

Cash Flow Statement	
$\text{Operating} = \text{NI} + \text{Depreciation} + \text{loss} \pm \text{NP} \pm \text{AR} \pm \text{Inventory}$	
Net Income = EndR&B - OpExP&S + Dividend	
(Non-Cash Items)	
Depreciation (Clos) = Cur - Last + New (if has)	
Gain on sale (Clos) (CurNew - CostNew + CostNew)	
Loss on sale (Clos) (CostNew - CostLast + CostLast)	
(Non-cash changes to Working capital)	
A/R (Chg)	
A/P (Chg)	
Inventory (Chg / Incr) (Flow)	
"Net cash from Operating activities"	
[Cash Flow from Investing activities] = Proceeds - Purchases	
Proceeds on sale	
Purchases = This year + New purchased	
"Net cash from Investing activities"	
[Cash Flow from Financing activities]	
Proceeds on shares (Clos)	
Dividends (Out)	
"Net cash from Financing activities"	
[Cash]	
Cash from beginning	\$
Cash from ending	\$
"Net increase in cash"	\$

Income Statement (Statement of earnings)	
Title (from XX, X to XX, X, XXXX)	
Revenue	
* Customer Deposits	
* Interest income	
* Revenue (sales, services etc.)	
"Total Revenue"	\$
Expenses	
* Salary expense	
* Utility expense	
* Rent expense	
* Insurance expense	
* Depreciation expense	
* Expense (office supplies etc.)	
"Total expense"	\$
"Net income"	\$

- * Who has depreciation? Taken into account.
- * Percentage calc.
- * Time period we need to evaluate.
- * Identify common categories of each rev & exp.

Overview of F/S

I/S \Rightarrow Operation performance at a specific period of time

B/S \Rightarrow Reports the resources (assets) owned by a company and the claims against those resources (L & SHS) at a specific point in time.

Current vs long-term \Rightarrow 1年为期

SHS \Rightarrow Share capitals & RE

RE/S \Rightarrow Reports RE, Div., repurchased, other changes in equity at a period of time.

CF/S \Rightarrow Reports sources and uses of a company's cash at a period of time.

"Relationships: ΣN (fr. I/S) in RE/S, EndRE (fr. RE/S) in B/S, EndCash (CF/S) in B/S."

Statement of Retained Earnings / Shareholder's Equity	
provide info for B/S	
Title (from XX, X to XX, X, XXXX)	
Retained Earnings at the beginning	
Net Income	
Dividends	
Retained Earnings in the end	\$

Balance Sheet (Statement of Financial Position)

Title (Date)	
Assets	
Current assets	
* Cash	
* Account Receivable	
* Prepaid expenses (Insurance etc.)	
* Office supplies	
* Inventory	
* Marketable securities	
* Other Liquid Assets	
"Total Current Assets"	\$
Long-term Assets	
* PPE (Property, plant, equipment, lands)	
* Long-term Investments	
* Patents, Copyright	
* Software	
* Franchises	
* Goodwill	
* Trademarks & Tradenames	
"Total long-term Assets"	\$
Liabilities	
Current liability	
* Accounts payable	
* Unearned revenue	
* Interest payable (include LT obligations)	
* Income taxes owned within next year	
* Notes payable	
* Dividends payable	
* Short-term loans (Bank loans etc.)	
"Total Current Liabilities"	\$
Long-term Liabilities	
* Bond payable	
* Mortgages	
* Car payments	
* Other LT loans (cannot be made within next year)	
"Total Long-term Liabilities"	\$
Shareholder's Equity	
* Common / preferred shares	
* Retained Earnings	
"Total Shareholder's Equity"	\$
"Total shareholder's equity and liabilities"	

Accounting Cycle

Step 1: Analyze Transaction

Assets \Rightarrow Cash, A/R (应收账款), Inventory (存货), Prepaid expenses (预付; e.g.: 房租、保险), Notes receivable - PPE & Land & Buildings & Furniture & Fixture.

Liability \Rightarrow A/P, Unearned revenue, Accrued liabilities (产生但未付的expense): Interest / Salary / Tax payable, Bank loan, Notes payable, LT liabilities: Bonds, mortgages.

Equity \Rightarrow Common shares, Preferred shares, Retained Earnings: Rev↑, RE↑, Div↓, RE↓; Exp↑, RE↓.

I/S \Rightarrow Salary rev, Service rev, Interest income, Salary exp, Utility exp, Rent exp, Insurance exp, Depreciation exp, Cost of Goods sold (CoGS), Loss, 购买销售成本.

