COMMENT

Finance Theories <Final> Note by Phing (MSF_FT27)

CH 10 Financing choices :

▸ Equity financing :

- unlisted firms' equity value < listed firm bcs "cannot be traded" (more alternative financing choices to use)
  - ↳ venture capital : very expensive & deep discount (ต้องออกหุ้นเยอะๆ ให้ venture capitalist)
- Listed firms : raise equity by selling new ordinary shares / seasoned equity offering or give warrants to existing shdrs (right offerings)
  - ↳ SEO ทำได้แค่ firm ใหญ่ๆ

* Prefer to sell warrants than sell cls if mkt overestimates firm's risk :

- Growth firms (only plan, e.g. no existing factory that can generate sustain CFs. their assets' volatility is higher than that of mature firms) (more risky)
  - volatility of EBIT stream (make it bad!) determine volatility of assets ⇒ value of equity also volatile
    - E[CFs] ⇓ Price = PV of firm → is volatited as well
    - A = L + E more together
  - volatility ↑ → value of call ↑ (limited loss & unlimited upside)

PHING's comment : คิดว่า volatility ↑ (measure by SD) ทำให้ firm's value ↓ และ equity value ↓ แต่ถ้าออก warrant (แนวๆ call option) นักลงทุนจะยอมซื้อ เพราะ volatility ↑ call option value ↑

▸ Debt financing : bank debt (~80%) is the most popular

- unlisted firm can only borrow from bank - privately placed debt
- listed firm can issue bonds
  - ↳ publicly placed issue / privately

Bank debt	vs.	Bonds
- ST / LT		- LT only
- small amounts		- Economies of scale <much larger>
- privacy of trade secret		- subjected to disclosure & rating
- line of credit		- no line of credit
- relatively restrictive (e.g. debt covenants)		- better financing terms
- no sweeteners		- room for special features

- e.g. selling bonds with warrant → lower coupon rate
- callable bond (call option is held by issuer)
  - usually higher coupon rate
  - has call protection period
  - to refinance at lower rate

* Growth firm prefer ST maturity (prefer bank เพื่อความลับทางการค้า) (e.g. new product line) (don't want to struck with LT debt)
& Lender not willing to lend LT to growth firm

debt > prefered > C/S

P/L

EBIT ← operating income
- interest expense ←
Net profit ←

▶ Equity vs. Debt financing

Equity	Debt
- Residual claim	- Fixed claim
- mgt control (can vote)	- no mgt control (but covenants)
- lowest priority on CF	- High priority on CF ←
- dividend not tax-deductible	- int payments tax-deductible ← as tax shield
- Infinite life	- Fixed maturity

Hybrid financing

▶ Financial choices based on firm's life cycle:

① Start-up:
- high risk → CFs uncertainty < low mean, high variance → low quality E[CFs] > (MV criterion)
- carry little debt to keep min financial risk

② Growth:
- initially succeeded in attracting customers & establishing presence in mkt.
- large growth → internal CFs < reinvestment needs
- Value from uncertain growth options (have many future opportunities to invest in new projects) ⇒ high P/E ratio
- high mean & high variance CFs
  ↳ business risk high → keep financial risk under control
- low / negative earnings → no tax benefits!

③ Maturity:
- slow down growth
- earnings & CFs ↑, reinvestment needs ↓ (slower growth, e.g. at GDP level NOT NEGATIVE!)
- High mean & low variance CFs → good quality E[CFs]
  ↳ business risk ↓
- afford tax benefits of borrowing → can bear greater financial risk

④ Decline:
- growth opportunities ↓ (negative growth)
- internal CFs > reinvestment needs ⇒ no new financing
- shdr wealth maximization by retiring debt & buying back stock

▶ Hybrid Financing : ① convertible bonds → at choice of bondholders into fixed # CIS
↳ pre-determined

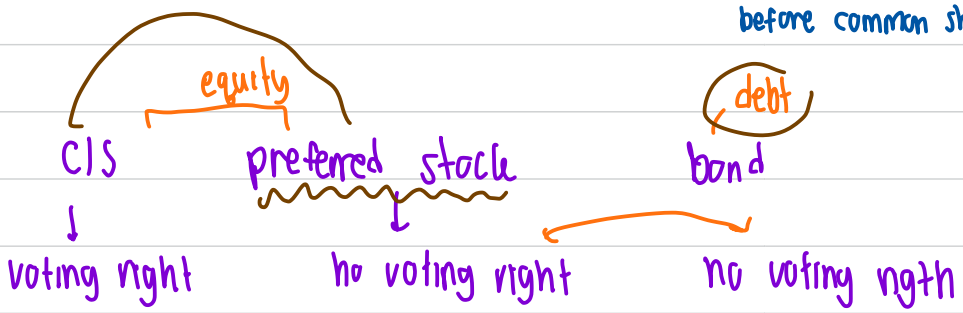
= straight bond + conversion option

② Preferred stock : - pay periodic cash dividend → similar to debt financing.
- no voting rights, get only CF rights
- no maturity & dividends are not tax-deductible

not obligation unlike debt : - firm cannot pay interest → default → go bankrupt

↳ more common in unlisted firms

e.g. Young, high growth unlisted firm sell convertible preference shares to venture capitalists
↳ venture capitalists want equity → success get alot
but with preference shares, they get their claim before common shdr in time of liquidation



priority of claim

<

dividend is not tax deductible

<

70%

cannot pay dividend
⇓
not default

cannot pay interest
⇓
default

value of firm is determined by LHS (value-creating operation) not RHS of BS (D, E)
assets

CH 11 : Capital Structure Theories

☆ Modigliani & Miller (M&M) Capital Structure Irrelevance Propositions

↳ mkt value of any firm is independent of its capital structure < D, E

|| leverage doesn't matter to valuation

A = L + E

* Strict assumptions:

① Frictionless capital mkts : no transaction cost (allows risk!)

