Corporate Finance

- Capital Budgeting 如何赚钱
- Capital Structure 如何融资
- Dividend and Share Repurchase 如何分钱
- Corporate Performance
- Corporate Governance
- Mergers and Acquisitions

Capital Budgeting

Summary

- **Capital Budgeting**
  - Incremental after-tax cash flow at opportunity cost
- **Expansion** Project NPV
  - Initial: outlay $= \mathrm{FCInv} + \mathrm{NWCInv}$
  - Each period: $\mathrm{CF} = (\mathrm{S} - \mathrm{C}) \times (1 - \mathrm{t}) + \mathrm{D} \times \mathrm{t}$
  - Ending: $\mathrm{TNOCF} = \mathrm{NWCInv} + \mathrm{Sales_T} - (\mathrm{Sales_T} - \mathrm{B_T}) \times \mathrm{t}$
- **Replacement** Project NPV
  - Initial: outlay $= \mathrm{FCInv} + \mathrm{NWCInv} - \mathrm{Sales_0^{old}} - \left(\mathrm{Sales_0^{old}} - \mathrm{B_0^{old}}\right) \times \mathrm{t}$
  - Each period: $\mathrm{CF} = (\Delta\mathrm{S} - \Delta\mathrm{C}) \times (1 - \mathrm{t}) + \Delta\mathrm{D} \times \mathrm{t}$
  - Ending: $\mathrm{TNOCF} = \mathrm{NWCInv} + \Delta\mathrm{Sales_T} - (\Delta\mathrm{Sales_T} - \Delta\mathrm{B_T}) \times \mathrm{t}$
- **NPV with different lives**
  - Least common multiple of lives
  - Equivalent annual annuity (EAA) approach
- **Capital Rationing**
  - Sort by NPV and use greedy approach
- **Real Option**s
  - Timing, sizing, flexibility, fundamental
- **Real Option** Project NPV
  - $\mathrm{NPV} = \mathrm{NPV_{without}} + option\ value - \boldsymbol{option\ cost}$
  - Valuation based on decision trees or option pricing models
- Economic Income 经济收入
  - $EI_t = PV_{t-1} \times WACC$
  - Economic Income $=$ cash flow $+ \Delta$Market Value
  - Economic Income $=$ cash flow $-$ **economic depreciation**
  - $\mathrm{CF} = (\mathrm{S} - \mathrm{C}) \times (1 - \mathrm{t}) + \mathrm{D} \times \mathrm{t}$
- **Accounting Income**
  - $\mathrm{AI_t} = \mathrm{EBIT_t} \times (1 - \mathrm{t}) - \mathrm{Int_t} \times (1 - \mathrm{t})$
  - $\mathrm{AI_t} = \mathrm{EBIT_t} \times (1 - \mathrm{t}) - \mathrm{Debt_{t-1}} \times \mathrm{r_d} \times (1 - \mathrm{t})$
- **Economic Profit – 经济利润（净收入） = 经济收益 - 初始投入成本**
  - $\mathrm{Economic\ Profit} = \mathrm{EBIT} \times (1 - \mathrm{t}) - \mathrm{Captial_t} \times \mathrm{WACC}$
- **Residual Income – 超额/剩余收益 - 股权价值**
  - Residual income = net income – equity charge
  - $\mathrm{RI_t} = \mathrm{NI_t} - \mathrm{Equity_{t-1}} \times r_e$
- Claims Valuation

Capital Budgeting Categories

- Replacement projects
  - Maintain normal business
  - Cost reduction
- Expansion projects
  - Expand current business
  - New product or market
- Mandatory projects
  - Regulatory

    - Government
    - Environmental
    - Safety
- Other projects
    - Pet project
    - High-risk endeavor R&D

Capital Budgeting Principal - Incremental after-tax cash flow at opportunity cost