Dividend \Rightarrow 分红, 不属于其它版块 listed before

Step 2 & 3: Journalize Transaction & Post to general ledger (T-Accounts)

General form \Rightarrow Title of account

Dr | Cr

Other Specifically \Rightarrow		Assets	=	Liabilities	+	shareholder's Equity
Dr ↑	Cr ↓			Dr ↓ Cr ↑		
N/B				N/B		
Revenues				Expenses		
Dr ↓ Cr ↑				Dr ↑ Cr ↓		
N/B				N/B		
Department				Dividends Declared		
Account >				Dr ↑ Cr ↓		
				N/B		

Journal Entry \Rightarrow Dr 在上, Cr 在下

-一个JE至少有一个Dr 和一个Cr去平衡

$\Delta Dr = \Delta Cr$

Expense, Dividend 永远在Dr上; Revenue 永远在Cr上, Purchase return 在Cr上.

Exp, Rev, Div P. 会增加。

Trial Balance \Rightarrow 试算表

BEP in dollars = Fix esp / CM ratio

Cash changes: $\Delta \text{Cash} = St - bSt - b(Lt - Lt - 1) > St$ (This months sales, collected next month)

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* Profit before Tax = Rev - Exp

* Profit after Tax = $(1 - \text{tax rate}) \times (\text{CM} - \text{fixed cost}) = (1 - \text{tax rate})$

$\times (NI + \text{Tax} + \text{Interest} + \text{Non-operating gains/losses})$

* Unit sales to attain the target profit = $(\text{Fixed exp} + \text{Target profit}) / \text{CM per unit}$

* BEP \Rightarrow Profits = $(\text{Sales} - \text{Variable exp}) - \text{Fixed exp}$

Sales = Variable exp + Fixed exp + Profits (or BEP = profit = 0).

* Cost of Inv = Pur - Pur return & Allowances - Pur Discount = Goh Purchased

* Periodic System: Begin Inv + CoGS = CoG available for sale + end Inv = CoGs

* EBIT = Tot Rev - CoGs - Operating expenses - Depreciations & Amortization = NI + Interest + Taxes

计算CoGs:

1. FIFO \Rightarrow 先购入的原材料被耗掉 制造格

Date Description Pur/unit 单价/单位, CoGs [unit先/单价先/总] Ending Inv [unit先/单价先/总] [unit后/单价后/总]

2. Average \Rightarrow 平均平均算, 表格前两项与FIFO相同, 后两项只有一行

* Average cost is greater due to incorporating higher unit costs.

* Estimate the annual effective rate of return: $k = (1 + \text{discount}%)^{365/n} - 1$, e.g. $> 10\% \Rightarrow n = 365 - 10 = 355$, discount is 2%.

* Cash Conversion Cycle = Inventory conversion period + Receivables conversion period - Payables deferral period

* Working Capital Manag.: Payables Turnover = $\frac{\text{PUR}}{\text{A/P}}$; Average days of sales in payables (ADP) = $\frac{\text{ADP}}{\text{PUR}} = 365/355$

Inventories Turnover = $\frac{\text{COGS}}{\text{Inventory}} = \frac{\text{COGS}}{\text{ADP}} = 365/355$

Receivables Turnover = $\frac{\text{Sales}}{\text{AR}} = \frac{\text{AR}}{\text{ADP}} = 365/355$ (shorter, lower ~).

* Break even sales Growth Rate: $g = \frac{1-b}{(1-b)+(1-\text{tax})}$

Form growth factor if: Higher gross margin (1-b); lower production costs do;

Collects its receivables more quickly (higher g); Pays off bills more slowly (lower b); less inventory slower Y)

* On credit == 账户

* Invoices is A/R

* In advanced == prepaid == receivable

* Accrued == payable

* Avg A/R \approx A/R

* Debts \approx Liabilities

* Bank loan: 对于当天来讲, 借债 \$, 但当天无需考虑利息, since 利息日结。

* 不确定 account name 时考虑 permanent T-account.

* 不是应付未付时, 考虑 unearned revenue.

* Depreciation 还 Dr 则 Accumulative depreciation 是 Cr.

* 注意大段文字描述以及文字描述。

* Expenditure \Rightarrow Wages, rent ... ; Depreciation; Debitful Debits; Bond Debits

* CoGS 属于 Rev

1. Share premium = Issue price - Par Value

2. Asset= Liability + Equity

3. Gross profit = Sales - Cost of sales.

4. Cost of sales = Opening inventories + Purchase - Closing inventories

10. Quick ratio or Acid test ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

11. Working capital = Current asset - Current Liability

12. Break Even points = $\frac{\text{Total Fixed Costs}}{\text{Contribution per unit}}$ \Rightarrow in units

6. Operating Profit Margin = $(\text{Operating Profit}/\text{Sales}) * 100$

7. Cash operating Cycle =

Inventory turnover + Receivable turnover - Payable turnover

8. P/E ratio = Price / Earning

9. Current Ratio = $\frac{\text{Current assets}}{\text{Current liabilities}}$

Current assets = $\text{Cash} + \text{Accounts receivable} + \text{Inventories} + \text{Prepaid expenses}$

/* Conceptual Framework */ { Accounting Principle }

- Revenue Recognition ⇒ 1. Directs a company to recognize revenue in the period in which it is earned.
2. Revenue is not considered earned until a product or service has been provided.

