (Abnormal Earnings)

residual earnings = (ROCE$_t$ – cost of equity capital) BV$_{t-1}$

→ support growth in abnormal earnings arises from

- growth in ROCE (i.e., profitability)
- growth in S/E

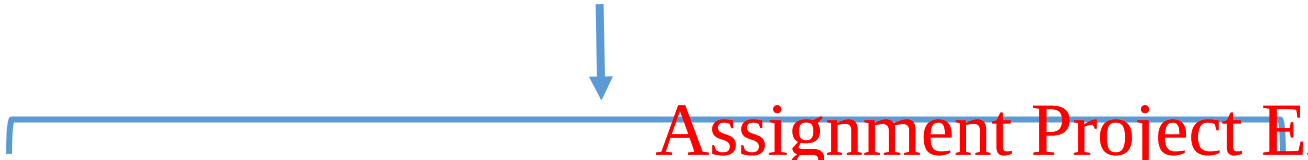
growth in ROCE

ROCE = = {profit margin asset turnover} + {FLEV spread}

NOA

RNOA = =

=



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where *Core Sales Profit Margin* =

➞ profit margin 'unaffected' by Other Income or Unusual Items

➡ captures the firm's ability to generate profits *from sales*

△RNOA = △

= (core sales PM) @ previous ATO + ATO @ new core sales PM

Can we gain any 'deeper' insights that might assist with forecasting?

To illustrate – General Mills

	RNOA	Profit Margin	Asset Turnover
2010	10.1%	7.95%	1.27
2009	4.1%	3.41%	1.19
	↑ 6.0%	**↑ 4.54%**	**↑ 0.08**

from Penman Exhibit 13.2 re: General Mills

	2010	2009
Core Operating Revenues	14,797	14,691
Core Operating Income from Sales (after tax)	1,435	1,174
Core Other Operating Income (after tax)	370	352
Unusual Items (after tax)	(628)	(1,025)
Operating Income (after tax)	1,177	501
Net Financing Expenses (after tax)	(251)	(239)
Noncontrolling Interest	(5)	(9)
Comprehensive Income		253

$$\frac{1{,}174}{14{,}691}$$

⇒ Core sales PM = 1.71% 0.0970 0.0799

also **given** = *2.85%*

➡ RNOA = (1.71% 1.19) + (0.08 9.70%) + 0.33% + 2.85%

= {2.04% + 0.78%} + 0.33% + 2.85%

(core sales PM) ATO

2.8 ***re income from sales***

➡ increase in RNOA due to 0.33% increase rel r core income (outside of sales)

2.85% increase related to unusual (one-time) items

→ for General Mills, slightly less then ½ of the increase in RNOA is related to 'core operating income from sales' (2.82% out of 6%)

critical 'drivers' of growth (increases) in ROCE

→ core sales PM; asset turnover; financial leverage (FLEV); and spread (i.e., NBC)

for core sales PM:

changes in the 'core sales PM' are determined by how costs change as sales change

→ notions of variable & fixed costs

Operating leverage (OLEV) – the operating costs are ***fixed***

OLEV = % △ core OI = % △ core

** operating leverage should not be confused with operating liability leverage (OLLEV) that appears in the 'operating leverage equation relating ROOA to RNOA