* ② Anyone (individual), regardless risk, can borrow & lend at risk-free rate (R_f) : perfect capital mkt

③ no costs to bankruptcy

④ firms issue only risk-free debt & risky equity

⑤ all firms belong to same risk class → same systematic risk!!

⑥ Only corporate tax (no personal taxes)

⑦ All CF streams are perpetuities (no growth) *

$$P_0 = \frac{E[CF_t]}{(1+r)^t} \Rightarrow P_0 = \frac{E[CF_t]}{\rho}$$

⑧ no adverse selection (no signaling opportunities)

⑨ no moral hazard

capitalization rate = net oper income (NOI) / mkt value of asset

▸ **M&M I** : mkt value of firm is independent of its capital structure (capitalizing expected return at rate ρ)

Investors can create homemade leverage * will breakdown if no perfect capital mkt

eq.1 $V_L = V_U$ if $T_c = 0$

V_L ↓ value of levered firm

V_U ↓ value of unlevered firm ↑ all equity

T_c ↳ corporate tax rate

$$\rho = \frac{NOI}{\text{firm value}} \rightarrow \text{firm value} = \frac{NOI}{\rho}$$

• M&M I relies on arbitrage pricing argument

↳ assets with same expected payoff must have same price otherwise we will have inequilibrium condition → arbitrage happens

EX Equilibrium expected firm value (given $\rho = 10\%$, $r_f = 6\%$) → same all aspects except capital structure

	100% equity Unlevered co.	50% equity 50% debt Lever Co.
NOI (net-operating income) (EBIT)	£100,000	£100,000
Less int exp ($r_d \times D$)	0	(30,000) (500,000 × 6%) → for debtholder
NI	100,000	70,000 → left for shdr
* Total firm value (NOI ÷ ρ) (same return same factory)	1,000,000	1,000,000
* Mkt value of equity	1,000,000	500,000
r_e (cost of equity)	10%	14%
r_f (risk-rate free)	6%	6% → follows assumptions
* Mkt value of debt	0	500,000

price = £50/share

70000 / 500,000

bcs equity 100%

X • Since debt is lower risky instrument than equity → use debt should lower average cost of financing to firm

↳ In equalibrium, average cost of financing will be the same (no mispricing)

↓

Ex: Investors are willing to pay a premium price for LeverCo @ £56 per share

Disequilibrium expected firm value

	100 equity Unlevered co.	50% equity 50% debt Lever Co.
NOI (net-operating income)	£100,000	£100,000
Less int exp ($r_d \times D$)	0	(30,000)
NI	100,000	70,000
* Total firm value (NOI ÷ ρ)	1,000,000 ($\rho = 10\%$)	1,060,000
* Mkt value of equity	1,000,000	560,000
r_e (cost of equity)	10%	12.5%
r_f (risk-rate free)	6%	6%
* Mkt value of debt	0	500,000

→ Mkt value ↑ 60,000 but not increase value of debt

$\left(\frac{100,000}{1,060,000}\right)$

$\rho = 9.434\%$

$\frac{70000}{560,000}$

not increase by 60k bcs value of risk-free asset will not change bcs $E(CF_t)$ is constant <assume no bankruptcy cost>

Overvaluation of LeverCo's stock → can make arbitrage

"handmade leverage by investors"

↳ bcs both UnleverCo & LeverCo give ☆ same operating CF stream of same systematic risk @ $\rho = 10\%$

create portfolio with unlever / LeverCo to imitate another

Ex: 1% of firm's mkt cap

Step 1) Short 1% LeverCo mkt cap and get £5,600

2) Borrow £5,000 (1% of LeverCo's debt) at r_f of 6%

3) Use £10,000 to long 1% of UnleverCo. → same as holding 1% LeverCo

4) Left £600 → long additional UnleverCo.

5) After a year: * $\rho = 10\%$ ⇒ return = £10,600 × 10% = 1060

ทำ overvalue แล้วซื้อทั้งคู่ > ได้ same operating CF stream with same systematic risk

leverage ratio = $\frac{5000}{10600}$ $\left(\frac{D}{D+E}\right)$ ⇒ same leverage ratio as LeverCo. & same systematic risk

		CF
6)	• Unwind long position on ③ + ④ UnleverCo	10,600
	• Return on long positions 10,600 × 10% (ρ)	1060
7)	• Pay off borrowing	
	↳ principal ②	(5000)
	↳ int exp (5000 × 6%) (R_f)	(300)
8)	• Close short position on LeverCo	
	↳ stock	(5,600)
	↳ expected return (£5,600 × 12.5%)	(700)
	∴ Expected net position	£60 → no risk at all

* no capital gain ?