- Use **cash flow** not accounting income 现金流
- **Incremental** cash flow 增量
- **Exclude**
    - **Sunk** cost -> excluded 不考虑沉默成本
        - Cannot be avoided even if it is not undertaken
    - **Financial cost 不考虑资金成本**
        - Financial costs are **reflected** in project's required rate of return
        - Return more than cost of capital will increase firm value
- **Include**
    - **Opportunity cost 机会成本**
        - Cash flows a firm will lose if it is undertaken
    - **Externalities** -> included 考虑外部影响
        - Effects on other cash flows
        - **Cannibalization** – negative externality
            - New projects take sales from existing projects
            - Loss in sales should be taken into account
        - Positive externality
            - Promote the sales of other projects
- **Discount rate**
    - = cost of capital = required rate of return = opportunity cost
- **Timing** 时间点
    - Earlier are more valuable
- **After-tax** 税收现金流
    - Use after tax cash flow
    - Use MCAR for depreciation for tax reporting purpose

Modified Accelerate cost Recovery system (MCAR)

- US
    - reporting: Straight line depreciation
    - Tax: **MCAR**, leading to higher NPV
- Capital budgeting, use **MCAR** due to after-tax cash flow
- Half-year convention
    - Asset is placed in the **middle** of first year 折旧费用只有半年
- Depreciable basis
    - Basis = purchase price + **shipping + handling** installation costs

