ACCT7106 – Session #2: Valuation & A Role for Accounting

PART 1 – Background

Our ***primary focus – corporate form*** of business:

shareholders ↔ board of directors ↔ management

re: management → operate firm

assumed objective of management = ***maximize shareholders' wealth***

⇒ ***maximize share price!***

Why maximize share price?

If management maximizes share price, investors can always sell their shares if they don't like the firm's policies and receive maximum price

Further, given well-functioning markets and rational investors, share price will reflect the market's risk attitude, time preference, and opportunity cost

Why not the more typical economic objective of maximizing profit?

- profit should be viewed relative to investment $\Rightarrow$ concept of opportunity cost
- since multiperiod, the time value of money must be acknowledged
- profit must be judged relative to risk

Roles of Management ➡ creation of value

1. Controller function ⇒ asset efficiency

i.e., efficient use of working capital and liquidity management
running the internal accounting system

2. Treasury function ⇒ long-term funds acquisition

i.e., debt or equity? - will affect the risk and tax position of the firm

3. Capital budgeting ⇒ real (productive) asset acquisition

i.e., composition of the firm's fixed assets
mix of capital and labour

⇒ determines the firm's profitability and operating risk

The historical results of management's decisions across these three functions are reflected in the firm's Balance Sheet ("identifies" and "values" assets, liabilities, and equities)

Consider the 2020 Balance Sheets ('*Consolidated Statement of Financial Position*') of both:

- ***Coles Group Limited*** (page 100 of its Annual Report)
- ***Woolworths Group*** (page 78 of its Annual Report)

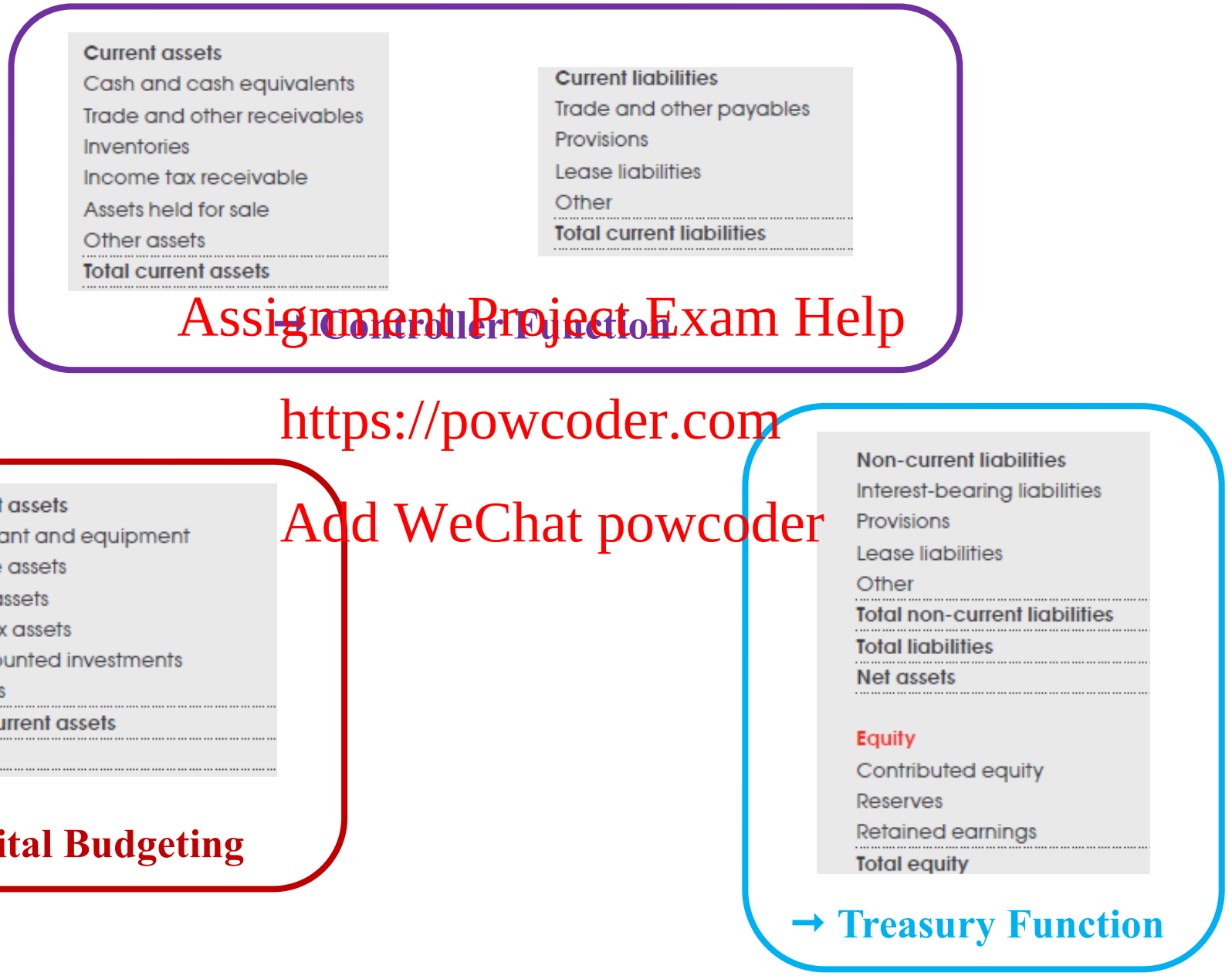
and the resultant way in which these B/S can be rearranged to represent the 3 functions

Finally, the B/S for the two companies can be compared given the reasonable commonality in the nature of their businesses