re: growth in S/E

$$\triangle S/E = \triangle NOA - \triangle NFO$$

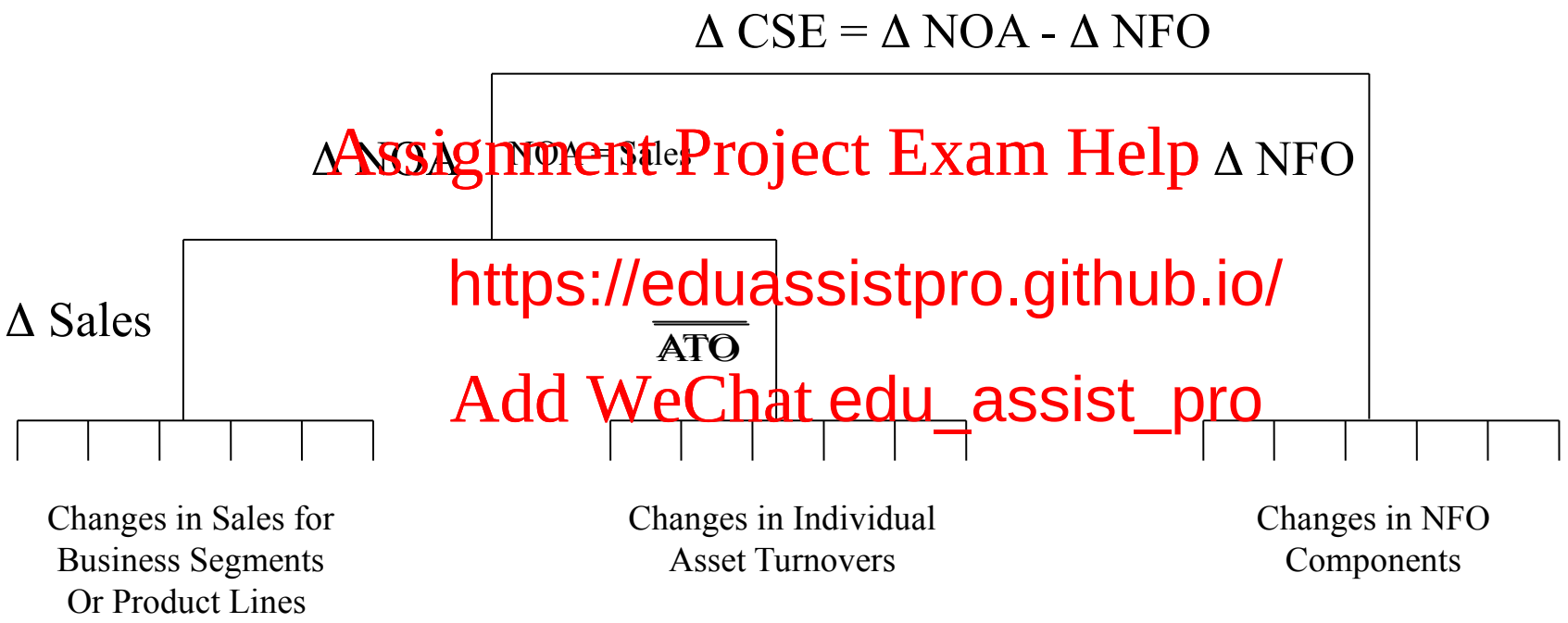
where NOA = sales recall: ATO =

$$\Rightarrow \quad \triangle S/E = \triangle(sales - \triangle NFO$$

→ drivers of the change (growt

- growth in sales
- change in NOA (through △sales & △ATO)
- change in FLEV (amount of net debt used to finance the change in NOA, as opposed to equity)

Change in S/E = Change due to change in sales at previous level of asset turnover + Change due to change in asset turnover + Change in financial leverage



In summary

what is a 'growth firm' a firm that can increase its 'residual earnings'

→ a 'growth firm' features:

- ✓ sustainable, growing sales
- ✓ high or increasing c
- ✓ high or improving asset turnovers

note: sustaining high 'core profit margins' indicates the presence of *'competitive advantage'*

without a 'durable' competitive advantage, the firm's residual earnings (abnormal earnings) will ultimately decline

PART 4 – Valuation Exercise applied to Coles

caveats !!!

- largely an '***art***' rather than a science
- involves considerable i udgement (subjective)
- you would each most likely arrive at sli nt interpretations and thereby different estimates that the ones I am pose
  - this doesn't make any particular set of estimates either 'more correct' or 'more incorrect'; just different!

  (although clearly some estimates appear more plausible than others, at least on the surface, until explained or justified)

PART 4 – Step 1: Forecast Sales

sales ‘drive’ the system !!

- ✓ a consideration of historical sales growth rates can be a ***starting*** point *BUT* …. need to develop a thorough understanding of the business and its environment to make meaningful sales forecasts

  - ➔ the firm’s business strategy
    the market for the firm’s products
    the firm’s marketing plan

    how the broader economic factors and the industry dynamics affect the business

‘constraints’ – regression to mean; sustainable growth rate; plausible terminal growth rate

***re*: Coles** ***IBIS*World** https://my.ibisworld.com/au/en/industry/g4111

Industry Outlook

Price competition in the Supermarkets and Grocery Stores industry is forecast to remain strong over the next five years.