- Expense Recognition ⇒ 1. Match expenses with associated revenues in the period in which the revenues were earned.
2. Would be no reliability in statements if expenses were recorded separately from the revenue generated.

Cost principle ⇒ Everything the company owns or controls (assets) must be recorded at historical cost, its value at the date of acquisition.

- Full Disclosure ⇒ 1. A business must report any business activities that could affect what is reported on the financial statements.
2. Usually recorded in footnotes on the statements or in addenda to the statements.

- Separate Entity Concept ⇒ 1. A business may only report activities on financial statements that are specifically related to company operations.
2. The business is considered an entity separate and apart from its owners.

Conservatism ⇒ if there is uncertainty in a potential financial estimate, a company should err on the side of caution and report the most conservative amount.

Monetary Measurement Concept ⇒ need a monetary unit to record a transaction "stable monetary unit".

- Going-concern Aspt ⇒ 1. A company will continue to operate in the foreseeable future.

2. A common time frame might be 12 months.

- Time Period Aspt ⇒ 1. Company can present useful info in shorter time periods, such as years, quarters, or months.

2. Broken into time frames to make comparisons and evaluations easier.

/* Ratios */

{ Profitability Ratios } ⇒ Earnings or operating success

$$\begin{aligned} * \text{Current ratio} &= \text{Current assets} / \text{Current liabilities} \\ * \text{Quick ratio} &= (\text{Current assets} - \text{Inventory}) / \text{Current liabilities} \end{aligned}$$

LEVERAGE

$$\begin{aligned} \text{Debt ratio} &= \text{Total liabilities} / \text{Total assets} \\ \text{Alternative debt ratio} &= (\text{Total liabilities} + \text{Minority interest under Canadian GAAP}) / \text{Total assets} \\ \text{Debt to worth} &= \text{Total liabilities} / \text{Shareholders' equity} \\ \text{Equity ratio} &= \text{Shareholders' equity} / \text{Total assets} \\ \text{Debt to tangible net worth} &= \text{Total liabilities} / \text{Tangible net worth} \end{aligned}$$

COVERAGE

$$\begin{aligned} \text{Interest coverage} &= \text{EBIT} / \text{Interest expense} \\ \text{Fixed-charge coverage} &= \text{EBIT} / (\text{Interest expense} + \text{CMLTD}) \\ \text{Cash flow coverage} &= (\text{Net income} + \text{Depreciation and amortization}) / \text{CMLTD} \\ \text{Operating cash flow ratio} &= \text{Operating cash flow} / \text{Current liabilities} \end{aligned}$$

PROFITABILITY

$$\begin{aligned} * \text{Return on asset (ROA)} [\text{LHB}] &= \frac{\text{Earnings}}{\text{Total Assets}} \\ * \text{Return on equity (ROE)} &= \text{Net profit} / \text{Equity} \\ \text{Comprehensive-ROA} &= \text{Comprehensive income} / \text{Total assets} \\ \text{Return on invested capital} &= \text{Operating profit} / (\text{Total liabilities} + \text{Shareholders' equity}) \\ * \text{Gross profit margin (GPM)} [\text{LHB}] &= \text{Gross profit} / \text{Net sales} \\ \text{Operating profit margin} &= \text{Operating profit} / \text{Net sales} \\ \text{EBITDA margin} &= \text{EBITDA} / \text{Net sales} \\ * \text{Net profit margin} &= \text{Net profit} / \text{Net sales} \\ * \text{Asset turnover} [\text{LHB}] &= \text{Net sales} / \text{Total assets} \\ * \text{Fixed asset turnover} &= \text{Net sales} / \text{Fixed assets} \\ * \text{Price-earnings (PE) ratio} : \text{Investor price} &= \text{Stock price} / \text{Basic earnings per share} \\ \text{Price-to-diluted earnings ratio} : \text{Investor price} &= \text{Stock price} / \text{Diluted earnings per share} \\ \text{Reverse PE ratio} &= \text{Basic earnings per share} / \text{Stock price} \\ \text{Reverse diluted PE ratio} &= \text{Diluted earnings per share} / \text{Stock price} \end{aligned}$$

GPM ⇒ Margin between selling price and COGS [LHB]

Profit Margin ⇒ Net earnings generated by each dollar of sales [LHB], higher means better control over its costs;

$$\begin{aligned} \text{PM} &= \text{Net Earnings} / \text{Net Sales} \\ &= \text{Rev} - \text{COGS} - \text{Other expenses}. \end{aligned}$$

Return on Common Shareholders' Equity ⇒ Measure overall profitability of ST's investment;

$$\text{RCSE} = (\text{Net Earnings} - \text{Preferred Dividends}) / \text{Avg Common SHE} [\text{LHB}]$$

" Residual income " Avg invested capital by ST for the time.