Statement of Financial Position
as at 28 June 2020

	NOTES	CONSOLIDATED 28 JUNE 2020 $M	CONSOLIDATED 30 JUNE 2019 $M
Assets			
Current assets			
Cash and cash equivalents	2.1	992	940
Trade and other receivables	2.2	434	360
Inventories	2.4	2,166	1,965
Income tax receivable		42	-
Assets held for sale	5.2	75	94
Other assets	2.3	70	47
Total current assets		**3,779**	**3,406**
Non-current assets			
Property, plant and equipment	2.5	4,127	4,119
Right-of-use assets	2.7	7,660	-
Intangible assets	2.6	1,597	1,541
Deferred tax assets	1.6	849	365
Equity accounted investments	5.1	217	212
Other assets	2.3	120	134
Total non-current assets		**14,570**	**6,371**
Total assets		**18,349**	**9,777**
Liabilities			
Current liabilities			
Trade and other payables	2.8	3,737	3,380
Provisions	2.9	861	743
Lease liabilities	2.7	885	-
Other		198	168
Total current liabilities		**5,681**	**4,291**
Non-current liabilities			
Interest-bearing liabilities	3.1	1,354	1,460
Provisions	2.9	472	598
Lease liabilities	2.7	8,198	-
Other		29	71
Total non-current liabilities		**10,053**	**2,129**
Total liabilities		**15,734**	**6,420**
Net assets		**2,615**	**3,357**
Equity			
Contributed equity	3.2	1,611	1,628
Reserves		43	42
Retained earnings		961	1,687
Total equity		**2,615**	**3,357**

and reorganised to fit with the 'financial executives' 3 functions:



Consolidated Statement of Financial Position

	NOTE	2020 $M	RESTATED[1] 2019 $M
Current assets			
Cash and cash equivalents		2,068	1,066
Trade and other receivables	3.1	740	682
Inventories		4,434	4,280
Other financial assets	3.2	534	45
Other current assets		16	–
		7,792	6,073
Assets held for sale	5.2	333	225
Total current assets		8,125	6,298
Non-current assets			
Trade and other receivables	3.1	154	145
Other financial assets	3.2	168	633
Lease assets	3.3.1	12,062	–
Property, plant and equipment	3.4	8,742	8,252
Intangible assets	3.5	7,717	7,793
Deferred tax assets	3.7.3	1,327	736
Other non-current assets		177	59
Total non-current assets		30,347	17,618
Total assets		38,472	23,916
Current liabilities			
Trade and other payables	3.8	7,508	6,676
Lease liabilities	3.3.2	1,560	–
Borrowings	4.6.3	2,027	274
Current tax payable		131	84
Other financial liabilities	3.2	84	58
Provisions	3.9	1,881	1,793
Total current liabilities		13,191	8,885
Non-current liabilities			
Lease liabilities	3.3.2	13,168	–
Borrowings	4.6.3	1,904	2,855
Other financial liabilities	3.2	3	24
Deferred tax liabilities	3.7.3	204	345
Provisions	3.9	918	986
Other non-current liabilities	3.10	52	337
Total non-current liabilities		16,249	4,547
Total liabilities		29,440	13,432
Net assets		9,032	10,484
Equity			
Contributed equity	4.3	6,022	5,828
Reserves	4.4	391	490
Retained earnings		2,329	3,783
Equity attributable to equity holders of the parent entity		8,742	10,101
Non-controlling interests	5.3.3	290	383
Total equity		9,032	10,484

and reorganised to fit with the 'financial executives' 3 functions:

Current assets
Cash and cash equivalents
Trade and other receivables
Inventories
Other financial assets
Other current assets

Assets held for sale
Total current assets

Current liabilities
Trade and other payables
Lease liabilities
Borrowings
Current tax payable
Other financial liabilities
Provisions
Total current liabilities

→ **Controller Function**

Non-current assets
Trade and other receivables
Other financial assets
Lease assets
Property, plant and equipment
Intangible assets
Deferred tax assets
Other non-current assets
Total non-current assets

→ **Capital Budgeting**

Non-current liabilities
Lease liabilities
Borrowings
Other financial liabilities
Deferred tax liabilities
Provisions
Other non-current liabilities
Total non-current liabilities
Total liabilities
Net assets
Equity
Contributed equity
Reserves
Retained earnings
Equity attributable to equity holders of the parent entity
Non-controlling interests
Total equity

→ **Treasury Function**

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Total equity		**9,032**	10,484

Controller Function → net working capital (current assets; current liabilities) → operations

	Coles Group		Woolworths Group	
Current Assets	**3,779**		**8,125**	
cash	992	26.25%	2,068	25.45%
inventories	2,164	57.32%	4,434	54.57%
receivables	434	11.48%	740	9.11%
Current Liabilities	**5,681**		**13,191**	
payables	3,737	65.78%	7,508	56.92%
borrowings	---		2,027	15.37%
provisions	861	15.16%	1,881	14.26%
lease liabilities	885	15.58%	1,560	11.83%

Capital Budgeting → investment in long-term assets

	Coles Group		Woolworths Group	
Non-Current Assets	**14,570**		**30,347**	
lease assets	7,660	52.57%	12,062	39.75%
p,p&e	4,127	28.33%	8,742	28.81%
intangible assets	1,597	10.96%	7,717	25.43%
deferred tax assets	849	5.83%	1,327	4.37%
Non-Cur Assets % of TA	79.40%		78.88%	
lease & ppe % non-curr	52.57 + 28.33 = 80.90%		39.75+ 28.81 = 68.56%	
lease & ppe % TA	64.24%		54.08%	

Treasury Function → long-term financing decisions

	Coles Group		Woolworths Group	
Non-Current Liabilities	**10,053**		**16,249**	
lease liabilities	8,198	81.55%	13,168	81.04%
debt	1,354	13.47%	1,904	11.72%
provisions	472	4.70%	918	5.65%
Equity	**2,615**		**9,032**	
contributed	1,611	61.61%	6,022	66.67%
retained earnings	961	36.75%	2,329	25.79%
Total Debt / Total Assets	85.75%		76.52%	
Non-Curr Debt / Equity	3.844		1.799	

Finally, what are the two companies actually "worth"?