↳ bcs no growth in CFs assumption

* If $r_e = 18\%$?? (value of equity, firm, ρ เปลี่ยน)

↳ mkt value of equity decrease to 388,888.89 ? (undervalue)

* Unlever + borrow = lever

value of firm เท่ากัน

* If firm decides to issue debt & repurchase equity → will not increase value bcs investors can already do on their own (homemade leverage)
* Borrowing decision doesn't affected expected return on firm's assets (ρ)

▸ Investors who hold Levered firm's (D & E) debt & equity → get all firm's operating income

eq.2 ↳ $\rho = w_d r_d + w_e r_e = \left(\frac{D}{D+E} \cdot r_d\right) + \left(\frac{E}{D+E} \cdot r_e\right)$ ← WACC

* no tax

eq.3 $r_e = \rho + \frac{D}{E}(\rho - r_d)$

equilibrium, return on equity, slope

M&M II: Expected return on equity in a levered ($D \neq 0$) firm increases in proportion to / linearly with D/E ratio (mkt value)

↳ ∴ r_e is $E[r_e]$

▸ If relax assumption ④ & firms can issue risky debt ⇒ lenders will require higher int rate as firm borrow more (default risk↑) ⇒ M&M II predicts slower increase in $E[r_e]$

∴ M&M I: Leverage has no effect on shdr's wealth <irrelevance with firm value>

M&M II: $E[r_e]$ increases with D/E ⇒ leverage is relevant to require rate of return on equity

↳ as firm borrows more → int exp↑ → prob that EBIT falls short of int exp↑ → default↑ → shdr bear greater risk → r_e↑

P/L
EBIT (constant) → ρ remain unchange
− int exp↑ → fixed obligation
profit to shdr↓ → r_e

▸ WACC is a proxy of ρ not ρ! ; ρ : - unobservable, function of systematic risk (exogenous to firm) ≠ WACC
↳ cannot be affected by D/E

▸ when D/E = 0, $T_c > 0$ ⇒ leads to wealth transfer from shdr → govt

↳ $V_U = \frac{E(NOI)(1-T_c)}{\rho}$ } $P_0 = \frac{E[CF_t]}{(1+\rho)^t}$ − $E[NOI](1-T_c)$ ← FCFF

▸ When D/E > 0

eq.4 ↳ $V_L = V_U + T_c B$ (tax deductable of value of debt)

eq.5 $V_U = \frac{E[FCF]}{\rho} = \frac{E(NOI)(1-T_c)}{\rho}$

assume perpetual, after-tax perpetual free cash flow

& no growth assumption

depre: an net asset (PPE) ↓ invest at least at the amount of depre to maintain same level of assets

$E(NOI)(1-T_c) = (\text{revenue} - \text{cash expenses} - \text{depre})(1-T_c) + \cancel{\text{depre}} - \cancel{I}$

replacement inv

* FCFF = NI + Int(1+T) + non-cash − Capex − ~~adjust in WC~~ (I)

FCFF → D (interest ($r_d D$)), E (residual)

D | E

$E[NI] + depre - I$ $\quad r_d D$

* firm issues debt → after tax CFs split up btw shdr & debtholder:

For levered firm, CFs :

$$E[NI] + \cancel{depre} - \cancel{I} + r_d D = (revenue - cash\ exp - depre - r_d D)(1-T_c) + \cancel{depre} - \cancel{I} + r_d D$$

$$E[NI] + r_d D = (\overbrace{revenue - cash\ exp - depre}^{E[NOI]})(1+T_c) - \cancel{r_d D} + r_d D T_c + \cancel{r_d D}$$

Eq 6 $$E[NI] + r_d D = E[NOI](1+T_c) + r_d D T_c$$

also perpetual stream with same systematic risk

* Value of levered firm: eq 7 $$V_L = \frac{E[NOI](1+T_c)}{\rho} + \frac{r_d D T_c}{r_f}$$

ρ: after-tax, WACC in after-tax

r_f: risk-free, before-tax rate, int exp occurs before tax

EBIT
− int ← before tax
− tax

eq 8 $$V_L = \underbrace{V_U}_{} + T_c B$$

B: value of debt: $\frac{r_d D}{r_f}$ ← perpetual stream

$T_c B$: PV of tax shields

* WACC:

$$\rho = \left(\frac{D}{D+E} \cdot \overset{E[r_d]}{r_d}(1-T_c)\right) + \left(\frac{E}{D+E} \cdot \overset{E[r_e]}{r_e}\right)$$

in equilibrium

เราใช้ r_f discount debt
↳ ถ้า B is risky → ใช้ r_f discount ไม่ได้

CH 12 Capital Structure Theories (part 2)

▶ Debt & taxes

$B = \frac{r_d D}{r_f}$ ↑ discount > r_f

eq 9 $V_L = V_U + T_c B$ (upper bound)

tax shield should be large enough

* Limitation:

(a) firms benefit from tax shield only when profitability is (+)

Profit after tax (+)
− income tax
Net profit

(b) B (value of debt) is not expected to be persistently material through time
↳ size and duration of debt are not permanent (known with certainty)
↳ B is risk & not permanent ex ante → FV of tax shield risky → discount rate > r_f ($T_c B$ ↓)

∴ ได้ corporate tax shield ก็จริง แต่ investor อาจจ่าย personal inc tax มากขึ้น

(c) T_c benefits can be partly offset by investors ability to defer capital gains & pay lower capital gain tax.