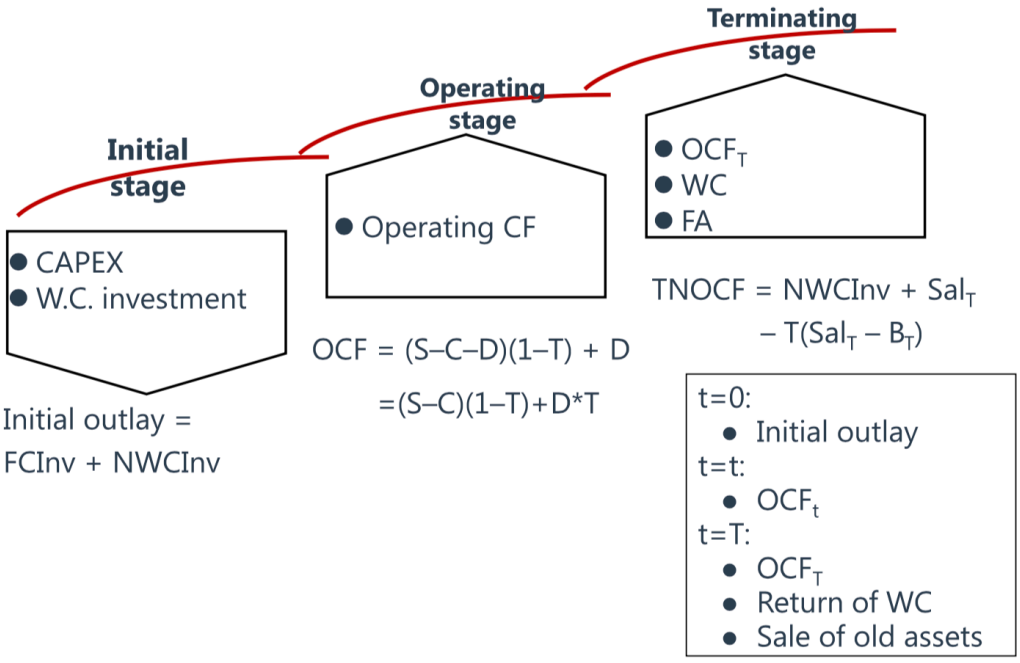
Expansion Projects

- Initial cash outlay/initial **capital**

    - $\text{outlay} = \text{FCInv} + \text{NWCInv}$
    - FCInv: net fixed cost (prices, shipping and installation)
    - NWCInv: net **working** capital
        - $\text{NWCInv} = \Delta\text{noncash current asset} - \Delta\textbf{nondebt}\text{ current liabilitites}$
            - 非现金流动资产: inventory, account receivable
            - 非现金流动负债: account payable (no debt)
        - Cash is not an asset 不考虑现金
        - Positive, require financing.
        - At the end, it can be fully recovered. 结束时可以全部收回
- **After-tax operating** cash flow 税后经营现金流
    - $\text{CF} = (\text{S} - \text{C} - \text{D}) \times (1 - \text{t}) + \text{D} = (\text{S} - \text{C}) \times (1 - \text{t}) + \text{D} \times \text{t}$
        - $\text{EBIT} = \text{S} - \text{C} - \text{D}$
        - S: sales
        - C: **cash** operating cost 现金成本
        - D: depreciation expense 非现金成本、折旧
        - Accelerated depreciation -> higher NPV
- **Terminal** year after-tax **non-operating** cash flows (TNOCF) 期末税后非经营现金流
    - $\text{TNOCF} = \text{NWCInv} + \text{Sales}_\text{T} - (\text{Sales}_\text{T} - \text{B}_\text{T}) \times \text{t}$
    - Fixed assets
        - Ending book value: $\text{B}_\text{T} = FCInv - \sum D_t$ 开始价值-累计折旧
        - Sales proceeds: $Sales_T$
        - Tax on profit: $(Sales_T - \text{B}_\text{T}) \times \text{t}$
        - **After-tax salvage value**: $\text{Sales}_\text{T} - (Sales_T - B_T) \times t$

Replacement Projects

- Initial outlay (sell old asset)
    - $\text{outlay} = \text{FCInv} + \text{NWCInv} - \text{SFCInv}_\text{old}$
        - $\text{SFVInv}_0^{\text{old}} = \text{Sales}_0 - (Sales_0 - B_0) \times t$ 开始处置老项目的钱
        - $\text{NWCInv} = \text{NWCInv}_\text{new} - \text{NWCInv}_\text{old}$ 新旧项目直接抵消
- Incremental cash inflow
    - $\Delta CF = (\Delta\text{S} - \Delta\text{C}) \times (1 - \text{t}) + \Delta\text{D} \times \text{t}$
- Terminal cash flow
    - $\text{TNOCF} = \text{NWCInv} + \Delta\text{SFCInv} = \text{NWVInv} + \text{SFVInv}_\text{T}^{new} - \text{SFVInv}_\text{T}^{old}$
        - $\text{SFVInv}_\text{T}^{new} = \text{S}_\text{T}^{new} - (\text{S}_\text{T}^{new} - B_T^{new}) \times t$
        - $\text{SFVInv}_\text{T}^{old} = \text{S}_\text{T}^{old} - (\text{S}_\text{T}^{old} - B_T^{old}) \times t$ 老项目在结束时的价值
    - $\text{TNOCF} = \text{NWCInv} + \Delta S_T - (\Delta S_T - \Delta\text{B}_\text{T}) \times t$



