Overview

Capital budgeting: investment decision (what LTA)

Capital Structure: financing decision (how to raise and distribute cash for required capital exp)

WC management: STA management

| Components of CS = Debt: a promise by the borrowing firm to repay a fixed dollar amount by a certain date; Equity: equity holders (shareholders) can claim the residual value of a firm that remains after the debtholders are paid.

| Priority of claim: debtholders > shareholders. If firm value < amt promised to debtholders, shareholders get nothing (not (-) as limited liability), thus SH incentive to maximise firm value.

| Riskiness: Firm's perspective – debt is riskier as it is a contractual obligation; Investors – equity

Combined payoffs to debt and equity

| If value of firm X is LESS than $D,
(Equity) shareholder's claim: max(0, $X-$D) = $0
(Debt) Bondholder's claim: min($D, $X) = $X

| If value of firm X is MORE than $D,
(Equity) shareholder's claim: max(0, $X-$D)=$X-$D
(Debt) Bondholder's claim: min($D, $X) = $D

• Either way, sum = $X (value of the firm)

MAIN GOAL of a corporate firm: shareholder wealth maximisation(share P or value) – 1) max sales/mkt share (lower price/ relax credit policy) 2) min cost (lower quality, R&D expenses) 3) max profits (channel stuffing, defer expenses to future e.g. maintenance/future ex to current or curr ex to future)

| how to max SP: LT, CF – amount, timing, riskiness + reputation – G&S, innovation, workplace…

Compute cost of capital (of proj)

• Stockholders can reinvest dividend in risky fin securities so expected return on a capital budgeting proj should >= that of fin security of comparable risk

All-equity firm expansion project: CAPM – $\overline{R_i} = R_f + \beta_i(R_M - R_f)$

Firm has debt expansion project: WACC – $r_{WACC} = \frac{S}{S+B} r_s + \frac{B}{S+B} r_B(1 - T_c)$,

• Rs – CAPM, rB – YTM (cost of debt)

| Note: if a proj has diff risk than firm's cost of capital, use the risk of proj to determine NPV (using hurdle rate might decrease its value over time and increase risk -> wrongly reject/accept)

| Difficulty in estimating beta: 1) absence of universally acceptable proxy for mkt portfolio 2) betas may vary with time influenced by changing fin risk and biz risk (product line, tech, fin leverage)

| Determinants of β: 1) business risk – cyclicality of revenue (highly cyclical stocks = highβ), operating leverage (↑fixed cost&↓var.cost = ↑OL= ↑ β) 2) fin risk – amt of debt, fin leverage

In absence of tax,

$$\beta_{Asset} = \frac{D}{D+E} * \beta_{Debt} + \frac{E}{D+E} * \beta_{Equity}$$

Where βAsset = weighted β of firm's assets

In presence of fin leverage (Debt>0), equity β will always > asset β (even when debt is risk-free) → debt contributes to financial risk

Valuation of common stock

NTA (book value) = total assets – total liabilities – intangible assets – par value or preferred shares = shareholder equity = intangible A – par value PS

DDM $P_0 = \frac{E(D_1)}{1+r_s} + \frac{E(D_2)}{(1+r_s)^2} + \frac{E(D_3)}{(1+r_s)^3} + \cdots = \sum_{t=1}^{\infty} \frac{E(D_t)}{(1+r_s)^t}$

Where rs is the required return of shareholders

Value of common share = PV of future expected div

DDM (zero growth) $P_0 = \frac{E(D_1)}{r_S}$

DDM (const growth) $P_0 = \frac{E(D_1)}{r_S - g} = \frac{D_0(1+g)}{r_S - g}$

DCF: 1. FCF = EBIT*(1-t) + Depre & Amort.– ΔNWC - Δ fixed assets (capex) | LFCF = EBITDA - NWC – change in fixed assets (capex) - interest payments

• EBIT = sales – VC – depreciation

• OCF = EBIT(1-t) + D&A

2. Enterprise value $= \text{PV}(\Sigma\text{FCF})$ -> $\frac{FCF_0*(1+g)}{r_{WACC}-g}$

3. Value of equity =EV+ excess cash$_0$ – value of debt

4. Firm value = EV + cash

| (IV of firm from DCF) If firm has $100m in debt and 10m shares outstanding, what is firm's intrinsic value (IV) per share? IV of equity = IV of firm - debt = $416.94 - $100 = $316.94 million. IV per share = IV of equity / no. of shares = $316.94 / 10m = $31.69