EX:

	Unilever Co Equity 100%	Debt 50% (borrow 500,000 on 10%)
Corporate income (EBIT)	£50,000	£50,000
Interest expense	(0)	(50,000)
Profit before tax	50,000	0
Income tax (35%)	(17,500)	0
Net profit	32,500	0

→ ไม่ต้องจ่าย income tax £17,500 แต่ไม่เหลือ profit ไรเลย เพราะต้องจ่าย interest expense

If no div, this is investor capital gain →

* investors (in aggregate)

	shdr (deferable) cap gain	debt-holder (cannot) int income
Cap gain tax (10%)	3,250	
personal inc tax (30%)	15,000	
← Equity 100%	32,500	0
← Debt 50%	0	50,000

↳ จ่าย ภาษีรายบุคคลแพงกว่า 17,500 และต้องจ่ายทันที

ไม่ได้นี่

* From eq 9 $V_L = V_U + T_c B$ predicts firm should be financed with debt 100%
↳ if assume perfect (frictionless) capital mkt ← no offsetting costs

② pooling equilibrium → H

▸ Pecking order theory :

• information assymmetry btw managers vs. investors
  - less informed
  - ↓
  - firm's equity underpriced / undervalued when it raise new equity money

* Myer & Majluf assumptions:

① Only info asymmetry on E[value of assets in place] (adverse selection) but capital mkts are perfect

② No moral hazard, no agency conflicts

③ Inv projects in firm's opportunity set all have ⊕ NPV ← ไม่พิจารณา ⊖ NPV ตั้งแต่ต้น

④ NPV of firm's new inv projects is public knowledge (no asymmetry)
  - growth opportunities are exogenous to firm
  - if manager cannot recover this → value of firm ↓

Other assumptions → ① pure equity firm
② existing shdrs do not rebalance their portfolio when firm sells more equity

* But theory still holds when firms are not pure-equity firms

EX : H (high value firm) vs. L (low value firm) → face same ⊕ NPV project
- cost (C)
- NPV = r
  - added value to shdr

L : • L accepts project & sell equity worth C to finance it
  - fairly priced by mkt

• Existing shdr have to give up % equity to new shdr : $\alpha = \frac{C}{L+r+C}$
  - C = new equity
  - L+r+C ← NPV added to value of shdr from new project
  - → now have % equity = $1-\alpha$
  - → payoff from new project & selling equity = $(1-\alpha)\times(L+r+C)$

$$= \left(\frac{L+r}{L+r+C}\right)\times(L+r+C)$$

$$= L+r$$

↳ value ของ existing shdr ↑ by r
L จะเลือกลงทุนแน่นอน!

payoff จากหุ้น + NPV

H+r+C (−30) → L+r+C (10)

H : • ถ้าไม่ลงทุน, existing shdr จะได้แค่ H

• ถ้าลงทุนแล้วออก equity → mkt will price H as L → H undervalue! (bcs of info asymmetry)

• คือตามปกติ existing shdr ควรจะได้ $(1-\alpha)(H+r+C)$ แต่ H↓ ทำให้ขายหุ้นที่ราคาถูกลง เพราะ mkt undervalue

• เพราะ H↓ → $(H-L)\alpha > r$
  - (H−L) = เสียไป ถ้าลงทุน → ไม่คุ้มถ้าเลือกลงทุน
  - r = ราคาที่ขายได้
  - H−L = true value
  - wealth transfered from existing to new shdr

H pass up project

∴ In equilibrium, only L will accept new project

ซื้อที่ L ถ้า H เลือกออกหุ้น
↳ ราคาตกไปที่ L เพราะ outsiders แยกไม่ได้

* How mkt value of existing share ↓ if it issues new equity?

↳ mkt value of firm = $pH + (1-p)(L+r)$

↑ prob that mkt perceives firm as H firm

↳ mkt value of L firm <not pass up project>

existing share

↳ mkt realizes it is firm L & value it at $L+r$

from $\alpha(H-L) > r$

$pH + (1-p)(L+r) > L+r$

2. announcement of an equity issue leads to drop in price of existing share

* Manager of H firm may pass up ⊕NPV project

↳ bcs ① underpricing $\alpha(H-L)$ may larger than NPV r

② existing shdrs will suffer a net wealth loss (wealth dilution) $= \alpha(H-L)$

* Ranking sources of fund < with less exposure to adverse selection)

1) internal funds (RE)
2) external borrowing (debt) ← low risk
3) external equity ← risky as last resort

} → not subject to info asymmetry

convertible debt & preferred stock?

* Assymmetry causes underinvestment (manager pass up project to not let existing shdr suffer)

when wealth dilution ($\alpha(H-L)$) > r project's NPV

↳ ลดอำนาจการ release information

* High growth firm will always choose to finance project with equity regardless quality

↳ its value comes from investment opportunities assume publicly known

↳ new project's NPV (r) > wealth transfer ($\alpha(H-L)$)

- ⇓ price ↑ when issue stock
- no separating equilibrium btw H & L

∴ Pecking order theory : • ไม่ได้หา optimal debt ที่ควรใช้

• only makes predictions about financing behavior

• adverse selection cost >>> tax-shield benefit ($T_c B$) → firm prefers internal equity