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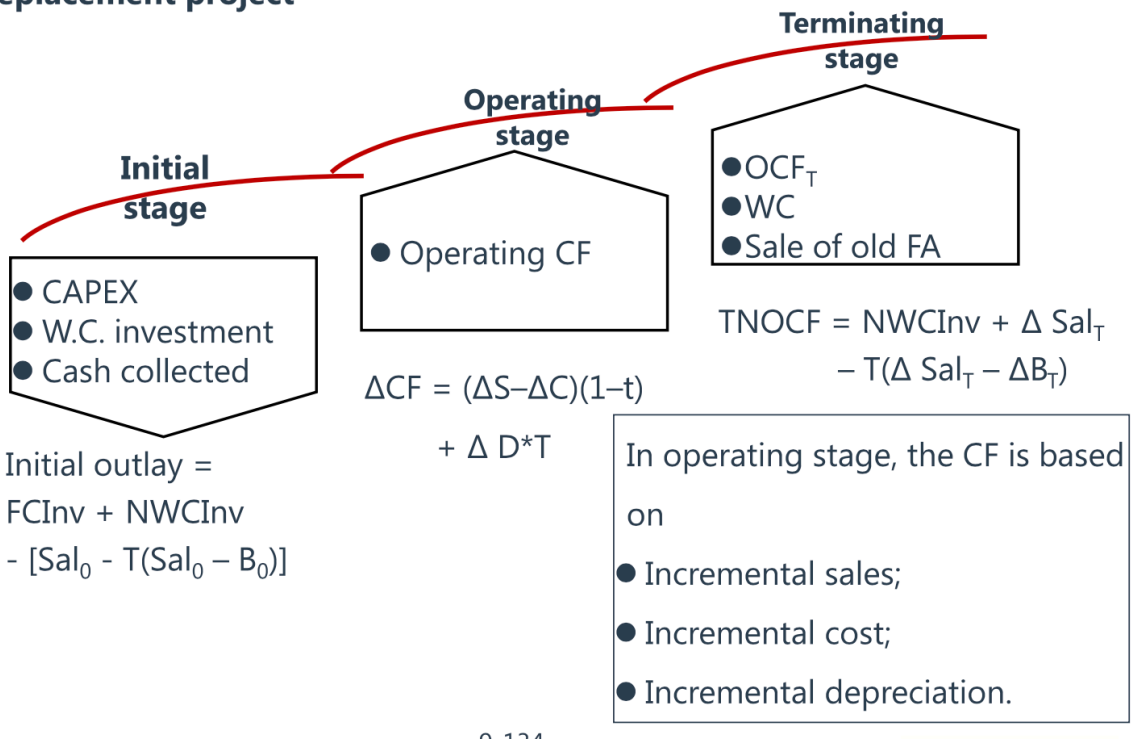
Replacement project



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Inflation Effects

- $1 + \mathrm{R}_{\mathrm{nominal}} = (1 + R_{real}) \times (1 + R_{inflation})$
- 现金流和利率要匹配
- Use **nominal or real** cash flows 名义还是实际现金流和利率
  - Nominal cash flow -> nominal discount rate
  - Real cash flow -> real discount rate

- If inflation is higher than expected 比预期高
  - The profitability is **lower** 利润低
  - Reduce the value of tax saving from depreciation 折旧税减少
    - Depreciation is based on **asset** purchase price
    - Asset purchase price increase due to inflation, depreciation should increase but still use original price, 因此折旧变少，税盾变小
  - Reduce the value of payments to bondholders 债务价值减少
    - Most are fixed
  - Affect revenue and costs differently 不同

Mutually Projects with different Lives

- Least common multiple of lives 最小公倍数
  - 持续投资，让年限等于最小公倍数
  - Assume original NPV and maturity n
  - Repeat times m
    - The least common years is $T = n \times m$
  - $\text{NPV}_{\text{new}} = NPV \times \sum_{i=1}^{m} \frac{1}{(1+r)^{(i-1)\times n}}$ 折现法
    - $= NPV \times \left(1 + \frac{1}{(1+r)^n} + \frac{1}{(1+r)^{2n}} + \cdots + \frac{1}{(1+r)^{(m-1)n}}\right)$
  - 新的现金流：一共 m 年，每年收到NPV，利率是以前 n 年的复利
  - $\text{NPV}_{\text{new}} = PMT \times \sum_{i=1}^{m} \frac{1}{(1+R)^i}$ 年初支付的年金
    - $PMT = NPV, N = m, R = (1+r)^n - 1 \rightarrow PV, \boldsymbol{BEG}\ mode$
    - 每期支付NPV, 一共m年，利率为$(1+r)^n - 1$，压缩了时间
- Equivalent annual annuity (EAA) 年金法，等额本息支付法
  - Find the sequence of annual payments with a present value that is equal to project's NPV
  - Assume original NPV and maturity T
    - $\text{N, R, PV} = -\text{NPV}, \text{FV} = 0 \rightarrow \text{PMT}$ 等额本息支付