Earnings Per Share (EPS) ⇒ net earnings earned on each common share;

$$\text{EPS} = (\text{Net earnings} - \text{Preferred Dividends}) /$$

Weighted Avg num of common shares

Not Comparable between companies.

Payout Ratio ⇒ % of earnings distributed in cash dividends ; LHB for income-seeking investors ; $(1 - \text{PDR}\%)$ = retention ratio

$$\text{PDR} = \text{Cash Dividends} / \text{Net Earnings}$$

↑, less company needs ur money to grow the business.

{ Double-Entry Bookkeeping }

* Accounts & general ledger

* Must record a change in at least two different accounts.

* At least one Debit & one Credit.

$$\star \sum \text{Dr} = \sum \text{Cr}$$

{ Standards }

* FASB ⇒ Both private & public ; include GAAP ; It uses a conceptual framework.

* GAAP ⇒ guide F/S.

* SEC ⇒ Ensuring companies adhere to GAAP requirements.

{ Characteristics }

* Relevance ⇒ Predict the future & Make decisions

* Faithful representation ⇒ Neutral & Free of errors

* Comparability & verifiability. Timeliness & understandability.

Better working capital :

* Pay a special dividend

* Pay cash dividends

* Buy Inv if significant discount

* Discounts offered by suppliers

$$\star \text{Gross profit} = \text{Net sales} - \text{COGS}$$

$$\star \text{Net Earnings} = \text{Gross profit} - \text{Operating expenses}$$

$$\star \text{Merchandise inventory} = \text{Inv} + \text{Pur} - \text{COGS}$$

$$\star \text{Accounts payable} = \text{A/P} + \text{Pur} - \text{Cash payment to suppliers}$$

$$\star \text{Net sales} = \text{COGS} + \text{Gross profit}$$

$$\star \text{Operating exp} = \text{Gross profit} - \text{Net earnings}$$

$$\star \text{Pur of merchandise inventory} = \text{End Inv} + \text{COGS} - \text{End Inv}$$

$$\star \text{Long-term asset turnover} = \text{Tot operating rev} / \text{LT assets}$$

$$\star \text{RE} = \text{Tot Assets} - \text{Current Assets} - \text{Tot Liabilities} \quad \star \text{Weighted avg} = \frac{\sum \text{Wt Inv}}{W}$$

$$\text{COGS} = \text{与商品制造、贩售直接相关的花费}$$

$$W \text{ is the weights.}$$

Variable Cost 随产量变化而变化

$$\text{Contribution margin} = \frac{\text{Net sales} - \text{COGS}}{\text{Net sales}} \quad \text{ratio} = \text{CM} / \text{Total Rev}$$

$$\text{Margin of safety} = \text{Actual sale} - \text{BEP} ; \text{in dollars} \times \$. \text{ in \%} : / \text{Current sales}$$

$$\begin{aligned} \text{Predictive: \% change in profit} &= \text{\% change in sales} \times (1/\text{Mtg}) \\ &\text{Re: Operating Risk} \end{aligned}$$

$$\star \text{Rev} = (\text{Profit} + \text{Expense}) / \text{CM Ratio}$$

{ Liquidity Ratios }

* ST ability to pay its maturing obligations & meet unexpected needs for cash.

$$\text{Working Capital} \Rightarrow \text{ST debt paying ability} ; \text{WC} = \text{CurrAssets} - \text{CurrLiabilities} \quad (\text{LHB})$$

$$\text{Current Ratio} \Rightarrow \text{ST debt paying ability} ; \text{CR} = \text{CurrAssets} / \text{CurrLiabilities} \quad (\text{LHB})$$

$$\text{Inventory Turnover} \Rightarrow \text{liquidity of inventory} ; \text{IT} = \text{COGS} / \text{Avg Inventory} \quad (\text{LHB})$$

$$\text{Days in Inventory} \Rightarrow \# \text{ days inventory is held before sold} ; \text{Trend} \uparrow \text{means slower sales or inventory is outdated} ; \text{D} = \text{IT} / \text{LB} \quad (\text{LHB})$$

Receivables Turnover ⇒ liquidity of receivables ; High R means company on a cash basis, or extension of cr & collection of A/R is efficient ; Low R company should re-assess its credit policies ;

$$\text{RT} = \text{Net credit sales} / \text{Avg Gross Receivables} \quad (\text{LHB})$$

Average Collection period ⇒ Amount of time to collect accounts receivable on avg ;

$$\text{Avg Collec P} = \frac{365}{\text{RT}} = \text{Tot operating Rev} / \text{Avg A/R}$$

Cash Current Debt Coverage ⇒ ST debt-paying ability on a cash basis ;

$$\text{CCDC} = \text{Cash provided by operating Activities} / \text{Avg Curr Liabilities} \quad (\text{LHB})$$

{ Solvency Ratios }

* Negative trends indicate deteriorating financial strength.