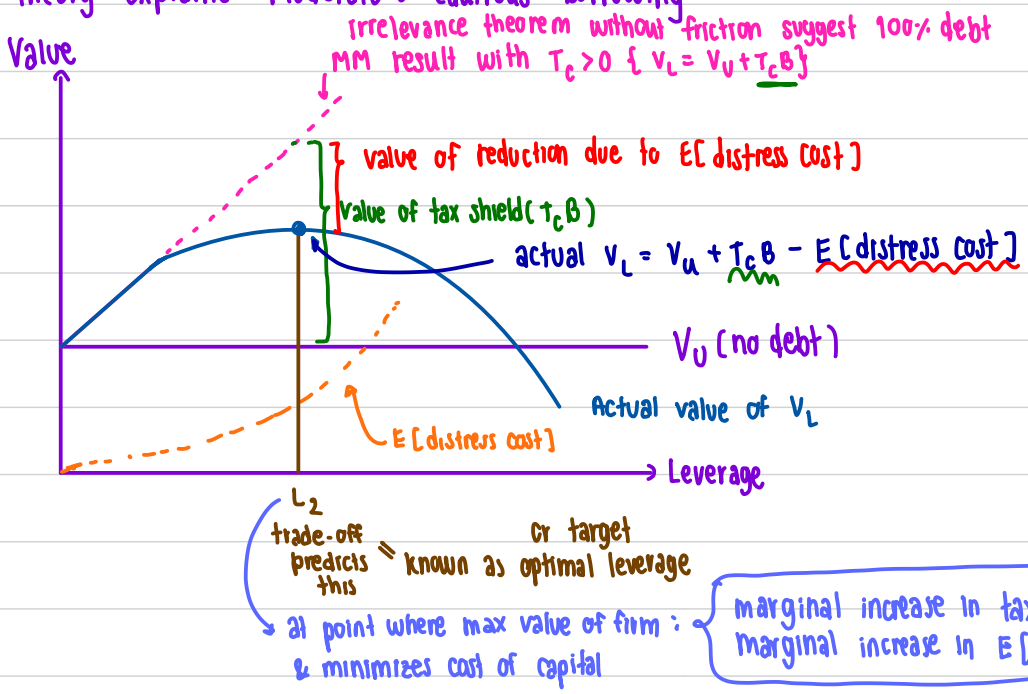
② ▸ Trade-off theory :

- Benefits of debt financing (tax shield) vs. offsetting costs ↗ not frictionless capital mkt

$$\underbrace{V_L = V_U + T_c B}_{\text{from irrelevance theorem}} - \underbrace{PV(\text{financial distress cost})}_{\text{expected distress cost}}$$

* V_L is maximized at the point where $T_c B$ & PV (financial distress costs) are equal at margin
↳ choose leverage ratio by trading off btw E[tax benefits of debt] vs. E[cost of bankruptcy and financial distress]

* Trade-off theory explains moderate & cautious borrowing



* E[distress cost] increases exponentially in leverage

default ↙ E[distress cost] = prob of falling into distress × actual cost of financial distress ↗ constant

sign of bankruptcy ↓ investors reaccess CFs from firm

Ex: 5% debt $\xrightarrow{+10\%}$ 15% debt ; prob became higher
70% debt $\xrightarrow{+10\%}$ 80% debt ; prob became higher by larger %] → E[ ] goes up exponentially ↓ volatility of E[CFs]↑

PV(factory)↓ → value of debt ↓
" —— " equity ↓ → stock price ↓

- Trade-off theory predicts firms with high E[distress costs] should be cautious & operate at low target leverage.
  ↳ • firms facing above average business risk (low quality of EBIT & high beta bcs high volatility)
  • high growth firm : cannot afford to pay debt

* Distress cost:

- Direct costs: incurred in the bankruptcy & reorganization process
  - 1) legal & administrative costs
  - 2) shutdown & disposal costs ← can be estimated directly from factory

small compared to

- Indirect costs:
  - agency cost btw debtholder & shdr <moral hazard> (1)

fixed claim

<risk shifting> ↳ shdr shift to invest in riskier project with debtholder's money

* Call option characteristic: ↳ underlying is firm's asset, exercise price is face value of debt, maturity is the end of operation period