Profit

Industry profitability is projec ext five years, despite weak household incomes and high

Competition

Internal industry competition is forecast to remain high over the next five years

Investing in technology

Major supermarkets will likely become more innovative and use new technologies to attract customers to increase their market share over the next five years.

Industry Life Cycle

The life cycle stage of this industry is ☑ **Growth**

LIFE CYCLE REASONS

- The industry is growing sli all economy

- Fierce competition is restricting the entry ers, but established players are expanding store networks

- Technological change in the industry is moderate and increasing

Industry Performance Data Historical & Prospective

Woolworths

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenues	54,505.7	55,492.2	58,921.7	61,155.0	60,868.4	58,276.0	55,669.0	56,726.0	59,984.0	63,675.0
ave = 1.82%		1.81%	6.18%	3.79%	-0.47%	-4.26%	-4.47%	1.90%	5.74%	6.15%
EBIT	3,329.90	3,919.60	3,733.70	3,783.10	3,748.40	2,564.00	2,326.00	2,548.00	2,724.00	3,219.00
ave = 0.79%		17.71%	-4.74%	1.32%	-0.92%	-31.60%	-9.28%	9.54%	6.91%	18.17%
CFO	2,991.10	2,873.80	2,719.90	3,472.70	3,345.10	2,358.00	3,122.00	2,930.00	2,948.00	4,561.00
ave = 7.42%		-3.92%	-5.36%	27.68%	-3.67%	-29.51%	32.40%	-6.15%	0.61%	54.72%
Op Margin	7.70	8.70	8.00				6.00	6.40	6.60	8.90
NPAT (%)	4.00	4.90	4.00				2.50	2.80	2.90	2.50
dividends	1.22	1.26	1.33	1.37	1.3		0.84	1.03	1.02	0.94
Payout ratio	69.00	56.00	70.00	70.00	71.0		76.00	84.00	77.00	74.00

Industry

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ave = 3.14%		2.89%	4.68%	3.97%	5.87%	3.99%	-0.88%	1.08%	1.15%	5.48%

Industry Performance Data **Outlook** (from IBIS*World*)

Year	**Revenue (%)**	IVA (%)	Establishments (%)	Enterprises (%)	Employment (%)	Exports (%)	Imports (%)	Wages (%)	Domestic Demand (%)
2020–21	**0.51**	-0.11	-0.84	-0.55	-1.12	N/A	N/A	-0.67	N/A
2021–22	**2.64**	2.64	0.13	-0.60	-0.01	N/A	N/A	1.50	N/A
2022–23	**1.76**	3.00	-0.37	-1.40	0.01	N/A	N/A	1.12	N/A
2023–24	**2.31**	2.30			-0.26	N/A	N/A	1.08	N/A
2024–25	**2.37**	2.37			-0.15	N/A	N/A	1.25	N/A
2025–26	**1.49**	1.50	0.98		0.01	N/A	N/A	1.40	N/A

caveats moving from industry forecasts to firm-level forecasts

- historical industry patterns can be a good 'starting' point, especially if the future is likely to be similar to the past … however, also need to recognise broad indicators to the contrary
  - gov't or trade statistics that forecast change in global economy, or the specific industry
  - forecasts of a recession or slowdown in GDP
  - shifts in industry-wide demand with changing demographics and/ consumer tastes

  → need to have a knowledge of industry trends and of the susceptibility of the industry to macroeconomic changes

- need to tailor the industry pr ecific firm features
  - firms have idiosyncratic features that yield 'driver ictably different from industry patterns

  → need to consider how the firm's future drivers may or will be different from the typical pattern in the industry (arguably the main factor relates to competition and the firm's reaction to it)

- focus on the drivers that are key to understanding the firm's profitability

  ⇒ start with industry 'drivers' (e.g., Table 16.3) *and then* adjust for firm-specific features