Debt to Total Assets Ratio ⇒ % of total assets provided by creditors ;

$$\text{DTA} = \text{Total Liabilities} / \text{Total Assets}.$$

Free Cash Flow ⇒ Cash available for paying dividends or expanding operations.

$$\text{FCF} = \text{Cash provided by operating Activities} - \text{Net Capital Expenditures} - \text{Dividends Paid} \quad (\text{LHB})$$

Times Interest Earned ⇒ Ability to meet interest payments as they come due ; $\text{TIE} = \text{Earning Before Interest Expense} / \text{Interest Expense}$

$$\frac{\text{Earning Before Interest Expense}}{\text{Interest Expense}} = \frac{\text{EBIT}}{\text{Interest Expense}} \quad (\text{LHB})$$

Cash Total Debt Coverage ⇒ LT debt-paying abilities (cash basis) ;

$$\text{CTDC} = \text{Cash provided by operating Activities} / \text{Avg Total Liabilities} \quad (\text{LHB})$$

Dividend Yield ⇒ Earnings generated by each share, based on the market price per share ; $\text{DY} = \text{\$ Dividend per share} / \text{\$ Market Price per Share}$ [LHB for income-seeking investors].

General

Firm value (PV) = CF / r ; Cashflow, Discount rate

Pension plan \Rightarrow Lender: employee, employer

Borrower: retiree

Basic interest rates \Rightarrow RF , inflation \downarrow .

Overnight rate \Rightarrow overnight lending rate for bank.

Prime lending rate \Rightarrow What I paid if the bank lending money.

Basic points $\Rightarrow (1/100) \times 1\% = bp$

Time Value

$PV(1+r) = PV \Rightarrow PV > PV$; r = rate of return

$PV(t=0) = \frac{PV_n}{(1+r)^n} \Rightarrow n$ is period

$r = R_f + \beta \Rightarrow R_f$ = risk-free rate; r is the discount rates; β is compensation for risk.

Risk-free asset \Rightarrow Stock; $\min r = R_f$; $R_f = \text{Treasury bill by govt}$.

Risky asset $\Rightarrow R_f$; $P = \frac{R_f}{1+\beta P_f}$; treasury bill by govt.

Price Stock (\downarrow) = $\frac{CF}{(1+r)^t}$

Simple compounds interest $\Rightarrow PV_n \times r \times n = \I

$$\$I = \$I' + PV_n$$

Annuities $\Rightarrow PV_n = PMT \frac{(1+(r/n)^n - 1)}{r/n}$; $PV_0 = PMT \left[\frac{1 - (1+(r/n)^{-n})}{r/n} \right]$

Give u money at the end of each year.

Annuity Due $\Rightarrow A_r^T = \left[\frac{1 - (1+r)^{-T}}{r} \right] (1+r)$

Get money at the beginning of each year;

Present value of annuity due > present value of ordinary Annuity.

Perpetuities $\Rightarrow PV_0 = C/r$; C = the period CF (preferred stock (preferred shares) per val * % (constant cash)).

Impact of Compounding \Rightarrow Effective annual interest rate

$$r_{\text{eff}} = (1 + \frac{r}{m})^m - 1; m = \# \text{ of compounding periods per year.}$$

Monthly interest rate $\Rightarrow r_{\text{per period}} = (1 + \frac{r}{m})^{1/m} - 1$

Mortgages $\Rightarrow K_{\text{per period}} = (1 + \frac{r_{\text{per}}}{m})^{mT} - 1$

$r_{\text{per}} = \text{quoted rate}; m = \text{compounding frequency}, t = \text{payment frequency.}$

Balance outstanding (at $t=t_m$ after the first mortgage payment) $\Rightarrow PV_0 = \frac{C}{r} [1 - \frac{1}{(1+r)^{mT}}]$

Bond & Bond valuation \Rightarrow Annuity

$r \uparrow = R_f + \beta \uparrow$ \Rightarrow MV(maturity value) \approx Face value;

The money that the investor gets. \uparrow price of bond $\Rightarrow PV_{\text{bond}} = PV(A_{\text{CPN}}) + \frac{A}{(1+r)^{mT}}$; $r = YTM$

CPN \Rightarrow Coupon interest = payment of interest.

$\sum_{T=1}^n \frac{CPN}{(1+r)^T} + \frac{\text{principal}}{(1+r)^n}$; P = price in dollars, n = # of periods, CPN = Coupon payment, t = time period when payment is received, r = periodic interest rate

Price - yield Relationship \Rightarrow $P \uparrow$, Demand T ; $i \downarrow$, $P \uparrow$.

Semi-Annual Coupon $\Rightarrow \bar{CPN} = MV * CR \% / 2$; CR = Coupon Rate.