Coles Group Limited

- *Balance Sheet* Net Assets (Net Book Value) = Equity = $2,615 million
- current share price (3 December 2020) = $17.98

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

→ market-to-book ratio = 24,012 / 2,615 = 9.18

Woolworths Group

- *Balance Sheet* Net Assets (Net Book Value) = Equity = $9,032 million
- current share price (3 December 2020) = $37.84

⇒ market capitalisation ≈ $38 * 1,288 million shares = $48,944 million

→ market-to-book ratio = 48,944 / 9,032 = 5.42

accounting value ≠ ***market value***

accounting value ≠ ***market value***

Why Not? reasons include

- orientation (historical vs. future)
- GAAP (accounting 'conventions')
- perspective (accounting vs. economic income)

critically, market value reflects a 'future orientation'

⇨ need to estimate future cash flows and future discount rates to conduct the 'valuation exercise'

PART 2 – Equity Valuation (Overview)

In general terms, the value of equity can be expressed as:

$$V_0 = \sum_{t=1}^{\infty} \frac{x_t}{(1+k_t)^t} \quad = + + + + +$$

where x_t and k_t are the relevant flows and discount rate, respectively, for period t

note, the formula adopts an infinite investment horizon ($t = 1 \rightarrow \infty$) because equity financing is permanent financing.

⇒ **in principle, must estimate both the amount and the timing of the future flows, and establish an appropriate (period-specific) discount rate**

Both the task and the formula can be made somewhat easier if certain simplifying assumptions are adopted

If the equity instrument is *assumed* to yield a constant (uniform) stream of flows in perpetuity and the discount rate is *assumed* to remain constant (a flat term structure):

$$V_0 = \frac{x}{k}$$

Alternatively, if the stream is *assumed* to grow at a constant rate, g, in perpetuity and the discount rate is *assumed* to remain constant, the valuation equation reduces to:

$$V_0 = \frac{x_1}{k - g}$$

note the timing – V_0 and x_1

➡ value today (time 0) and year 1 flow ($t = 1$)

Finally, drawing upon the above: under the assumptions

- constant discount rate (flat term structure) → the 'time subscript' can be dropped from k
- that year-by-year estimates are made for a finite period (*n* years) after which flows are assumed to, on average, grow at a constant rate *g*

the valuation model then simplifies to the following:

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

$= + \ldots +$

year-by-year estimates of x_t for n years

terminal value at the end of year n → P_n

Example #2-1: *(#1-3 repeated)*

Suppose that an analyst has reliably projected the future cash flows for CC Ltd. over the next 5 years to be as follows:

year	**1**	**2**	**3**	**4**	**5**
FCF	3.429	3.753	4.059	4.310	4.488

The analyst also believes that these flows will grow at an average annual rate of 5% post year 5. Finally, the analyst believes that CC's risk profile is expected to remain unchanged into the foreseeable future and that the appropriate discount rate, k_e, is 10.7%.

Based on these forecasts, the residual equity value (value to the common shareholder) of CC Ltd. is:

$$V_0 = \frac{3.429}{(1.107)} + \frac{3.753}{(1.107)^2} + \frac{4.059}{(1.107)^3} + \frac{4.310}{(1.107)^4} + \frac{4.488}{(1.107)^5}$$

year-by-year estimates for 5 years

$$+\left(\frac{4.488(1.05)}{0.107-0.05}\right)\left(\frac{1}{(1.107)^5}\right)$$

Terminal value = PV of flows from year 6 onward

$$= 3.097 + 3.063 + 2.992 + 2.870 + 2.670 + 49.731 = \$64.423$$

Example #2-2:

Suppose that based on their earnings projections (forecasts), analysts believe that ZZ Ltd. will pay the following dividends per share in each of the next 5 years:

year	**1**	**2**	**3**	**4**	**5**
Dividends	$0.50	$0.50	$0.52	$0.55	$0.57

The analysts also believe that the shares will be selling at a price of $12.50 at the end of 5 years (i.e., $P_5 = \$12.50$).

Finally, the analyst believes that ZZ's risk profile is expected to remain unchanged into the foreseeable future and that the appropriate discount rate is 8%?

$= + + + + +$

$= + + + + +$ $= \$10.60$

⇒ if as an investor, you pay $10.60 for a share of ZZ today, receive each of the forecasted dividends, and then sell the share for $12.50 at the end of year 5, you will earn an annual return of 8% (your required rate of return based on the assessed risk of the shares)

if you pay more than $10.60, your return will be less than 8% (i.e., insufficient)

if you pay less than $10.60, your return will be greater than 8% (i.e., attractive ≡ ‘abnormal’)

More generally,

if the shares are currently selling for less than $10.60, then based on the analysts' forecasts of dividends, future price, and risk (discount rate), the shares are 'underpriced'

→ demand > supply and the price will be bid up

alternatively, if they are currently selling at a price higher than $10.60, they are 'overpriced'

→ demand < supply and the price will fall

in equilibrium, the price should settle to $10.60 at which point supply = demand

further, the price should remain stable until new information arises that leads to a revision in either or both of: (1) the expected future dividends; (2) risk (discount rate)

notes – underlying assumptions: informationally efficient markets
common beliefs (no information asymmetries)

PART 3 – Market Efficiency

three general types of efficiency relevant to the functioning of the capital markets:

- **Operational efficiency:** An operationally efficient stock market is one that carries out its operations at as low a cost as possible. There must be competition between the buyers and sellers on a particular stock exchange, and competition between different exchanges to attract those buyers and sellers.
- **Allocational efficiency:** Given finite resources, they should be allocated to their best use. An allocationally efficient market is one that channels available funds to firms with the most promising real investment opportunities.
- **Informational (pricing) efficiency:** An informationally (pricing) efficient market is one in which the market price of a stock reflects all relevant information about the stock. Further, the price of the stock will adjust rapidly to the release of any price relevant new information. Thus, in an informationally efficient market, the current share price reflects all current and historical information; only new information causes the price to change.

While each is a desirable attribute, informational (pricing) efficiency is fundamental. A basic requirement for the smooth functioning of a securities market is that all traders believe that the price at which they trade (the market price) is in some sense “fair” or “correct.”

If investors become concerned that the price is not “fair”, the secondary market would then become less active, or in the limit might even collapse. Importantly, without an active secondary market, the primary market would likely become far less viable.

An informationally (pricing) efficient market gives investors the confidence to buy long-term securities because they know that they can sell those securities to someone else at any time, and moreover, that the price at which they sell (or buy) will be a fair one.