Sales forecasts – Coles

Based on the macroeconomic outlook, the industry outlook, and Coles historical performance and prospects to "exploit" growth opportunities:

- ✓ growth rates in 'core sales revenue' will range between 2.0% and 2.5% over the next 5 years, with the pattern largely following predicted industry growth pattern
- ✓ ultimately Coles' sales gr erminal growth rate)

	2019 A	2020 A	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,176	37,408	38,343	39,110	39,990	40,890	41,708
		-2.01%	2.50%	2.00%	2.25%	2.25%	2.00%

Step 1: Forecast Sales ✓

⇒ **Step 2: Forecast Core OI from Sales (before tax)**

⇒ **next steps:**

2a forecast ATO and calculate NOA implied by sales forecasts and forecasted ATO

2b revise sales forecasts n of 'asset constraints'

Explain changes in ATO by looking at individu overs
- A/R; inventory; property, plant & equip
- A/P; operating liability turnover

Also consider
- operating asset composition ratios
- operating liabilities composition ratios
- OLLEV

ATO forecast – Coles

2020 ATO = 3.065

2019 ATO = 38,176/13,102 = 2.914 (based on the adjusted 2019 NOA)

- ❑ is there any reason to believe that the ATO might or could change?

  → which accounts are sufficiently material to influence the ATO, and can they be changed? see th *f ROCE* (next slide)

  'material' accounts: in equipment; intangible assets accounts p visions

  examine related NOTES to the F/S to understand the roles of each account and the likelihood that they can be changed

- ❑ is the level of NOA implied by the estimated ATO and the sales forecasts supportable?

Asset Turnover Drivers		turnover = sales / item	inverse = item / sales
Operating Assets			
cash & cash equivalents	187	200.043	0.0050
receivables	434	86.194	0.0116
inventories	**2,166**	**17.271**	**0.0579**
assets held for resale	75	498.773	0.0020
other assets	190	196.884	0.0051
property, plant & equipment	**4,127**	9.064	**0.1103**
right-of-use assets			**0.2048**
intangible assets			**0.0427**
deferred tax assets	849		0.0227
equity accounted investments	217		0.0058
Total Operating Assets (OA)	**17,502**	2.137	0.4679
Operating Liabilities			
trade payables	**3,737**	**10.010**	**0.0999**
provisions	**1,333**	**28.063**	**0.0356**
other	227	164.793	0.0061
Total Operating Liabilities (OL)	**5,297**	7.062	0.1416
Net Operating Assets (NOA)	**12,205**	**3.065**	**0.3263**

2020 ATO = 3.065

2019 ATO = 38,176/13,102 = 2.914 (based on the adjusted 2019 NOA)

- ❑ is there any reason to believe that the ATO might or could change?

  not obvious that any of the 'material' accounts can or will change

  → set ATO = 3.00

  (also sensitivity un increase slightly over time)

- ❑ is the level of NOA implied by the estim d the sales forecasts supportable? ***YES*** sustainable growt 020 g^* = 3.4%

	2019 A	2020 A	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,176	37,408	38,343	39,110	39,990	40,890	41,708
NOA = sales / ATO of 3	13,102	12,205	12,781	13,037	13,330	13,630	13,903
% NOA			*4.72%*	2.00%	2.25%	2.25%	2.25%

2c gross profit margin = (core sales revenue – COGS) / sales

2 factors
- price
- cost

2020 (37,408 – 28,043) / 37,408 = 0.2504
2019 (38,176 – 29,253) / 38,176 = 0.2337

- slight improvement but is there any reason to believe that it could improve further?
  - no NOTE to help understand
  - Woolworth's gross profi 6 2019 – 0.2908

(but no reason to believe that the 2 companies aggr e same way e.g., branch and admin expenses)

set gross profit margin at **0.260** (and conduct sensitivity between 0.25 and 0.275)

		2021 E	2022 E	2023 E	2024 E	2025 E
Revenues		38,343	39,110	39,990	40,890	41,708
Gross Margin	(@ 0.260)	9,969	10,169	10,397	10,631	10,844