Relative valuation: Earning multiples (P/E, EV/EBITDA), book value multiples (P/B, EV/BV), revenue multiples (P/Sales, EV/Sales)

-> comparable analysis: share price of A = same-industry peers' mean P/E * company A's earnings per share

Price earning multiple (P/E)

P/E=share price/ earnings per share

Price to book multiple (P/B)

P/B=market value of equity/book value of equity

Price to sales revenue multiple (P/S)

P/S=market value of equity/Sales Revenue

Enterprise Value to EBITDA multiple

EV/EBITDA=$\frac{MV_{equity} + MV_{debt} - excess\ cash}{EBITDA}$

Enterprise Value to Book Value multiple

EV/BV=$\frac{MV_{equity} + MV_{debt} - excess\ cash}{BV_{equity} + BV_{debt} - cash}$

Enterprise Value to Sales Revenue multiple

EV/Sales=$\frac{MV_{equity} + MV_{debt} - excess\ cash}{Sales}$

Risk & Return & CAPM

For a single stock given probabilities:

- Expected return: $E(r) = \sum_{i=1}^{N} p_i r_i$ (where i means the i-th economy state)
- Variance: $\sigma^2 = \sum_{i=1}^{N} p_i (r_i - E(r))^2$
- Covariance: $\sigma_{SB} = \sum_{i=1}^{N} p_i (r_{iS} - E(r_S))(r_{iB} - E(r_B))$
- Correlation coefficient: $\rho_{SB} = \frac{\sigma_{SB}}{\sigma_S \sigma_B}$

If given historic data (lost 1 degree of freedom avg)

$\bar{r} = \frac{\sum_{t=1}^{T} r_t}{T}$, $\sigma = \sqrt{\frac{\sum_{t=1}^{T}(r_t - \bar{r})^2}{T-1}}$, $\sigma_{AB} = \frac{\sum_{t=1}^{T}(r_{At} - \bar{r_A})(r_{Bt} - \bar{r_B})}{T-1}$

Portfolio risk and return

$r_P = w_B r_B + w_S r_S$, $\sigma_P^2 = \sum_{i=1}^{3} p_{iP} [r_{iP} - E(r_P)]^2$

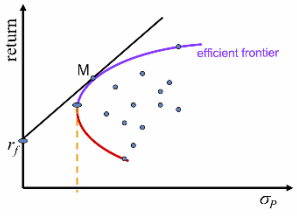
| alternative: $\sigma_P^2 = (w_S\sigma_S)^2 + (w_B\sigma_B)^2 + 2(w_S\sigma_S)(w_B\sigma_B)\rho_{SB}$

Diversification:

$\rho = 1 \rightarrow \sigma_P = w_B\sigma_B + w_S\sigma_S$,

$\rho = -1 \rightarrow \sigma_P = w_B\sigma_B - w_S\sigma_S$

Efficient set of many securities



(CML)

$$x_1 = \frac{\sigma_2^2 - \rho_{1,2}\,\sigma_1\sigma_2}{(\sigma_1^2 + \sigma_2^2 - 2\rho_{1,2}\,\sigma_1\sigma_2)}$$

Minimum var port:

Efficient Frontier: portfolios with higher returns and same level of risk

CML

• $E(r_i) = r_f + \frac{E(r_m - r_f)}{\sigma_m}\sigma_i$

• determine best portfolio mix of risk-free and market, each pt on line is an efficient portfolio.

SML (CAPM)

• $\beta_i = \frac{Cov(r_m, r_i)}{\sigma_m^2}$ →SML under equilibrium

• all securities and portfolios same reward-to-risk ratio and equal the reward-to-risk ratio for the market portfolio

• SML: $E(R_i) = R_f + \beta_i(E(R_M) - R_f)$

• evaluate overpricing/under-pricing, each point on line represents correctly priced portfolio/individual asset. • Rf – 10YSGS YTM

APT

• more general than CAPM, no assumption of market portfolio

$. R = \overline{R} + U$

· U -> systematic and unsystematic risk

· CAPM's beta measure responsiveness of return to R_M, APT broke down into sys risk factors

$R_P = X_1\overline{R}_1 + X_2\overline{R}_2 + \ldots + X_N\overline{R}_N$
$+ (X_1\beta_1 + X_2\beta_2 + \ldots + X_N\beta_N)F$
$+ X_1\varepsilon_1 + X_2\varepsilon_2 + \ldots + X_N\varepsilon_N$

Corporation & Agency Problem

Partnership - General: all partners are liable for the firm's debt; Limited: general + limited partners (no participate in mgmt of business + liability is limited to capital provided.)