Note, an informationally efficient market is also important to the financial executive who uses market value as a measure of management performance. Undertaking corporate actions that maximize share price is only meaningful if that market value accurately reflects the actions of the firm’s management

Under the efficient market hypothesis (EMH), there are three forms of informational (pricing) efficiency. These forms differ by the type of information available, and to what extent the price reflects each type of information:

- **Weak form:** current security prices only reflect all historical market data
- **Semi-strong form:** current security prices reflect all publicly known and available information, including historical stock market data
- **Strong form:** current security prices fully reflect all information, both public and private

Note, the three forms build a hierarchy. The information set under the semi-strong form includes that under the weak form (historical market data). Thus, for a market to be semi-strong form efficient, it must also be weak form efficient. Similarly, the information set under the strong form (all public and private information) included that under both the semi-strong and weak form. Thus, for a market to be strong form efficient, it must also be both semi-strong and weak form efficient.

The key implication of the EMH is that no investor should be able to use a particular form of information to their advantage – this information should already be impounded in share price.

Overall, the evidence supports both the weak and largely the semi-strong forms of the EMH. The evidence suggests that investors basically cannot use historical market data or publicly available information to pick stocks. Stock prices already reflect these sources of information.

The evidence does suggest that insider (private) information can be used to successfully pick stocks. However, this is illegal. Insider trading occurs when an individual buys or sells shares based on inside information — price-sensitive information not yet made publicly available.

This is where the role of an active regulatory body such as ASIC becomes important. First, by requiring that information relevant to pricing securities is widely disseminated, the regulator is ensuring that this information is available to all investors and as such, no investor has an information advantage. Second, by enforcing insider trading laws, the regulator can seek to reduce the likelihood of any one market participant trading with an information advantage. However, notwithstanding the role of the regulator, there is still periodic evidence of insider trading and hence the market is not strong-form efficient.

In summary, informational (pricing) efficiency is critical for three key reasons:

- **It encourages people to buy shares.** Ultimately, a reticence to invest can lead to a lack of funds for companies and inhibit growth
- **It facilitates financial management.** Sound financial decisions can only be made if the company's share is correctly priced. Any implications of a decision that the firm makes, need to be fully and correctly reflected in the share price
- **It helps to allocate resources.** If a well performing company has under-valued shares because the market has priced them incorrectly, the company won't receive an appropriate allocation of funds from investors. This will have a detrimental effect on the overall wealth of society as a whole because the available funds will not have been allocated to their most productive uses

Note, prices sometimes deviate from the price implied by publicly available information. The market doesn't always react as expected, and human behaviour has much to do with it

e.g., processing costs and time
overconfidence
loss aversion

*Aside – **'fundamental analysis'***

Australian Investors Association (AIA) –

Fundamental analysis attempts to determine the value of a company by analysing the financial data from the annual report and using other qualitative data about the company and the environment in which they operate. This value is often called 'intrinsic value'.

Fundamental analysis assumes that over the long term, a stock price will reflect the company's intrinsic value.

Investopedia

'Fundamental Analysis' is a method of evaluating a security that entails attempting to measure its intrinsic value by examining related economic, financial and other qualitative and quantitative factors.

Fundamental analysts attempt to study everything that can affect the security's value, including macroeconomic factors (like the overall economy and industry conditions) and company-specific factors (like financial condition and management).

Investopedia:

Fundamental analysis attempts to measure a security's intrinsic value by examining related economic and financial factors including the balance sheet, strategic initiatives, microeconomic indicators, and consumer behavior.

Fundamental analysis (FA) is a method of measuring a security's intrinsic value by examining related economic and financial factors. Fundamental analysts study anything that can affect the security's value, from macroeconomic factors such as the state of the economy and industry conditions to microeconomic factors like the effectiveness of the company's management.

The end goal is to arrive at a number that an investor can compare with a security's current price in order to see whether the security is undervalued or overvalued.

This method of stock analysis is considered to be in contrast to technical analysis which forecasts the direction of prices through an analysis of historical market data such as price and volume.

Why bother undertaking ‘fundamental analysis’ if capital markets are informationally efficient (semi-strong)?

- ✓ Circularity – a market is only efficient if investors/analysts search for new information, and then make investment decisions (trade) on the information that they uncover (i.e., the market is only efficient if investors/analysts behave as if it isn’t)
- ✓ By being the “first” to uncover new information, the investor can be the first to trade on the information and thereby benefit through the price adjustment process

PART 4 – Implementing the Valuation Model

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

$= + \ldots +$

terminal value at the end of year n → P_n

Issue #1 **– discount rate (*k*):**

Issue #2 **– investment horizon (*n*):**

Issue #3 **– choice of flow measure (*x*):** (e.g., dividends, free cash flow, earnings)

Issue #4 **– estimating future values of '*x*'** (on a year-by-year basis for '*n*' years, and then the 'on average' growth rate, *g*, over the extended period)

Issue #1 **– discount rate:**

In general, appropriate discount rate is the rate of return required by investors to induce them to commit capital, given the level of risk involved

→ $R = R_F + E(I) + RP$

where R_F = risk-free rate of return,

$E(I)$ = expected rate of inflation,

RP = risk premium specific to investment

If the objective is to value the firm in aggregate (i.e., its assets), the appropriate figure is the firm's weighted average cost of capital.

Alternatively, if the objective is to value the firm from the perspective of the common shareholder, the appropriate figure is the firm's cost of equity capital

One of the most commonly adopted approaches to estimating a firm's cost of equity capital is through a CAPM-based type of measure

Total Risk	=	**systematic risk** (*market-related*)	+	**unsystematic risk** (*firm-specific*)

capital market theory argues that investors can eliminate unsystematic (firm-specific) risk through portfolio formation but cannot eliminate the common / systematic (market-related) risk

note total risk is typically thought of in terms of the variance of the security's return distribution, σ^2

it can be estimated either using historical return data or through scenario forecasting (i.e., predicting possible future outcomes and their associated probabilities).