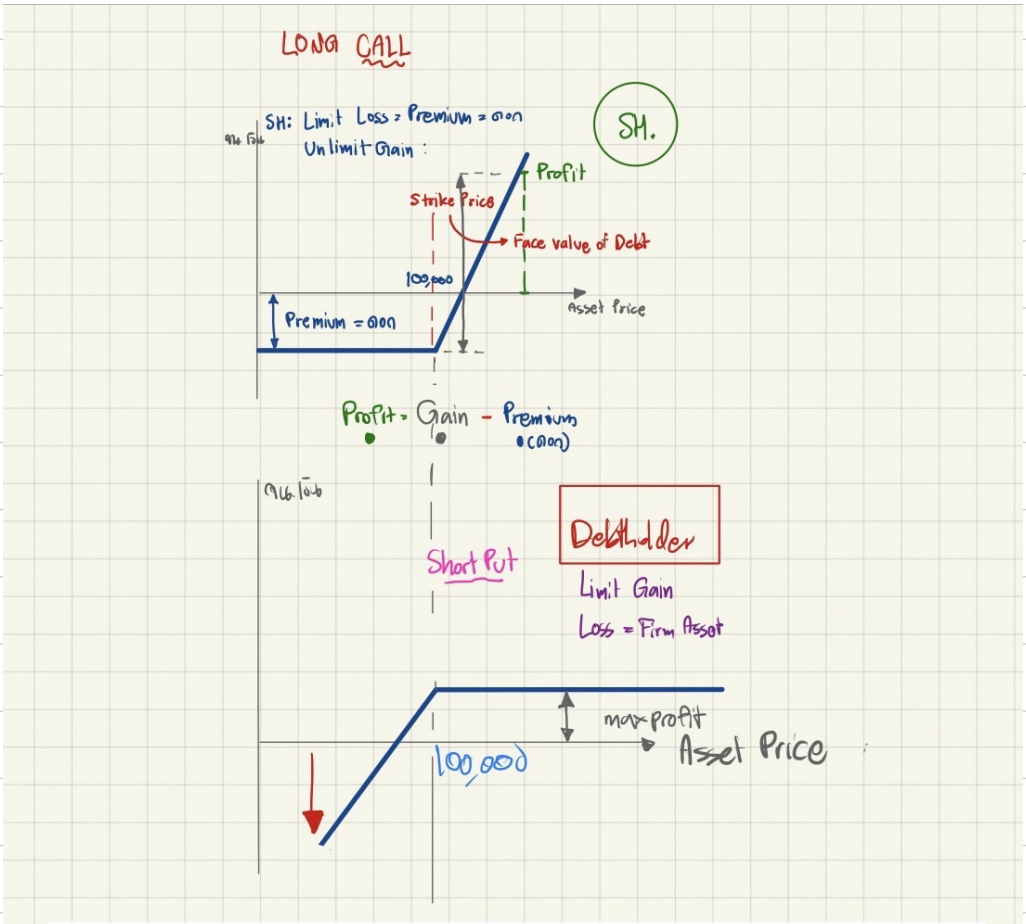
Shdr: long call on firm:
- Upside: unlimited gain
- Downside: just the value of asset e.g. factory

} shdr has incentive to invest in higher risky project

Debtholder: Short put:
- Upside: limited gain
- Downside: face value of factory

↓ E(equity) becomes higher as CFs from factory becomes more volatile <deviate from contract>

From P'Jo:



- Because equity is like a call option, equity holders will benefit from risky investments.
- Debt is a short put option position, so debt holders will be hurt by an increase in risk.

Amount of debt to finance A & B is 7k

Ex: Two assets with same cost price & expected payoff, but diff asset-specific variances.

Same systematic risk

(A) → 9k, 11k

(B) → 18k, 2k

E[payoff of dhdr] = (7×0.5)+(7×0.5) = 7k

E[payoff of shdr] = (2×0.5)+(4×0.5) = 3k

E[payoff of dhdr] = (7×0.5)+(2×0.5) = 4.5k

E[payoff of shdr] = (11×0.5)+(0×0.5) = 5.5k → * shdr has incentive to deviate from contract (A) to invest in B bcs it gives higher expected payoff to shdr & limited lose

* If shdr shift to B
- dhdr lose: 7 - 4.5 = 2.5k
- shdr get: 5.5 - 3 = 2.5k

risk shifting incentive ↓ →

		Debt 100% borrow 7k	Debt ~70% borrow 5k	Debt ~36% borrow 2.5k	Pure equity borrow 0k
A	E[payoff to dhdr]	7k	5k	2.5k	0k
	E[payoff to shdr]	3k	(4×0.5)+(6×0.5) 5k	(6.5×0.5)+(8.5×0.5) 7.5k	10k
B	E[payoff to dhdr]	4.5k	(5k×0.5)+(2×0.5) 3.5k	(2.5k×0.5)+(2×0.5) 2.25k	0k
	E[payoff to shdr]	5.5k	(13×0.5)+(0×0.5) 6.5k	7.75k	10k
If shift to B					
↳ • Dhdr lose		-2.5k	-1.5k	-0.25k	0
• shdr get		2.5k	1.5k	0.25k	0

* To reduce incentives to shift risk, debtholders:

1) charge higher int rate
2) impose more restrictive debt covenants → take away firm's financial flexibility in investing risky assets
3) refuse to lend if risk-shifting incentive is very sever

/ underinvestment

* Debt overhang problem:

↳ shdr may reject/forego new equity-financed positive NPV cap inv project

↳ bcs of large enough debt in B/S

↳ dhdr get hand on EBIT first

- If add good quality project to firm
  ⇓
  Improve quality of EBIT
  ⇓ acts like tax to shdr
  Dhdr benefit from this first
  ⇓
  Remaining goes to shdr

EBIT
- interest exp
- tax
net profit

If ⊕ EBIT < int expense (good quality)
firm default
& entire NPV of project transfers from shdr to dhdr
:(:)

* Agency costs of debt serve as integral part of trade-off theory

(counterweight to $T_c B$)

↳ more significant than direct cost of distress i.e. banleruptcy costs

↳ Growth firm : use equity more than debt

↳ ① value of firm comes from future investment plan (project's NPV) → cannot be collateral <low quality>

↓ cannot afford to underinvestment → it needs funds to reinvest a lot & with int exps, this will be lower

② Not good quality EBIT → don't benefit from tax shield

③ High SD & lots of investing opportunities → greater room for risk shifting

↑ ถ้ากู้ จะโดน higher int rate, strict covenants

Summary of indirect costs of distress

1) Agency cost
2) loss of business/trades → suppliers not afford to supply raw materials to firm with high distress
3) Potential loss of specialized human capital