Corporation - Legally defined, artificial being, separate from its owners → owners not liable for any obligation of the corporation. Their liability is limited to the capital invested. · Often ownership and control are separate. The firm is managed by the BOD and CEO.

Corporation v Partnership

Capital: market | few individuals

Liquidity: easily exchanged | substantial restriction

Taxation: tax code | distributions

Liability: limited | general (unlimited) vs limited

Continuity: perpetual life | limited life

Voting rights: usually each share gets one vote | GP in charge, LP may have some voting rights

(principal-agent) P=shareholders, A=mgmt

Reasons to max firm size & growth – 1. ↑ job security ∵ large firm size less likely a hostile takeover 2. ↑ power, status, and salaries 3. Create opportunities for lower and middle lvl managers.

Agency cost – direct (perks consumed, monitoring exp.) or indirect (lost opportunities of +ve NPV proj)

Solutions – interest alignment, internal monitoring (BOD), external monitoring (share price drops)

Capital Budgeting:

Appraisal Techniques

1. Payback period: $n = \sum yrs\ to\ break\ even + \frac{remaining\ investment}{last\ yr\ CF}$

2. Discounted payback: PV(FCF)

3. NPV: $NPV = -I_0 + \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \cdots + \frac{FCF_N}{(1+r)^N}$, r_{WACC}

4. EVA: = NOPAT – invested capital * WACC ≈ EBIAT – cost of capital * BV(assets) at start of year

Then compute NPV of the cash flows.

5. IRR: $\sum_{t=0}^{n} \frac{CF_t}{(1+IRR)^t} = 0$

6. MIRR: up CF to FV (final year), then $Initial\ cost = \frac{\sum FV(FCF)}{(1+MIRR)^t}$

7. PI: $\frac{PV(inflows)}{Initial\ outlay}$, PI > 1 accept

| Find cross over point in NPV: find IRR of incremental CF then compare agnst r

| reinvestment rate assumptions: NPV assumes at r (opp. cost of capital); IRR at IRR; MIRR at r

Relevant CF (not accounting)

1. Only incremental CF are relevant: CF occur ONLY if we accept the project (in whole of parts)

2. CF: -initial outlays + addi. revenue (includes complement) + addi. costs (includes erosion, opp cost, VC) + ↓costs -EBIT*t + depre&amort. + ΔNWC

3. Irrelevant CF: Sunk cost (alr incurred irrespective of proj), overhead allocation, corporate disruption (erosion occurs anw), financing cost (e.g. interest)

4. NWC: CA – CL | ΔNWC = NWC_t - NWC_{t-1}

5. Terminal value:

· salvage value of fixed asset = MV – tax*(MV-BV)

· recovery of NWC (if any)

Inflation & unequal lives

Inflation: $1+r_{nominal} = (1+r_{real})(1+\text{inflation rate})$

Repeated proj with unequal lives:

1. replacement chain (common life): repeat proj again and compute CF

2. EAA/EAC: compute PMT based on NPV,N,I/Y

Find EAA whose PV = proj NPV. Choose ↑EAV/↓ EAC. Both approach always lead to same decision.

Project analysis

Goal: to complete NPV methodology by analysing variability in prices and costs (forecasting risks) and adds flexibility in relation to future decision opportunities to real options.

1. Sensitivity analysis: determine sensitivity of NPV to a **single** var (from pess/opt/expected values)

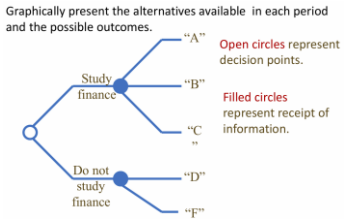
2. Scenario Analysis: for inter-related vars, change a few at a time and perform NPV

3. Break-even analysis: looks at sales and break-even (v. the other 2 on 1/more var and change)

Accounting: units $= \frac{\text{Fixed Costs + Dep}}{\text{Selling Price − Variable Costs}}$ (TR-TC = 0)

Financial: $\text{units} = \frac{\text{EAC} + \text{FC}(1-\text{tax}) - \text{Dep(tax)}}{(\text{SP - VC})(1 - \text{tax rate})}$ (NPV=0)