Price ($t=0$) = $\frac{CPN_1}{(1+r/2)} + \frac{CPN_2}{(1+r/2)^2} + \dots + \frac{CPN_n + MV}{(1+r/2)^n}$; r is semi-annual maturity rate. (YTM)

For semi-annual coupons \Rightarrow size of coupon payment ($\div 2$); $YTM (\rightarrow)$ num of periods ($\times 2$)

Quoted prices \Rightarrow PV of the remaining CF's as of last CPN point.

Cash price = Quoted price + Accrued Interest $= CP + \$\text{bond} * CR * (\text{days} / 365)$.

Stock Evaluation \Rightarrow Perpetuity

Primary Markets \Rightarrow Initial Public Offering

Secondary Markets \Rightarrow Secondary offering; No new capitals flow into; involving "stock exchanges"; "OTC" (Over the Counter markets \Rightarrow Bonds, small cap stocks, etc.).

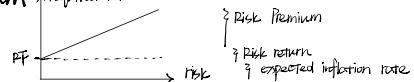
$$\{ A = L + O/E \}$$

Income \approx Interest + Dividends + Capital Gains

Preferred stock \Rightarrow DV is the same, but indefinite period.

Common stock \Rightarrow Dividend payments = payout ratio * NI; All unsure.

$r = RF + \text{Risk Premium}$ required return (%)



Preferred share valuation

$P_p = D_p / r_p$; P_p is market price (or PV); D_p is annual fixed dividend

Amount of r_p is required rate of return investor demand (discount rate).

Preferred stock \Rightarrow Perpetuity

Price = $\bar{DV} / (1+r) + \bar{DV} / (1+r)^2 + \dots + \bar{DV} / (1+r)^n$

$$\bar{DV} = \% * \text{par val (or issuing val)}; r = R_f + \beta$$

Common share valuation (using DDM).

$P_0 = D_0 (1+g) / (r_c - g) = D_1 / (r_c - g); g$ is growth rate

Constant growth rate

Stock price \uparrow if: i. Dividends \uparrow ; ii. Growth rate \uparrow ; iii. Investors required

return decreases.

Price \uparrow of a common share linked to: i. Corporate profitability \uparrow ; ii. General

level of interest rates (e.g.: $R_f \downarrow$); iii. Risk (e.g.: Risk Premium required by investors \downarrow).

Applied when: Assume the growth rate can sustain in very long term.

Relation holds when $r = g$

$r = D_1 / P_0 + g = \text{Dividend Yield} + \text{Capital Gains Yield}$

Price of common stock $\Rightarrow \bar{DV}_1 / (1+r) + \bar{DV}_2 / (1+r)^2 + \dots + \bar{DV}_n / (1+r)^n$

$$\begin{aligned} \text{Multi-Stage Growth } P_0 &= \frac{D_1(1+g)}{(1+r_0)} + \frac{D_2(1+g)^2}{(1+r_0)^2} + \dots + \frac{D_n(1+g)^{n-1}}{(1+r_0)^{n-1}} \\ &\quad + \frac{D_{n+1}(1+g)^n}{(1+r_0)^n} \div (1+r_0)^{n-1} \\ &= \text{FOP} : \frac{D_1}{(1+r_0)} + \frac{D_2}{(1+r_0)^2} + \frac{D_3}{(1+r_0)^3} \end{aligned}$$

Growth rate of dividends $\Rightarrow g = b * ROE$

b = Firm's earnings retention ratio

$= 1 - \text{firm's dividend payout ratio} :$

ROE = Firm's return on Common equity = $\$NI / \SHE

$= NI / Sales \times Sales / Total Assets \times Total Assets / Equity$

= Net profit margin \times Turnover Ratio \times Leverage Ratio

Increase value of the firm = profit margin on sales \uparrow \times turnover rate

on sales \uparrow ; leverage the firm using equity in Debt \uparrow .

Value of growth opportunities $\Rightarrow P_0 = EPS_1 / r + PVGO$; $EPS_1 = \bar{DV}$

= no-growth component + present value of growth opportu~.

No PVGO if no new buying or sth.

$\text{NPVGO} = [\text{new purchase at Date } 0] / (1+r) \div \text{share outstanding}$

New price per share $= EPS_1 / r + NPVGO$

$P/E = \text{Price-per-share} / EPS_1$; Calc. avg P/E ratio for the group;

Estimate EPS for the company for next 12 months.

If	Then	Bond Sells at:
Coupon < YTM	Market Price < Face	Discount
Coupon = YTM	Market Price = Face	Par
Coupon > YTM	Market Price > Face	Premium

Project Evaluation

Copes (capital expenditures)

Long-lived assets = i. Tangible (PPPE)

ii. Intangible (research, etc.)