▷ Agency theoretic Explanation of capital structure

↳ moral hazard in employment contract < manager & shdr >

* Jensen's free cash flow problem : ← not tell optimal leverage, just tells outcome

- Managers want to keep high FCF so that they can consume on job
- Debt can serve as an effective device for disciplining bad managers

↳ with debt, managers will decide to invest in projects with low risk to prevent firm from default

↳ manager lose job & cannot diversify their job

* Stulz : some slack can be beneficial to shdr

↳ so that firm can invest in good investment

▷ If firm has poor investment opportunities → shdr will want firm to issue debt

↳ debt reduces overinvestment by managers < as it reduces FCF >

▷ If firm has good inv opportunities → low debt to prevent underinvestment

for general firms (not mature)

Ch13 Payout Decisions & Theories of Div Policy

net profit → reinvestment
net profit → free cash flow

free cash flow: amount available for paying dividend ⇒ Dividend payout policy is same as financial decision or leverage decision

▸ Total return to shdr: r_e = dividend yield + capital gain

$$= \frac{DPS}{P_{t-1}} + \frac{P_t - P_{t-1}}{P_{t-1}}$$

▸ Payout ratio = $\frac{\text{Dividends}}{\text{Earnings}}$ } reflects stage of firm

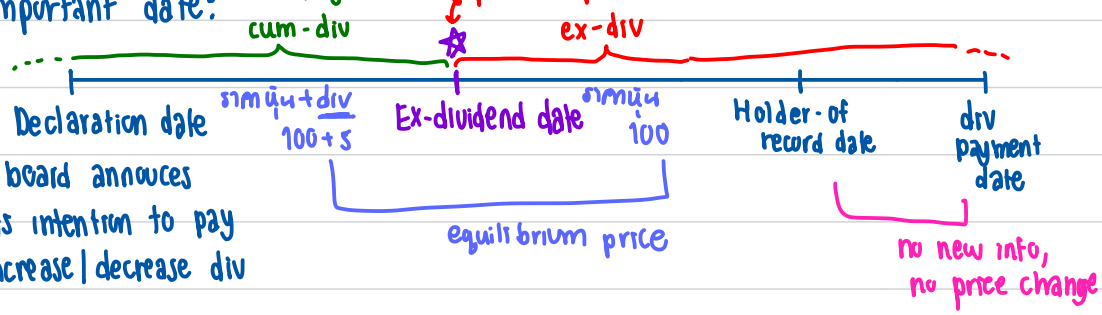
% estimate 0, 1 %

- growth firm: 0 payout ratio (low FCF) → to reinvest
- mature/declining firms: high payout ratio (high FCF)

▸ Retention rate↑ = 1 − payout ratio↓

▸ growth (g)↑ = ROE × retention rate↑

▸ Important date:



▸ Dividend patterns:

1) Dividends tends to follow earnings → firms ↑ div only if they're certain that they can maintain higher dividends
   ↳ managers are more concerned with changes in divs than with levels of div

2) Dividends are sticky
   ↳ manager worries about not being about to maintain high level of div once they have increased it.
   ↳ Firm tends to increase, not decrease div
   ↳ managers are reluctant to cut dividends

3) Dividends are much less volatile than earnings (P/E ratio) ($\sigma^2_{EPS} > \sigma^2_{DPS}$) (Div follows earning but * diff volatility)
   ↳ only apply to public firms (EPS & DPS tend to be closed in private firms)

4) Dividend policy tends to follow life cycle of firm

5) " ——— " trade off btw costs & benefits of each policy

6) Disappearing cash dividends

▸ M&M Irrelevance of Dividend policy: value of firm (upstream, from EBIT) is unaffected by its dividend policy (downstream)

* Assumptions:

① Frictionless capital markets

② Only corporate tax (no personal taxes)

③ All firms belong to same risk class (same systematic risk) and are identical (เพื่อใช้เปรียบเทียบ) in every aspect except for their payout ratio in current time period

④ All future dividend payments from second time period onwards are identical

⑤ No adverse selection (no signaling opportunities)

⑥ no moral hazard

can create "homemade dividend"

EX All firms are in same risk class but diff div payout * no friction

	No Div	Med Div	High Div
net operating income after tax: $E[NOI](1-T_c)$	150	150	150
less $E[I]$ (reinvestment)	(65)	(65)	(65)
$E[FCF]$	85	85	85
# share	120	120	120
WACC (ρ)	12%	12%	12%
Growth	5%	5%	5%
Firm value (** assume constant div growth, ค่าใช้ DDM $= \frac{D_0(1+g)}{k-g}$)	1,275	1,275	1,275
$= \frac{E[FCF]\times(1+g)}{WACC-g}$			
* Total amount of dividends	0	85	170 ← no enough internal FCF to fund this (ขาด 85)
Dividend per share	0	0.71	1.42
* Proceeds from new issue	0	0	85
Amount of wealth given to new shdr			85
Cash balance ($E[FCF]$ − div)	85	0	0
Capital value for existing shdr	1,360	1,275	1,190
Price per share	11.33	10.625	9.92
Total value per share	11.33	11.33	11.33

CH 14: Theories of Dividend Policy:

▸ Clientele Effect Hypothesis:

- M&M pointed out that capital mkt imperfections → taxes & brokerage fees → lead investors to have a systematic preference for dividend or capital gain.
- Clientele effect: each div clientele may arise from
  1) Differing personal tax brackets for individual investors (Tax clientele) → e.g. มีเงินเดือนเยอะ & ไม่อยากเสียภาษีเพิ่ม ↳ prefers cap gain (Higher marginal income tax)

  or 2) " — " consumption preferences of " ———— " (Age clientele) → trade ST : cap gain; ↳ trade LT : dividend
- In equilibrium, investors will migrate to firms that have policy payout that closely matches their preferences → firm on average should not have lower value for making high/low payout
  does not affect the valuation of its equity
- If perfect capital mkt → investors can migrate btw div and cap gain easily w/o cost

▸ Dividend Irrelevance & Personal Taxes $\{ \underbrace{T_p(\text{income})}_{\text{progressive}} > \underbrace{T_p(\text{cap gain})}_{\text{fixed}} \}$ (div, cap gain)

- With personal taxes exist and $T_p(\text{income})$ (div) > T_p(cap gain), we should expect firms should pay no cash dividend & should be in form of cap gain e.g. via share repurchase
- Even $T_p(\text{income})$ (div) = T_p(cap gain), investors still prefer cap gain because investors can defer this.
  ↳ div ได้รับแล้วรับรู้รายได้ & เสียภาษีทันที แต่ cap gain สามารถ defer ได้จนกว่าจะขาย

▸ Bird-in-the Hand Fallacy (False belief)

↳ investors prefer a bird in hand (div, <certain> today) to two in bush (cap gain, <uncertain> future) ✗ cannot compare these two in diff time! (should be at same point of time)

- Valid comparison must be btw div today & price appreciation today
- When firm pays div → price drops by amount equivalent to increase in its share price due to dividend expected today (cum-div → ex-div)
  ⇓ E[DPS]
  then it becomes uncertain again
- Current dividend payments don't make firm's assets less risky
  ↳ bcs riskiness of firm comes from riskiness of its cash flows <EBIT stream>
  ↳ Investors แก้ด้วยการขายหุ้น & realize cash in current period
- Capital mkt friction <info problem>

ทำไมออก div ?

1 ▸ Informational signaling theory:

- Adverse selection exists (assumed no in M&M irrelevance of div)
- Mkt will perceive change in firm's payout policy as valuable ① new ② info about firm
  - 1 ใน 2 return นอกจาก firm
  - good / bad
- With adverse selection → เกิด pooling equilibrium → H value firm โดน undervalued
  - (เรื่อง pecking order theory)
  - ↓ underinvestment (manager pass up ⊕ NPV)
  - → ต้องมั่นใจว่า สามารถ generat cash flows sufficient to sustain payout increase in future
- Undervalued firm can take action to increase div or payout ratio to send credible signal to mkt that they are undervalued given their ⊕ NPV projects
  - ↓ costly! E[cost] > E(benefit) for bad quality firm, E[benefit] > E[cost] for good firm
    - ↳ L firm without ⊕ NPV projects cannot mimic
  - benefit: share price increases today < upward revaluation of firm by mkt > (bcs mkt learn about firm's future earning potential, mkt value of equity↑)
  - cost: if firm's future earnings < increased dividend
    - ↳ Firm will have to ① cut dividends in future (→ ราคาหุ้นตกรุนแรงกว่าตอนขึ้น div severely negative bcs mkt reaction is assymmetric) or making costly issue of equity to finance required reinvestment and/or ② forego ⊕ NPV projects to maintain increased dividend
      - ↳ underinvestment

* Firm with bad quality EBIT (low mean, high variance) will be underinvest if increase div

* High growth firm: ไม่จ่าย div เพราะ reinvest สูง
- ↳ dividend increase not always good signal:
  - ① increased profit
  - or ② reduced investment!!
- ↳ ทำออก div, กลุ่ม investors เปลี่ยน จาก กลุ่ม prefer cap gain → div ↳ Fisher separation

unobserve !
cannot diversify employment risk

2 ▸ Agency Cost Model of dividends
↳ Moral hazard <manager have incentive deviate from contract>

• ทำ finance funds ภายใน reinvest (either equity / debt) → firm is forces to be scrutinized by investment banking underwriters / commercial bank & buyers of new securities
↳ act as monitor for collective interest of shdr
↓ As long as agency cost > underwriting / issuance costs → shdr will bear issuance cost & receive regular cash div

• Dividend cut can be interpreted as symptom of Jensen free cash flow problem
↳ leads to severely negative mkt reaction
↳ signal that moral hazard in firm is high :(
↳ ปัญหาที่ manager keep high FCF to consume on job

* Alternative to cash dividend

① • Stock div can be used as signal as well
↳ effect of stock div should be neutral on shdr' wealth

② • Stock split as a means to distributing cash back to their shdrs.
Ex : 2-for-1 split → not send a costly signal → just improve liquidity
↳ # of shares double → share price should drop by 50%
↳ If DPS is cut < 50% → shdr receive larger amount of div in total
e.g. DPS before split = 1 THB → after split = 0.6 THB ×2
↓ shdr receive 1.2 THB in total

③ • Stock buyback / share repurchase
↳ - alternative to special cash dividend → reduce firm's FCF
↳ 1) easier to cancel than special cash div (less strictly)
2) allows managers to signal to mkt that firm is undervalued
3) give shdrs a choice to tender / not to tender their shares depending on their need for cash
↳ ให้ option to defer tax ต่างจาก cash dividend ที่ defer ไม่ได้!