Decision Tree



• value of option = proj value with option - proj value w/o option

Forecast financial statemtns

• to project unlevered FCF, based on 1) last 3-5 years histo. fin statements, company and/or client projections, equity research estimates (if no projections), industry data (benchmark growth rates and margins agnst comps)

• discount by risk associated with firm (WACC – investors' opp. cost for investing in biz with similar risk)

• rD: return on int-bearing debt | rE: required return on equity by equity holders

• target cap structure & MV (except for debt can use BV) most relevant for WACC

• WACC and UCF computed after tax

•rf: use 10Y govt bonds whose currency denomination matches CF

•rm-rf: ERP of market where firm operates

•equity beta: levered beta (stock beta)

• TV: FCF perpetual growth rate (<=GDP) or terminal exit multiple by taking compcos /compacqs to get implied g & TV

| e.g. TV @ T = PV(EBITDA @ T * (EV/EVITDA))

| normalise TV (normlisa EBITDA or UCF)

Financing decision & EMH

· Financing decisions: How much debt and equity to sell? When to sell debt and equity? When (or if) to pay dividends? Use NPV to evaluate

· Create value through 1. reduce costs/ increase subsidies (tax advantages, reduce financing costs), 2. create new security (putable bonds, convertible stock, mortgage-backed security, REITs; in the LR, competition = this value creation is relatively small) 3. fool investors (hard to do consistently – ponzi)

· Efficient capital market = stock prices fully reflect *available* info. · Since info is reflected in security prices quickly, knowing info *when it is released* does not help an investor to make profit. · Firms should expect to receive *fair value* for securities that they sell.

· Diff types of efficiencies: Weak = Security prices reflect all info found in past prices and volume; technical analysis is of no value (in long run). Semi-strong = Security prices reflect all publicly available info including historical prices and volume, published accounting statements and public announcements. Strong (weak + semi) = Security prices reflect all info, public and private

Prices are not uncaused or random, they reflect info. Price CHANGE is random and is driven by new info, which arrives randomly (i.e. not uncaused)

Evidence for: 1) Momentum Studies: Are the stock prices serially correlated/ profitable "trading rules"/ price changes random? — to test weak form efficiency. If WF exists, stock prices only respond to *new* or *unexpected* info, which arrives randomly (random walk). Pattern from past prices predict future = momentum = not WF efficient. Tendency to see patterns when there is none. 2) Event Studies: Does the market quickly and accurately respond to new info? — to test semi-strong form efficiency. Examine prices and returns around the arrival of new public info; if mkt is SS efficient, prices should reflect all publicly available info quickly and accurately. Look for counter evidence of underreaction, overreaction or delayed response around the event announcement. Applied to study dividend ↑/↓ etc. generally support that mkt is SS efficient, some suggest that mkts may even have some foresight into the future (leakage of info before public announcements), 3) Past record of professionally managed investment firms: Do they outperform the market? — to test semi-strong form efficiency. Managers of these funds use publicly available info to pick stocks. If mkt is SS efficient, then they should not be able to beat the mkt. 4) Corporate Insiders' performance — to test strong form efficiency. Investigate insider trading, support it's abnormally profitable. Thus, strong-form efficiency does not seem to be substantiated by the evidence.

Evidence against: stock mkt crash, temporal anomalies, speculative bubbles, small > large, value > growth, profit from technical analysis, results of mkt efficiency are flawed (CAPM)

Overall: Says 1) Prices reflect underlying value, 2) managers cannot time stock and bond sales, 3) cannot boost stock prices through creative accounting. Does not say 1) prices are uncaused, 2) all shares of stock have same expected return, 3) investors should throw darts to select stocks (need decide based on risk appetite), 4) no ↑ trend in stock price (but EMH says it will incorporate info very fast).

Raising Capital

IB: 1) Underwriting (IB assumed all execution risks) 2) Best efforts (issuer assumed all execution risks)

SEO reaction: MV of existing equity drops due to perceived managerial info (insiders are selling additional shares as its overpriced), debt cap (mkt may infer that managers are issuing new equity to reduce the D/E ratio due to financial distress), EPS delusion (not root cause in theory).

Underpricing theory: +ve publicity, ease of raising funds in future, underwriter's interest, Kevin Rock – underpricing brings in uninformed investors.