The CAPM then bases the investors' required rate of return on systematic risk. Specifically, the CAPM predicts that the required rate of return on common equity is:

$$k_e = R_F + \beta\,[E(R_M) - R_F]$$

where $\boldsymbol{R_F}$ = risk-free rate of return,

$\boldsymbol{E(R_M)}$ = expected return on market portfolio

$\boldsymbol{\beta}$ = firm's beta

$[\boldsymbol{E(R_M) - R_F}]$ is referred to as the 'market price of risk' and represents the "extra" return that an investor requires for investing in the market portfolio of (risky) equity securities over the risk-free asset

The firm's beta, $\boldsymbol{\beta}$, measures the sensitivity of the firm's return to changes in the return to the market portfolio

The beta-risk of the market portfolio, $\boldsymbol{\beta_M}$, is equal to 1 by construction

In estimating k_e using the CAPM, its three underlying inputs need to be measured

- typically, $\boldsymbol{R_F}$ is estimated using the return on government bonds but …. what maturity should be used? short-term? long-term?

- over what period of time should the historic market price of risk, $[\boldsymbol{E(R_M) - R_F}]$, be estimated? How should the average be determined – geometric mean or arithmetic mean?

- the firm's $\boldsymbol{\beta}$ is typically estimated using the market model based on historical return data

$$R_{jt} = \alpha + \beta_j R_{Mt} + \varepsilon_{jt}$$

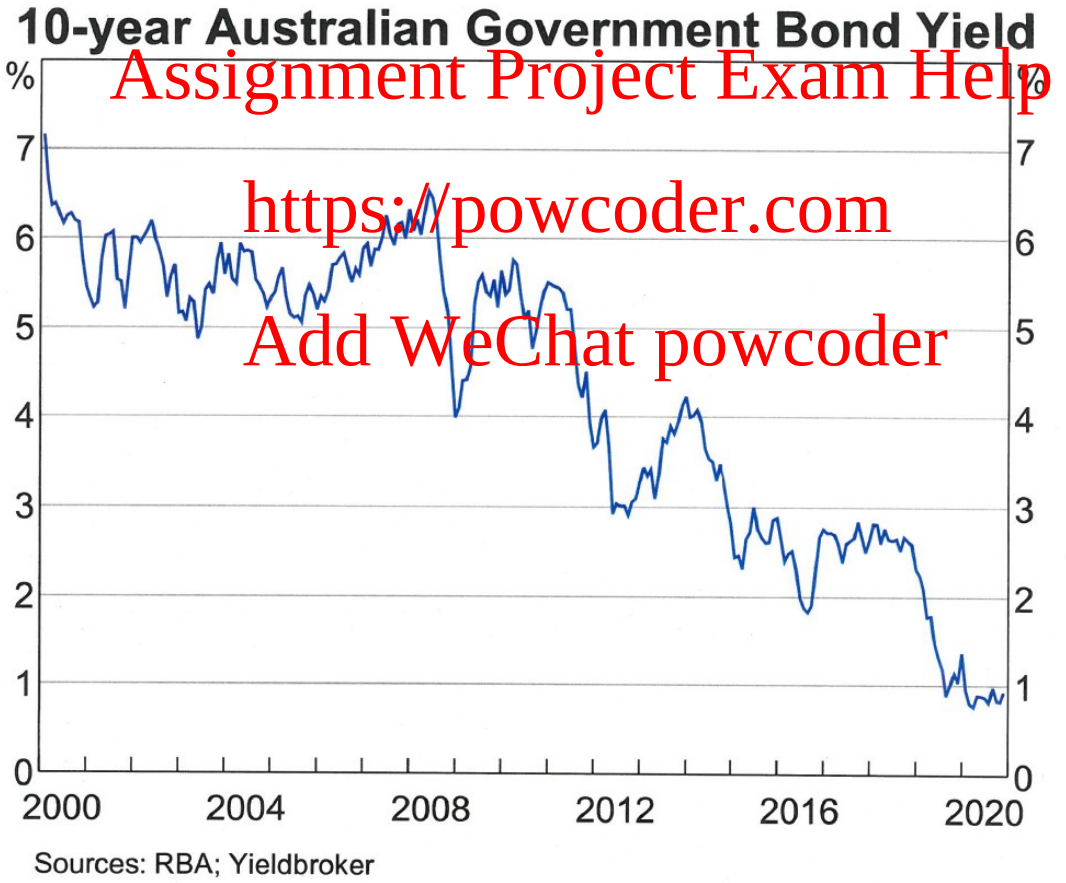
Data over what period of time should be used? What is the proxy for the market portfolio (ASX 100?; ASX 200?; All Ordinaries? or ….)? Daily data? Monthly data?

Note, this is an estimate of the historical beta since it is based upon historical return data.

However, if the firm's risk profile changes, for example through an increase in the firm's debt-to-equity ratio, beta will increase and the firm's cost of equity capital will also increase

- for, R_F consider the return on 10-year government bonds – note, while their yield is currently around 1%, their historical average is somewhat higher

  ➡ use a figure that reflects the 'on average' over the foreseeable future, for example 3 – 5%



- over an extended period, the market price of risk, $[E(R_M) - R_F]$, has **averaged between 5% and 7%**
  - an updated estimate for the market price of risk across many countries can be obtained from Prof. Aswath Damodaran's website

    http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html
  - the current figure cited for Australia (1 July 2020) is 5.23% - this figure also applies to many similar countries such as the U.S. and Canada, although the cited figure is 5.96% for the U.K.
  - according to this 2017 KPMG survey of Australian practitioners, most use a MRP of 6%

- the β for most firms is broadly available from various financial services – for example, from CommSec, the β on Coles' common shares is currently 0.73 and β on Woolworth's common shares is currently 0.64 (although a number of different websites show values that are quite a bit lower)

Example #2-3:

The common shares of AGF Management Limited have a beta of 1.36. Historically, the market price of risk, $R_M - R_F$, has averaged about 6% per year, and the current risk-free rate is 3%.

(a) What is the required rate of return on the common shares of AGF?

from the CAPM

$$k_e = R_F + \beta\,[E(R_M) - R_F] = 0.03 + 1.36\,[0.06] = 0.1116 \quad \Rightarrow \quad 11.16\%$$

(b) If investors expect AGF to pay a dividend of \$1.10 per share next year and \$1.25 in two years, and that the price of the shares will be \$10 in two years, what is the current price of AGF common shares?

= + + = + + = \$10.09

PART 5 – Corporate Risk

"Intuitively, investment risk is concerned with the range of possible outcomes from an investment; the greater this range, the greater the risk … Risk refers to the bunching of possible returns about an investment's expected return"

(R. Higgins, *Analysis for Financial Management*, 6th ed.)