Manager's responsibility \Rightarrow Maximize shareholder value

Constraint: resource; Result: Capital rationing

Sustainable growth rate $\Rightarrow g = b * ROE$

Value of firm \uparrow if: the firm retains and reinvests its profit on a

rate of return (RoE) greater than its cost of capital.

Capital Budgeting \Rightarrow Identify, evaluate, implementing, monitoring,

Copes decision consider \Rightarrow timing, magnitude, riskiness, of the net incremental, after-tax cashflow benefits.

Changing the underlying CF by changing the structure of project :

change credit terms, put off an expansion, etc..

Net present value $\Rightarrow NPV = -\text{Initial cost} + PV \text{ future benefits}$

$$= -IC + \frac{CF_1}{(1+r)^1} + \dots + \frac{CF_n}{(1+r)^n}$$

{ if Benefits > Cost, NPV is pos, project accept, creates SH wealth.

{ if Benefits < Cost, NPV is neg, project unaccept, destroys SH wealth.

Profitability index (P_I) $\Rightarrow P_I = PV \text{ inflow} / PV \text{ outflow}$

if $P_I > 1$, accept ; when NPV same, use P_I to compare.

Payback period (PP) \Rightarrow Focus on Liquidity

Internal rate of return $\Rightarrow IRR = -IC + \sum \frac{CF_n}{(1+IRR)^n}$

If $IRR >$ Discount rate r_{IRR} , project acceptable ; provide a rate of return on invested capital $>$ the cost of funds used to finance.

Capital Budgeting CF $\Rightarrow CF_0 = C_0 + \Delta NWC_0 + DC$

C_0 = initial investment at $t=0$

C_0 = initial capital cost of the asset

ΔNWC_0 = change in net working capital requirements

DC = PV of opportunity costs associated with the project

↓ Implied opportunity cost \Rightarrow difference between current A & L.

i. Raw materials OR inventory are purchased ; ii. Cash kept as buffer vs unexpected expense. iii. Credit sales are made to generate A/R, give up potential rev from alternative uses.

Tax shield benefit of CCA \Rightarrow tax rate $(1-T) * CCA \text{ amount} = \text{Savings}$
 $= \text{Cost} * \% * 1.5$
 Accelerated rate

PV of tax savings in CCA $\Rightarrow PV(\text{CCA Tax Shield}) = \left[\frac{C_0(1-T)}{k+d} \right] \times \left[\frac{1}{1+k^T} \right]$
 $d = \text{the applicable CCA rate}$
 $\text{Net } \sim = \left[\frac{C_0(1-T)}{k+d} \right] \times \left[\frac{1}{1+k^T} \right] - \frac{SV_n T d}{d+k} \times \frac{1}{(1+k)^n}$
 $k = \text{cost on Capital} ; SV_n \text{ is salvage value of } t=t_n$.

CCA = UCC * % \Rightarrow Income * t = tax payable

Tax savings $\approx CCA * T$

SV_n > UCC \Rightarrow Too much CCA over time ; recompute additional tax owing ; CCA bal. < 0 .

SV_n < UCC \Rightarrow Terminal loss (tax savings) ; CCA no assets remain, CCA bal. > 0 .

Replacement decisions $\Rightarrow NPV = PV(\Delta \text{Operating CF}_t) + PV(\Delta \text{CCA Tax Shield}) + PV(\Delta ECF_t) - \Delta CFE$

$\Delta CFE = C_0 \text{ new} - C_0 \text{ old} \Rightarrow \Delta SV_n = SV_n \text{ new} - SV_n \text{ old}$

$PV(\Delta \text{CCA Tax Shield}) = \left[\frac{C_0(1-T)}{k+d} \right] \left[\frac{1}{1+k^T} \right] - \left[\frac{\Delta SV_n d T}{k+d} \right] \left[\frac{1}{(1+k)^n} \right]$

Case when has not equal life
 Equivalent Annual NPV $\Rightarrow EANPV = \frac{\text{Project NPV}}{\left[1 - (1+k)^{-n} \right]} \Rightarrow \text{NPV} < 0, \text{out} ; \text{same time, smaller NPV, out}.$

Lease \nearrow Cheaper one wins
 Lease or buy \Rightarrow Lease \Rightarrow no Co, no Tb, no CCA, no SV. Lease payment \Rightarrow Buy \Rightarrow Co, Tb, CCA, SV

Project with uncertainty \Rightarrow Dynamic NPV : Calc. CF for each : (high for 1 - low for 2) * weight
 $- \text{fix cost} \Rightarrow \text{Expected CF} = \% * \text{CF}$.

Option to Abandon \Rightarrow value of real option = NPV with option - NPV w/o option

Cost of capital / structure

Cost of capital \Rightarrow minimum return ; Accept if CC $< IRR$

$EPS = NI / \# \text{shares} = (NI / \text{Equity Book Value}) \times (\text{Equity} / \# \text{shares})$
 $= RoE \times BVPS$

$$\text{Price} = EPS / Ke = RoE \times BVPS / Ke$$

$\downarrow P \Rightarrow$ market price of the stock $\Rightarrow P \uparrow$ if EPS $>$ Ke ; BVPS \Rightarrow book value \Rightarrow Ke \Rightarrow investor's required return.