→Counter eg: 6/15 finish 1st day above offer price, 1/15 is currently trading above water (2008)

Cost of new issues: 1)direct exp (spread / underwriting discount), 2) other direct exp (filing, legal fees, taxes reported in prospectus), 3) indirect exp (not in prospectus) like mgmt time, 4) underpricing (offer P < 1st day price), 5) green shoe option [overallotment - where underwriter has option to buy additional shares from the issuer at the offer price to cover oversubscription.], 6) [existing shares] price drop upon announcement of seasoned offering

Greenshoe option: Assume the company decides to IPO by selling 100m shares. The Green shoe option: underwriter can buy the shares at $9 each from the company and sells to investors at an OFFER price of $10. Spread or underwriting discount = $10-$9 = $1 underwriter is allowed to sell up to an additional allocation of the offering size above the 100m shares and is given a green shoe option.

· If over allocation is set at 15% of the offering, this would amount to 15m extra shares. The option allows underwriters to buy the 15% shares from the company at the OFFER price of $10.

The underwriter does not have the extra shares yet so it effectively shorts the shares (sells shares it does not have).

If share price <= $8 when market opens

The underwriter will buy the 15m shares from the market at $8 to close its short position. The underwriter makes a profit. Why? Sold the extra 15m shares at the offer price. of $10 and bought from the market at $8. Made ($10-$8) x 15m = $30m.100 m shares in mkt.

If share price >= 11.90 when market opens

There is underpricing = $11.90-$10 = $1.90 per share. Underwriter will exercise the Greenshoe option – this allows the underwriter to buy the 15m shares from the company at the offer price of $10. The underwriter does not gain or lose. Company loses because they underpriced the share at $9 when its worth $11.90 (for greenshoe, priced at $10 so lost $1.90 per share) 115m shares in mkt.

• P ↓: no option executed, underwriter buy from mkt 15% shares [made a profit as prev sold at offer price]; 100m shares in mkt

• P ↑, option executed, underwriter buy 15m shares from company at offer price, [no profit made prev sold 15m at offer price], 115m shares in mkt.

Other info: 1) Large issues incur proportionately lower costs than small issues. 2) avg, IPOs incur higher expenses than SEOs. 3) Direct costs of IPOs = approx 10% of proceeds raised. 4) Underpricing of IPOs = approx 19% of proceeds raised.

Rights

Rights issue: *If* a preemptive right is contained in the firm's articles of incorporation, the firm must offer any new issue of common stock to existing shareholders *first*. allows shareholders to maintain their % ownership if they so desire.

Mechanics: firm mgmt must decide on 1. exercise price (price that existing shareholders must pay for new shares) 2. no. of rights (no.of existing shares) required to buy 1 new share

Rights have value → Shareholders can either exercise or sell their rights [renounceable rights = can trf]

With rights issue, MUST do something or lose money (either sell or exercise rights)

e.g. A firm has 200,000 outstanding shares trading at $25 each. It is proposing a rights offering of 10,000 new shares at a $20 subscription price. One existing share is one right.

1 new share for every 20 existing shares. 1 new share for every 20 rights. (200,000/10,000)

1. What is the new market value of the firm? Ans: 200,000 shares * $25 + 10,000 shares * $20 = $5.2m
2. What is the ex-rights price? 210,000 outstanding shares with mkt value of 5.2m $5.2m / 210,000 shares = $24.7619
3. What is the value of a right?
$$\frac{\text{new price - subscripti on price}}{\text{no. of rights}} = \frac{\$24.7619 - \$20}{20} = \$0.2381$$
OR Old - new price = 25 - 24.7619 = $0.2381
4. Value of 20 existing shares w/o rights issue = 20 * $25 = $520
5. Value of 20 existing shares with rights but sell rights = 20 x $24.7619 + 20 x $0.2381 ≈ $500
6. Value of 20 existing shares with rights and exercise rights = 21 x $24.7619 = $520 (but paid $20 to buy)

Rights offerings are much cheaper, but >90% of new issues in the US are underwritten: Underwriters increase stock price, provide a form of insurance to issuing firm in a firm-commitment underwriting.