As can be seen from the fundamental valuation equation for common equity, an investment's expected return depends on the cash flows of the underlying firm. Thus, investment risk is tied to the riskiness of the firm's earnings or cash flow.

business risk "The equity risk that comes from the nature of the firm's operating activities"

⇒ in essence, the volatility or variability of the firm's operating income

Further, as demonstrated in the following examples, leverage (both operating and financial) will magnify business risk upon converting it into equity risk

operating leverage ⇒ degree to which operating costs are fixed

financial leverage ⇒ degree to which financing costs are fixed

Example #2-4: consider the following three situations for a given firm

A: labour intensive production, no debt, 1,000 C/S
unit selling price = $2.00 variable costs = $1.00 fixed expenses = $5,000

B1: capital intensive production, no debt, 1,000 C/S
unit selling price = $2.00 variable costs = $0.50 fixed expenses = $10,000

B.2: debt with an interest expense of $1,000 sold and proceeds used to repurchase 400 common shares

projected sales ranging from 4,800 units (recession) to 11,779 units (economic boom)

Sample calculations:

Situation A under economic recession (sales volume = 4,800 units)

→ selling price = $2 variable costs = $1 fixed costs =$5,000

earnings = 4,800(2 – 1) – 5,000 = – $200

earnings per share (EPS) = – $200 / 1,000 = ($0.20)

Situation B.1 under economic prosperity (sales volume = 11,779 units)

→ selling price = $2 variable costs = $0.50 fixed costs =$10,000

earnings = 11,779(2.00 – 0.50) – 10,000 = $7,668.50

earnings per share (EPS) = 7,668.50 / 1,000 = $7.67

Situation B.2 under normal economic times (sales volume = 7,500 units)

→ selling price = $2 variable costs = $0.50 fixed costs =$10,000

earnings = 7,500(2.00 – 0.50) – 10,000 – 1,000 = $250

earnings per share (EPS) = 250 / (1,000 – 400) = $0.42

the EPS figures under different combinations of sales volumes and leverage scenarios:

	Unit Sales				
	(recession)		(normal)		(prosperity)
	4,800	**6,000**	**7,500**	**9,375**	**11,779**
A	(0.20)	1.00	2.50	4.38	6.72
+ op lev					
B.1	(2.80)	(1.00)	1.25	4.06	7.58
+ fin lev					
B.2	(6.33)	(3.33)	0.42	5.11	10.97

Why is business risk priced?

A firm's earnings potential is linked to the overall earnings potential of the market (the economy)

In good times, earnings will, on average, improve while during a recession, earnings will, on average, decline

Thus, there is a systematic or nondiversifiable component to a firm's earnings (an "earnings beta") – it is this systematic component of business risk that will be priced

Further, as was demonstrated above, both operating and financial leverage serve to magnify a firm's business risk

Thus, both forms of leverage will ultimately serve to magnify a firm's beta risk and consequently increase its required rate of return

'bottom line' – if a firm's risk profile changes (e.g., a change in financial leverage; change in production technologies; change in product line; etc. etc.), historical measures of risk are likely no longer applicable and must therefore be adjusted

PART 6 – Implementing the Valuation Model (cont)

Issue #2 **– investment horizon:**

the conceptual valuation model adopts an infinite horizon under the assumption that the firm will continue in perpetuity

- however, unlikely that any firm will operate forever – far more likely that, at some point in the future, the firm will cease operations and pay a liquidating dividend

- additionally, from an implementation perspective, it is impractical to estimate flows over an indefinite planning horizon.

⇒ preferred approach = predict future year-by-year flows for some finite number of years and then estimate the likely residual or terminal value at the end of this forecast horizon.

→ what constitutes an appropriate forecast horizon?

→ involves trade-offs

Short forecast horizon (e.g., 2 – 3 years):

- enhances likely accuracy of the estimated flows (the 'projections');
- near-term flows also have the heaviest weight in the present value computations.
  - conversely, a relatively short forecast horizon causes a large portion of the total present value to be relegated to the residual value;
  - further, valuation process is difficult (impossible) when near-term flows are projected to be negative, as with new, innovative and rapidly growing firms

Longer forecast horizon (e.g., 10 to 15 years):

- reduces the influence of the estimated residual value on the total present value
- allows for start-up companies to reach a stage of viability.
  - the trade-off is that the predictive accuracy of detailed flow forecasts well into the future is likely to be questionable.

Summary:

best to select a forecast horizon which coincides with the point at which a firm's flow pattern is projected to settle into a relatively stable equilibrium (e.g., either no growth or growth at a stable and defensible rate).

this is also important because of the structure of the residual (terminal) component

- model does NOT work well when the growth rate approaches the discount rate in magnitude (i.e., when $k - g$ is small) and does not make sense when $g > k$ (i.e., when $k - g$ is negative).
- however, competition, technological change, and new entrants into the industry (among other factors) will ensure that g is measurably smaller than k over the longer term

→ in applying the model, analyst must attempt to estimate the long-term growth rate

Analysts typically select a forecast horizon in the range of 3 to 5 year

To illustrate the importance of the terminal value and the estimate of '*g*':

An analyst forecasts the firm's free cash flows (FCF) in year 6 to be $25 million and estimates that the firm's cost of equity at 15%.