2d core operating expenses ⇒ administrative expenses

2020: (8,081 – 41) / 37,408 = 0.2149

2019: (8,031 + 42) / 38,176 = 0.2115

⇒ administrative expense ratio up slightly when sales down

➡ consistent with a 'fixed cost' component

➡ assume a modest decline over the 5-year hor 0.21 to 0.208 as sales increase, and then stabilise at 0.208

	2021 E	2022 E	2023 E	2024 E	2025 E
Revenues	38,343	39,110	39,990	40,890	41,708
Administrative Expense (%)	0.210	0.2095	0.209	0.2085	0.208
= Admin Expense	(8,052)	(8,194)	(8,358)	(8,526)	(8,675)

2f tax expense

current effective tax rate on PBT (i.e., after int) 2020: 25.85% 2019: 23.65%

⇒ assume 30% tax rate on 'core OI'

2g other operating revenue; equity accounted investments

- no NOTE to expla 20 level of $500 million

2h unusual OI

- given definition as 'non-recurring', assume 0

	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%)	(575)	(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**	**0**	**350**	**350**
Unusual Items	0	0	0	0	0
Total OI (after tax)	**1,692**	**1,732**	**1,777**	**1,823**	**1,868**

Step 1: Forecast Sales ✓

Steps 2 – 6: Forecast components of OI after tax ✓

⇒ **Step 7: Forecast OA and OL to obtain NOA**

** given the previous arguments surrounding the stability of asset turnover (ATO) and the inability to alter the 'materi that the turnovers for the OA and OL items remain unchange

Asset Turnover Drivers	Current turnover	Assumed turnover	2021	2022	2023	2024	2025
			(38,343)	(39,110)	(39,990)	(40,890)	(41,708)
Operating Assets							
cash & cash equivalents	200.043	200	192	196	200	204	209
receivables	86.194	86	446	455	465	475	485
inventories	17.271	17.25	2,223	2,267	2,318	2,370	2,418
assets held for resale	498.773	500	77	78	80	82	83
other assets	196.884	200	192	196	200	204	209
property, plant & equipment	9.064	9	4,260	4,346	4,443	4,543	4,634
right-of-use assets	4			8,234	8,419	8,608	8,781
intangible assets	2			1,700	1,739	1,778	1,813
deferred tax assets	44.061	44		89	909	929	948
equity accounted investments	172.387	175		23	229	234	238
Total Operating Assets (OA)	2.137	2.105	18,219	18,583	19,001	19,429	19,818
Operating Liabilities							
trade payables	10.010	10	3,834	3,911	3,999	4,089	4,171
provisions	28.063	28	1,369	1,397	1,428	1,460	1,490
other	164.793	165	232	237	242	248	253
Total Operating Liabilities (OL)	7.062	7.053	5,436	5,545	5,670	5,798	5,914
Net Operating Assets (NOA)	3.065	3.000	12,782	13,038	13,331	13,631	13,904

Step 1: Forecast Sales ✓

Steps 2 – 4: Forecast components of OI after tax ✓

Step 5: Forecast NOA ✓

⇒ **Step 8: Calculate RNOA, FCF, and ReOI**

RNOA =

ReOI (to firm) = $OI_t - k_F * NOA_{t-1}$

WACC = (NBC) + (k_E) = (3.36%) +(7.40%) = 6.25%

Session #10

Session #3

Step 9: '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**
%△			.60%	2.59%	2.47%
NOA	1		331	13,631	13,904
RNOA	0.1324	0.132	33	0.1337	0.1344
%△RNOA	*0.0269*	0.000	05	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%

Illustrative Calculations

Free Cash Flow (FCF) = OI – △NOA

2021: *1,692 – (12,782 – 12,205) = 1,115*
2022: *1,732 – (13,038 – 12,782) = 1,476*
2023: *1,777 – (13,331 – 13,038) = 1,484*
2024: *1,823 – (13,631 – 13,331) = 1,523*
2025: *1,868 – (13,*