M&M Theorem

| V = B + S (debt reduce equity) -> goal is to max firm value, question if we can pick D-E ratio to make the pie as big as possible -> M&M says no impact

| cap structure qn: cap structure benefit S\H iff value of firm increases, pick opt D/E ratio

| fin leverage effect: EPS ↑ faster in good years (less shares) and ↓ faster in bad years (int pmt)

M&M without tax:

| MM without tax Proposition I: VL = VU

| MM w/o tax Proposition II: rs = r0 + (B/SL)(r0 – rB)

| II: implies leverage increases risk and return to S/H, derived from proposition I

$$\beta_U = \frac{S}{S+B}\beta_S + \frac{B}{S+B}\beta_D$$

$$\beta_S = \beta_U + \frac{B}{S}(\beta_U - \beta_D)$$

$$\beta_{equity} = \beta_{unleveredfirm} + \frac{B}{S}(1-T_C)(\beta_{unleveredfirm} - \beta_{Debt})$$

risk-free debt: $\beta_S = \beta_U\left(1 + \frac{B}{S}\right)$

| Assumptions: homogeneous expectations, perpetual cash flows, perfect capital markets (perfect competition, firms and investors can borrow/lend at the same rate, no asymmetric info, no transaction costs, no taxes)

| by assumptions, 2 firms are identical except for financing must have same value because 1) value is determined by underlying real assets 2) investors can lever on their own.

M&M With tax:

| Proposition I: VL = VU + TCB (firm value up w debt)

| Proposition II: $r_S = r_0 + (B/S)(1\text{-}T_C)(r_0 - r_B)$

$$\beta_{equity} = \beta_{unleveredfirm} + \frac{B}{S}(1-T_C)(\beta_{unleveredfirm} - \beta_{Debt})$$

| optimal cap structure: 100% debt

| firm can reduce WACC by increasing use of debt

Trade-off Theory

(extended) VL = VU + PV of tax shields (TCB) – PV of fin distress costs + reduction in agency costs of equity (work harder) + agency benefits of debt (reduce wasteful behavior + bank monitor)

| direct cost of fin distress: legal & admin costs for liquidation and reorganisation

| indirect costs: impaired ability to conduct biz

| more tangible assets --> more debt

| more uncertain operating income --> less debt

| more profits to shield --> more debt

| less volatile, more debt. less profitable, less debt

| ∴ optimal D/E close to 100%, unrealistic

Pecking Order Theory

| asymmetric info btw investors and managers

| internal financing (RE) -> debt -> equity

| no target D/E -> based on fin needs

| profitable firms less debt -> more internal fin

| firms prefer fin slack -> acc. cash in good times

Personal Taxes

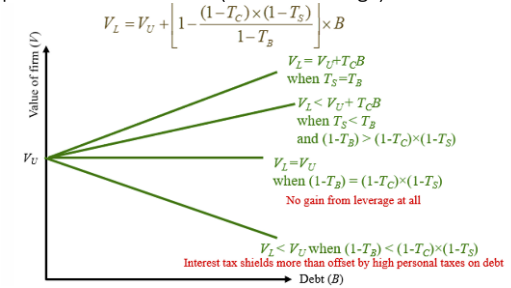
| might cancel tax advantage of debt at corporate level when debt income taxed higher than equity income -> offset -> net tax benefit of debt

$$V_L = V_U + \left|1 - \frac{(1-T_C)\times(1-T_S)}{1-T_B}\right| \times B$$

| consistent w MM w/o taxes TC=TS=TB=0 & MM w corporate tax TS=TB=0

| TS = TB -> personal tax does not affect valuation

| TB > TS: VL < VU + TCB (offset advantage)



APV – valuation in presence of debt fin

| value of a proj to a firm: APV = **unlevered NPV + NPVF** (fin side effects |-> int tax shield, cost of issuing new securities, cost of fin distress, debt subsisdy)

| eg NPV = EBIT(1-TC)/r0 - I = tcb

FTE – valuation in presence of debt fin

| annual CF to levered equity: eg (EBIT – rB*B)(1-Tc)

| rs = r0 + B/S(1-TC)(r0-rB) (S is levered equity)

| discount at rS -> NPV(FTE) = discounted after tax LCF – equity part of investment (I – B)

WACC - valuation in presence of debt fin

| find WACC then EBIT(1-TC)/rWACC- I (eg for perpetuity)

When to use which FTE, APV, WACC

| use WACC/FTE if firm's target D/E ratio applies to proj over the life of the proj, aka debt level varies with proj value

| APV if proj level of debt is known over the life of the project

| WACC and FTE can only handle fin side effects due to interest tax shield

| real world: WACC is most widely used managers generally think in terms of target D/E

| by project types

• scale-enhancing all-equity: rE

• scale-enhancing levered (w same biz risk and D/E as firm): can use all, just need correct r

• -> if diff risk, discount at r acc. to its beta, on SML

• non-scale enhancing proj -> biz risk and D/E diff. from firm -> 1. proxy's rS, 2. unlever rE, find APV, 3. relever and get rS find NPV(FTE) 4. get WACC, find NPV(WACC)