If the analyst believes that there will be zero growth in future (post year 6) cash flows, the estimated terminal value, in present value terms, will be:

$TV_0 =$ (= (= 72.0546

@ g = 4%	$TV_0 =$ 102.19	@ g = 14%	$TV_0 =$ 1,232.13
@ g = 8%	$TV_0 =$ 166.75	@ g = 14.5%	$TV_0 =$ 2,475.08
@ g = 12%	$TV_0 =$ 403.51	@ g = 14.9%	$TV_0 =$ 12,418.61

Issue #3 **– flow measure:**

two basic flow measures

- earnings
- cash flow
  - cash flows to the firm
  - cash flows to the investor (dividends)

re: Cash Flows

rationales for adopting cash flow-based as opposed to an earnings-based valuation:

- investors can not spend earnings for future consumption
- accounting earnings affected by arbitrary choices in such important areas as cost of sales, depreciation, and pension expense, among many other areas
- earnings are subject to purposeful 'management' (or even 'manipulation')
- earnings do not necessarily coincide with the timing of cash inflows and outflows

If one adopts a cash flow based valuation approach, the subsequent decision is then

– expected cash flows to investors (dividends)?
– expected cash flows to the firm?

the two will only differ to the extent that the firm reinvests a portion of the cash flows generated during a period (as opposed to a 100% payout policy)

Note, 'fundamental valuation' is conceptually based on the 'dividend valuation model' because dividends are literally the cash flows that investors actually receive

Note, 'fundamental valuation' is conceptually based on the 'dividend valuation model' because dividends are literally the cash flows that investors actually receive

If the firm generates a rate of return on the retained cash equal to the discount rate used by the investor (i.e., the cost of equity), then the two sets of cash flows will yield the same valuation.

Alternatively, if the funds can be reinvested at a rate exceeding the cost of equity (+ NPV), the "abnormal" growth will lead to enhanced firm value and dividend policy will matter

General form of the dividend valuation model:

$$P0=\sum_{t=1}^{\infty}\frac{E(Dt)}{(1+kt)^{t}} = \frac{E(D1)}{(1+k1)}+\frac{E(D2)}{(1+k2)^{2}}+\ldots\ldots\ldots - \sum_{t=1}^{n}\frac{E(Dt)}{(1+k)^{t}}+\frac{E(liqdiv_{n})}{(1+k)^{n}}$$

General form of the free cash flow model:

$$P0=\sum_{t=1}^{\infty}\frac{E(FCFt)}{(1+kt)^{t}} = \sum_{t=1}^{n}\frac{E(FCFt)}{(1+k)^{t}}+\frac{E(termFCFn)}{(1+k)^{n}}$$

nominal versus real cash flows –

- does not matter as long as the discount rate used is consistent
- typically, the cost of capital (equity) figure incorporates expected inflation

  if so, the valuation model should be based on nominal cash flows

pre-tax versus after-tax cash flows –

- shareholders can only benefit from after-tax cash flows, the analysis should be based on after-tax cash flows (and after-tax cost of capital)

leveraged versus unleveraged FCF –

unleveraged = cash flows before considering capital structure (interest)

→ cash flows available to service debt, pay dividends, and for reinvestment

⇒ to value the firm's assets (and WACC)

leveraged = cash flows available to the common shareholders (for dividends or reinvestment

⇒ to value the firm's common shares (and COEC)

PART 7 – Earnings-based Valuation

development of an earnings-based valuation model

→ attempt to base the valuation exercise on accounting numbers directly

notwithstanding the apparent limitations of accounting numbers (e.g., earnings often fail to reflect the timing of cash flows; earnings are subject to 'earnings management'), recent literature presents a "defensible" accounting-based valuation model, the so-called abnormal earnings valuation model of Ohlson [1995] and Feltham and Ohlson [1995, 1996]

AE (***RIM***) valuation model takes as its foundations:

- ✓ fundamental dividend valuation model
- ✓ the 'clean surplus relation'

fundamental dividend valuation model

$$V_0 = \sum_{t=1}^{\infty} \frac{E(D_t)}{(1+k)^t}$$

'clean surplus relation' ⇒ reconciliation of the shareholders' equity account

i.e., shareholders' equity (book value) at year-end

= beginning shareholders' equity + income – dividends + net capital contributions

➡ shareholders' equity

increases with 'income' & sale of new shares

decreases with dividends' & share repurchases

Consider the shareholders' equity section of Coles Balance Sheet

Equity			
Contributed equity	3.2	1,611	1,628
Reserves		43	42
Retained earnings		961	1,687
Total equity		**2,615**	**3,357**

⇒ two core components

contributed equity ≡ funds from sale of new shares

retained earnings ≡ income retained → + income – dividends

Statement of Changes in Equity

	ATTRIBUTABLE TO EQUITY HOLDERS OF THE PARENT				
	CONTRIBUTED EQUITY $M	SHARE-BASED PAYMENTS RESERVE $M	CASH FLOW HEDGE RESERVE $M	RETAINED EARNINGS $M	TOTAL $M
At 1 July 2019	**1,628**	**43**	**(1)**	**1,687**	**3,357**
Effect of adoption of AASB 16 *Leases*	-	-	-	(831)	(831)
At 1 July 2019 (adjusted)	**1,628**	**43**	**(1)**	**856**	**2,526**
Net profit for the year	-	-	-	978	978
Other comprehensive income	-	-	(12)	-	(12)
Total comprehensive income for the year	-	-	**(12)**	**978**	**966**
Share-based payments expense	-	13	-	-	13
Purchase of shares under Equity Incentive Plan	(17)	-	-	-	(17)
Dividends paid	-	-	-	(873)	(873)
Balance as at 28 June 2020	**1,611**	**56**	**(13)**	**961**	**2,615**

Accounting adjustment

Income

Dividends

fundamental dividend valuation model

$$V_0 = \sum_{t=1}^{\infty} \frac{E(D_t)}{(1+k)^t}$$

'clean surplus relation'

$$BV_t = BV_{t-1} + E_t + NCC_t - D_t$$

and algebraically rearranged to represent dividends

$$D_t = BV_{t-1} + E_t + NCC - BV_t$$

next, sub-dividing earnings into 'normal' and 'abnormal' components i.e.,

$$AE_t = E_t - k * BV_{t-1} \rightarrow \qquad E_t = AE_t + k * BV_{t-1}$$

To illustrate the intuition, consider a $100 million investment; COEC (k) = 8%; NI = $15 million

'normal income' = 0.08 * 100 = $ 8 million

'abnormal income' = 15 – 8 = $7 million

⇒ to exactly provide the required rate of return, the earnings from the investment must be $8 million ('normal income')

anything in excess of $8 million represents 'abnormal income' (above required returns) → positive NPV