*Residual Income (ReOI) = OI – k_e * NOA$_{t-1}$*

2021: *1,692 – 0.0625 * 12,205 = 929*
2022: *1,732 – 0.0625 * 13,038 = 933*
2023: *1,777 – 0.0625 * 13,331 = 962*
2024: *1,823 – 0.0625 * 13,631 = 990*
2025: *1,868 – 0.0625 * 13,904 = 1,016*

Abnormal Earnings (Residual Income) valuation model

+

= 12,205 + + + + +

= $40,015 million

FCF valuation model

= + + + +

= $43,298 million

Step 10 leverage (FLEV) and financing costs (NFE)

⇒ interest expense on long-term debt and lease liabilities

2020: FLEV = 3.6673

2020: NFE = 322

- assume property, plant & equipment (both p leased) grow at 1.5%
- assume capital structure remains largely unchanged → FLEV = 3.67
- assume interest rates ↑ ~ 0.5-0.6% current NBC = 3.36% → NBC = 4%

what happens to FLEV when S/E is calculated

	2020 A	2021 E	2022 E	2023 E	2024 E	2025 E
NFO (@ 1.5%)	9,590	9,734	9880	10,028	10,179	10,331
NFE (after tax)	322	389	394	401	407	413

Steps 11 , 12 & 13 CI, S/E, dividends, ReCI

	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,**		**427**	**1,473**	**1,518**
Core Other OI 500@ (1 – 0.3)	**3**			**350**	**350**
Unusual Items	0	0		0	0
Total OI (after tax)	**1,692**	**1,732**	**1,777**	**1,823**	**1,868**
Core NFE	(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	9,734	9,880	10,028	10,179	10,331
S/E = NOA - NFO	**3,048**	**3,158**	**3,303**	**3,452**	**3,573**
%△S/E			59%	4.51%	3.51%
Dividends	8		231	1,267	1,336
%△Div				2.92%	5.29%
ReCI (k = 7.4%) (to S/E)	1,109	1,111	2	1,172	1,200
%△ReOI		0.20%	2.79%	2.63%	2.39%

Illustrative Calculations

Dividends (Div) = CI – △S/E ± NCC *assume NCC = 0 (on average)*

2021: 1,303 – (3,048 – 2,615) = 870
2022: 1,337 – (3,158 – 3,048) = 1,227
2023: 1,376 – (3,303 – 3,158) = 1,231
2024: 1,416 – (3,452 – 3,303) = 1,267
2025: 1,455 – (3,5

*Residual Income (ReCI) = CI – k_e * BV_{t-1}*

*2021: 1,303 – 0.074 * 2,615 = 1,109*
*2022: 1,337 – 0.074 * 3,048 = 1,111*
*2023: 1,376 – 0.074 * 3,158 = 1,142*
*2024: 1,416 – 0.074 * 3,303 = 1,172*
*2025: 1,455 – 0.074 * 3,452 = 1,200*

Abnormal Earnings (Residual Income) valuation model

+

= 2,615 + + + + +

= $26,911.5 million

(** possible rounding errors – if all calculations carried through an Excel spreadsheet with no rounding, this figure becomes 26,905.0)

DDM valuation model

= + + + +

= $26,606.7 million

context

- current share price (20 January 2021) = $17.94

  ⇒ market capitalisation ≈ $18 * 1,334 million shares = $24,012 million

- Abnormal Earnings (Residual Income) valuation model

  ⇒ market capitalisation = $26,911.5 million

- DDM valuation model

  ⇒ market capitalisation = $26,606.7

'gap' suggests not quite to 'steady state'

- Sensitivity – assume g = 2.5% (instead of 3%)

  AE → $24,819.8 million

  DDM → $24,281.5 million

increased 'gap' → perhaps a bit 'extra' ***g*** left in DIV, or a a bit less in AE before reach 'steady state'

Summary of significant assumptions

- Sales growth 2.5% 2.0% 2.25% 2.25% 2.0%
- 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)
- Admin expenses assumed to d (had increased from 0.212 to 0.215)
- Financing costs assumed growth in PPE BC up 0.6%
- Unchanged capital structure
- Terminal growth (***g***) = 3%

PART 5 – 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 Statement*

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

Analysis of Financial Statements ✓

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

Industry dynamics ✓

➔ **Porter's five forces**

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

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