WACC = $Ke(S/V) + Kd(1-T)D/V$; S \Rightarrow current market value of equity, D \Rightarrow current market value of debt ; V = S + D, V \Rightarrow value of firm's capital ; Kd \Rightarrow cost of debt (the current yield on debt in the market), Ke \Rightarrow cost of equity (current expected rate of return). [Weighted avg. cost of capital].

Total market value of common shares $\Rightarrow S = \text{Price} \times \# \text{shares}$; S \Rightarrow Estimate market values
 preferred shares $\Rightarrow P = D_p / K_p \times \# \text{shares}$

- Total market value of debt (bonds) $\Rightarrow B = \frac{1}{K_b} \left[1 - \frac{1}{(1+K_b)^n} \right] + \frac{F}{(1+K_b)^n} \Rightarrow S_2 : \sim \text{Debt}$
- $V = D + P + S \Rightarrow WACC = Ke(S/V) + K_p(P/V) + K_d(1-T)D/V \Rightarrow S_2 : \text{Market Weights}$
- Cost of existing capital $\Rightarrow K_{\text{pref share}} = D_p / P_p ; Ke = D_W / P_{\text{com}} + g$
 $= R_f + \beta(R_m - R_f)$

Cost of Debt $\Rightarrow K_d = K_d \text{ before tax} \cdot (1-T)$

Constant Growth Gordon Model $\Rightarrow P_0 = D_1 / (Ke - g) \Rightarrow D_1 \Rightarrow$ Div paid in the first year,

\Rightarrow estimated future growth, $P_0 \Rightarrow$ current stock price

$K_{\text{WACC}} = \left(\frac{S}{S+D} \right) Ke + \left(\frac{D}{S+D} \right) Kd(1-T)$

Flotation costs \Rightarrow % Flotation method $\Rightarrow K_{\text{new}} = K / (1-f)$

	No Flotation costs	Flotation costs Method 1	Flotation costs Method 2
Cost of debt (net of taxes)	$K_d(1-T)$	$K_{d,\text{new}} = \frac{K_d(1-T)}{(1-f)}$	$NP = \frac{I(1-T)}{K_{d,\text{new}}} \left[1 - \frac{1}{(1+K_{d,\text{new}})^n} \right] + \frac{FV}{(1+K_{d,\text{new}})^n}$
Cost of Preferred Equity K_p	$K_p = \frac{D_p}{P_p}$	$K_{p,\text{new}} = \frac{K_p}{1-f}$	$K_{p,\text{new}} = \frac{D_p}{NP_p}$

Leverage Effect $\Rightarrow RoI = \frac{EBIT(1-T)}{(E+D)} / (E+D) \Rightarrow$ Return on investment

earnings after tax but before financing costs

$RoE = \frac{(EBIT - K_d D)(1-T)}{E} / E \Rightarrow K_d \Rightarrow$ cost of debt

$RoE = RoI + (D/E) \times (RoI - K_d(1-T)) \Rightarrow$ good states, $RoE > K_d$ after tax ; bad states $RoE < K_d$ after tax.

Market Risk Premium $\Rightarrow R_m - R_f$

Capital Asset Pricing Model $\Rightarrow Re = RF + (R_m - RF)\beta \Rightarrow P_0 = D_1 / (Re - g)$

PMT = face value * CR/n

marginal Cost of Capital (MCC) $\Rightarrow MCC = Ke \cdot \text{new} \frac{E}{V} + K_p \cdot \text{new} \frac{P}{V} + K_d \cdot (1-T) \frac{D}{V}$
 $WACC = Ke \frac{E}{V} + K_p \frac{P}{V} + K_d \cdot (1-T) \frac{D}{V}$

Value of the firm $= \bar{C}F / WACC$

$RoE = \frac{(EBIT - K_d D)(1-T)}{E} / E$

Interest Expense = Cost of debt K_d times amount of debt D

If no Debt, then $RoE = RoI$

Hedging

Long \Rightarrow pos exposure to the asset ; short \Rightarrow neg exposure to the asset

Pricing Forward Contracts $\Rightarrow F = (1+C) \times S \Rightarrow$ spot price, F \Rightarrow forward price, C \Rightarrow the cost of carry as percentage of S over the period in question, C = storage costs + financing costs

Intrinsic value $\Rightarrow IV(\text{call}) = \max(P-S, 0) \Rightarrow P \Rightarrow$ asset price, S \Rightarrow exercise price

Option price $= IV + TV \Rightarrow TV \Rightarrow$ time value ; At expiration $TV = 0$, the option premium = IV.