• proj with finite life: APV = base case NPV + NPVF = [cost + PV(UOCF) + PV(TCF)] + PV(interest tax shield)

| $\text{PV}_{\text{unlevered project's OCF}} = \sum_{t=1}^{5} \frac{\text{UCF}_t + \text{Dep Tax Shields}}{(1+\text{r}_o)^t}$

| $\text{PV}_{\substack{\text{interest}\\\text{tax shield}}} = \sum_{t=1}^{5} \frac{\text{T}_C \times \text{r}_B \times \$3\text{m}}{(1+\text{r}_B)^t}$

NPV(Financing side effects)
= Proceeds - PV(aftertax interest payments)- PV(principal repayments)
= $3m - (1-0.34)(0.125)($3m)$A_{5,0.125}$ − $\frac{\$3m}{(1.125)^5}$

Or

Mergers & Acquisition

forms & classification of acquisition

| M&A: very complex deal, large sums of money involved, transactions can transform local & international economies, inter-country relations

| acquisition: control tfr to acquiring firm (other takeovers include proxy contest/go private)

| merger/consolidation (must be approved by shareholders of both firm)

•Merger: combine ⩾2 corp. one survives and other cease to exist (surviving retains the died's name, identity, assets, liabilities)

•Consolidation: 2 firms end legal existence and become a new firm

| acquisition of stock (no need get approval of target S/H) - bidding firm >30% stake -> tender offer to remaining S/H -> deal directly with S/H > BOD

| acquisition of assets (must be approved by target S/H) - involves trf title of assets

| classifications:

•Horizontal: same industry •Vertical: diff stages of production process: bkwd (upstream) vs fwd (downstream) integration •Conglomerate: unrelated business areas

SYNERGY 你爱我我爱你 – why are firms acquired?

$$synergy = V_{AB} - (V_A + V_B) = \sum \frac{\Delta CF_t}{(1+r)^t}$$

ΔCF =ΔRev – ΔCost– ΔCapital Requirement – ΔTax

sources of synergy: 1. ↑revenue (mkt gains, create beachhead, ↓comp/↑mkt power) 2. ↓Cost/ ops synergy (economics of scale/ vertical int, combine complementary resources, tech trf, remove inefficient mgmt) 3. ↓capital requirement (sell duplicate facilities, reduce working capital) 4. Tax gains (tax loss credits, unused debt capacity)

dubious reasons for acquisition

• just for diversification, no synergies or other benefits = growth in EPS is accounting illusion

• bootstrap game: acquirer has high P/E, target low P/E → after merger, acquirer's short-term EPS ↑

coinsurance effect (CE)

firms have debt →B/H can draw on funds of both firms →mutual guarantee i.e. CE •existing debt less risky at the expense of S/H •retire existing debt before merger and/or increase post-merger debt usage to reduce cost of CE for S/H

NPV of acquisition - target always gains

| NPV to acquirer (A) = synergy – premium = $V_{AB} - (V_A + V_B) - [price\ paid\ for\ B - V_B]$

• cash offer NPV to A = VAB – VA – cash paid for B

• share offer NPV to A = VAB – VA - [n/(m+n)]*VAB →post-merger share price = VAB/(m+n)

Defensive techniques:

Before in play: Stagger term, supermajority, poison pill (target makes itself unattractive to bidders)

When in play: poison pill, managerial resistance (golden parachute), divestiture, white knight/ squire

Dividends

Types: regular/ extra cash, (bonus) shares, dividends in kind, alternative – repurchase shares

Standard cash div payment

Declaration date: firm declares distribution of div, afterwards, shares trade cum-div. Last Cum-Div Date: last day that buyers are entitled to the div. Ex-Div Date: first day that buyers are not entitled to the div. Record Date: firm prepares a list of S/H, all who hold the shares 3 business days before the record date (i.e. last cum-div date) receive the div.

price behaviour: in perfect world (no tax), share price falls by amt of div on the ex-div date

Div Policy = should firm pay div? pay now or later? Value of common share = PV of all future exp div

1.Irrelevant in perfect world w no tax & fees – no impact on firm value as investors can create own income streams by using homemade divs