Thus, for the **'clean surplus relation'**, the development is as follows:

$$BV_t = BV_{t-1} + E_t + NCC - D_t$$

and algebraically rearranged to represent dividends

$$D_t = BV_{t-1} + E_t + NCC - BV_t$$

next, sub-dividing earnings into 'normal' and 'abnormal' components i.e.,

$$E_t = AE_t + k*BV_{t-1}$$

finally, substituting for E_t in the D_t equation and assuming NCC = 0

$$\Rightarrow \boldsymbol{D_t = BV_{t-1} + AE_t + k * BV_{t-1} - BV_t = \{BV_{t-1}(1 + k) - BV_t\} + AE_t}$$

We are then left with the following expression for dividends which can then be substituted into the fundamental dividend valuation model:

$$D_t = \{BV_{t-1}(1+k) - BV_t\} + AE_t$$

$$V_0 = \sum_{t=1}^{\infty} \frac{E(D_t)}{(1+k)^t}$$

+

and finally expanding the expression:

+

+

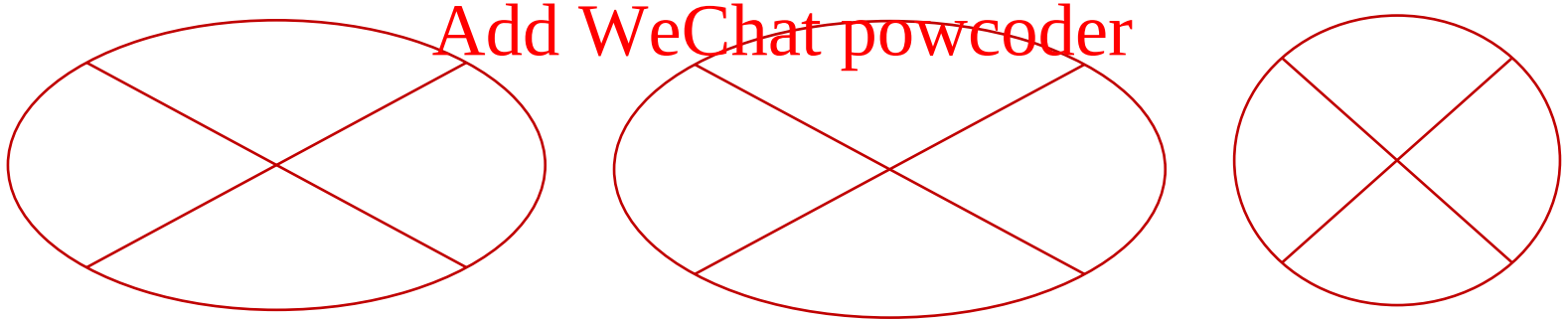
and for the first set of terms:

$+ \ldots\ldots +$

$= + \ldots\ldots$

$= + \ldots\ldots$

$= BV_0$



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and thus the final expression reduces to the following:

+

note: the abnormal earnings terms in the equation essentially reflect "goodwill" (i.e., future expected excess earnings)

Immediate implications of the model include:

- if a firm can only earn at a rate of return equal to k, investors should only be willing to pay BV for the firm (if $E_t = k * BV_{t-1}$ then $AE = 0$)

- the deviation of the firm's market value from its BV depends on its ability to generate abnormal earnings (i.e., to undertake positive NPV projects)

PART 8 – Abnormal Earnings Model: Illustration

In principle, valuation based on discounted AE delivers exactly the same estimate as discounted cash-flow based models (since the AE model is built only on the fundamental dividend valuation model and the accounting clean surplus relation).

Example #2-5:

An all-equity financed firm has as its only asset inventory that cost $60 million. The firm's tax rate is zero and its cost of equity capital is 15%

Analysts forecast that the firm will be able to sell one-half of its inventory in each of the next two years for $50 million in cash per year. The firm is then expected to be dissolved at the end of the second year.

The firm will pay a dividend equal to 60% of its cash flow in the first year and reinvest the balance at the rate of 15%. It will then pay a liquidating dividend at the end of the second year.

Balance Sheet

inventory	60,000,000	shareholders equity	60,000,000

Anticipated free cash flows (FCF) $FCF_1 = 50{,}000{,}000$ $FCF_2 = 50{,}000{,}000$

Proposed dividends (D) $D_1 = 0.6(50) = 30{,}000{,}000$ (i.e., 20,000,000 retained)

$D_2 = \{20\}(1.15) + 50 = 73{,}000{,}000$

Abnormal Earnings (AE) – assume weighted average inventory method

$$AE_1 = [50 - 30] - 0.15\{60\} = 11{,}000{,}000$$

$$AE_2 = [50 - 30] - 0.15\{30\} = 15{,}500{,}000$$

profit — normal earnings

under the 'free cash flow' valuation model

= + = $81,285,444.2344

under the 'dividend' valuation model

= + = $81,285,444.2344

under the 'abnormal earnings' valuation model (assuming weighted average inventory method)

= 60,000,000 + + = $81,285,444.2344

asides:

- as long as the analyst is aware of the nature of the firm's accounting policies, valuations will not be affected by variations in accounting policy

  e.g., *AE valuation model, assuming FIFO inventory method with COGS of $20 million in year 1 and $40 million in year 2*

= 60 + + = $81,285,444.2344

- dividend policy does not matter if firm's reinvestment rate equals cost of equity

  e.g., *dividend valuation model assuming 0 payout in first year*

= + = $81,285,444.2344

implementation of the formal AE valuation model (and also the FCF model) is a relatively involved and complex process for the analyst

i.e., FCF and earnings based valuation models require analyst to project likely amounts of revenues, expenses, assets, liabilities, and shareholders' equity.

→ their use requires analysts to undertake the very complex and "labour intensive" task of developing an understanding of the firm's future operating, investing, and financing decisions

To illustrate, Palepu, Bernard, and Healy characterize the process followed by a thorough analyst as involving the following 7 steps:

#1 Analyse strategy to understand factors driving the performance of an industry and a firm, and to assess whether those factors are likely to persist

#2 Analyse accounting to assess whether management has made conservative or aggressive accounting decisions.

#3 Forecast future earnings to the firm for a finite horizon (to the terminal year).

#4 Forecast growth in book value for the firm for the same horizon.

#5 Forecast earnings and book value growth beyond the terminal year.

#6 Estimate the firm's cost of equity.

#7 Use the cost of equity to estimate the abnormal earnings and discount these amounts.