2. impact of personal tax - should not issue shares to pay div bc S/H are worse off as govt gets a cut -> mitigates, but doesn't eliminate
• tax on div and capital gains when selling shares
• identical securities should have same return after tax (tax on div = Td, tax on capital gains = Tcg)
• Td > Tcg: same after-tax, higher pre-tax return
• Td = Tcg -> same pre and after tax return
• share repurchase benefits: investors pay tax only on profits of transaction, capital gains tax can be deferred, credible signal that shares underpriced
3. clientele effect: in eq, no single firm can affect firm value by switching dividend policies even in presence of tax - demand-supply relation bc investors face diff tax treatments: low (high) tax brackets prefer high (low) div
4. signalling - firms raise div when they perceive a long-term sustainable increase in the expected level of future earnings and cut div as a last resort. - asymm. informed investors interpret changes in div payout •hypothesis: div changes reflect a firm's future earnings prospects - ↑div=+signal, ↓div=earnings may not rebound

Real world: 1) mgmt focus on change in existing rate of dividend payout, not on absolute values 2) seek to avoid making changes to dividend rates that might have to be reversed within a year. 3) major changes in earnings "out of line" with existing dividend rates are the most impt determinants of the dividend decisions 4) Investment requirements generally have little effect on modifying the pattern of dividend behaviour. 5) Firms appear to have long-run target dividend-payout policies. + 6) practise dividend smoothing.

SG context: cap gains not taxed at all, cap losses not tax deductible
• old imputation tax system -> 2003 one-tier Corporate tax rate in 2002 = 24.5%
• old: pay corporate tax, but have tax credit refund/top up, actual tax paid by investors = personal tax rate, if no div = corporate tax rate
• one-tier: pre-tax earnings taxed only corporate; div not taxed but also no refund -> S/H Td < Tc are worse off
•legal restriction: comply with section 403 of companies act cap 50 – dividends must declare out of profits (acc or current year's, latter: without making good the losses of previous years)
•old: div policy is relevant, div > share repurchase div issuance ↓effective tax rate on each $ of firm's earnings→create value for S/H, SR = cap gains (not taxed) → no refund for S/H
•one tier: div policy is irrelevant as no impact on S/H's wealth (indifferent to share repurchase too)

Case 1

| co-op: biz entity (assets and surpluses) owned and controlled by members (also its customers or employees), with goal not to max profit for ext. S/H to serve needs and interests of members and broader community -> surplus reinvested or distributed among members
| NTUC Income corporatised: comm-oriented model -> S/H-based structure
| co-op's acquisition evaluation: 1) social purpose, hist obligations to members, public trust; 2) reserves & surpluses include acc. social capital and contributions of members 3) reserves assumed to be reinvested in community
| Income retained strong symbolic and cultural ties to co-op sector -> crucial pt in failed deal
| deal details: pre-conditional voluntary cash offer to acquire 51% stake in Income for 2.2bil
-> eq to 40.58/share, 37.3% premium over Income NAV/share of $29.55
| concerns: 1.85bil cap extraction from Income reserves: Allianz w 51% receives 943.5mil in cash, NTUC Enterprise w 21.8% 403mil, minority holding 27.2% gt remainder -> NTUC gain = 2.2bill + 403mil | for allianz: -2.2 bil + 943.5mil = -1.28bil
| embedded value estimate 4.357bil for 2022 and Allianz valued Income at 4.3billion
| Embedded value = NPV(future profits) + ANAV |ANAV=Market Value of Assets−Market Value of Liabilities (including Policyholder reserves)
| EV times = offer price per share/ EV per share

Case 2

| SIMBA Telecom acquired M1's consumer telco business in August 2025 for S$1.43 billion.
| acquisition -> SIMBA Singapore's second-largest mobile operator by subscriber base (~3.2 million).
| Keppel, M1's owner since 2019 privatization, divested M1's lower-margin consumer telco business to focus on enterprise ICT and digital infrastructure.
| pre acquisition, SIMBA was a price-disruptor with a smaller market share (~1 million subscribers) and limited mid-band spectrum.
| M1 was Singapore's third-largest mobile operator with competitive consumer operations but under margin pressure. Market expected StarHub to be a natural buyer of M1, but SIMBA surprised the industry by winning the bid.
| Keppel accepted a S$222 million accounting loss on the deal but reallocated capital to higher-growth areas.
| market reacted positively to the deal: SIMBA's shares surging nearly 30% on announcement.
| Post-acquisition, SIMBA-M1 combined captured ~38.3% of the postpaid mobile market, surpassing StarHub and trailing just behind Singtel.
| reduction of Singapore's telecom market from four to three major players.