Capital Rationing -> maximize NPV 资本限额

- **Ideally**
  - A firm will invest all positive NPV projects until the marginal return equal marginal cost
- **Capital Rationing**
  - Allocation of a fixed amount of capital among the set of projects to maximize share value (maximize total NPV)
  - Violates market efficiency
- **Hard or Soft Capital Rationing**
  - Hard: budget cannot be exceeded 不可以被超过
  - Soft: additional capital can be exceeded to justify value
- Process – Greedy Approach
  - Sort NPV in a **decreasing** order 按照 NPV 倒叙排
  - MaxNPV(budget, 1) 迭代算法
  - Each time two cases
    - Choose the first one 选择第一个最大的 NPV

        - NPV1 + MaxNPV(budget - c1, 2)
    - Choose the second one not the first one 选择第二个最大的 NPV
        - NPV2 + MaxNPV (budget – c2, 3)

Risk Analysis

- Sensitivity Analysis – one variable
    - Factor, increase and decrease
- Scenario Analysis - multiple variable 加权平均
    - Probability of each case: Base/best/worst
    - each case probability is p, NPV is $\mathrm{NPV_c}$
    - average weighted NPV is $\mathbf{p} \times \mathbf{NPV_c}$
- Simulation Analysis (MC simulation)
    - Distribution of NPV

Project Discount rate

- Company: WACC
- CAPM - project-specific rate (**hurdle rate**)
    - $\mathrm{R_{project}} = \mathrm{R_F} + \beta_{project} \times (R_{market} - R_F)$
    - $\beta_{project}$ measure of **systemic** risk
- If use company's weighted cost of capital (WACC)
    - Project risk > company risk -> overestimate NPV
    - Project risk < company risk -> underestimate NPV

Real Options

- Based on **real** assets not financial assets
- Improve NPV
- **Timing** options 时间期权
    - Delay or accelerate making an investment with the hope to have better information
- **Sizing Options 规模期权**
    - **Abandonment** options - put options
        - 退出的现金流比持续的多
        - Allow to abandon a project if PV of incremental cash flow **existing** exceeds those **continuing** a project
    - **Expansion** options – call options
        - Can make additional investment
- **Flexible options – operational aspects 运营**
    - Price-setting options 价格期权
        - Change the price of a product
    - Production-flexibility 生产要素期权
        - Pay workers overtime, use different input materials, produce a variety of products.
- **Fundamental options - derivative**
    - Projects that are options themselves because the payoffs depend on the price of underlying asset.
    - Copper mine depends on copper market price

Project with Real options Valuation

- NPV without the option
- NPV with option
  - $\text{NPV} = \text{NPV}_{\text{without}} + option\ value - \boldsymbol{option\ cost}$
- Decision tree
- Option pricing model

Economic

- EI 收益: 市值 = NP(EI) = 初始投资 + 债务价值 + 股东收益
- EP 净收益: MVA = NPV(EP) = NPV(EI)=NPV(EI) - **初始投资** = 债务价值 + 股东收益

Economic Income – 经济收益：未分配收入=税后现金流-市值贬值

- $EI_t = PV_{t-1} \times WACC$
- After tax cash flow 去除营运费用
  - $after\ tax\ cash\ flow = (S - C - D) \times (1 - t) + D = EBIT \times (1 - t) + D$
- $\textbf{Economic Income} = \textbf{cash flow} + \textbf{ΔMarket Value}$ 现金 + 升值
  - market value = PV(future cash flow) 价值一般变小
- $\text{Economic Income} = \text{cash flow} - \textbf{economic depreciation}$
  - economic $\textbf{depreication} = -\Delta\text{Market Value}$ 价值折旧/贬值
  - financial cost: ignored because it is reflected in WACC 不考虑
- Accounting income – Net income in I/S
  - Accounting depreciation – based on book value
  - Financial cost: interest expense (subtracted)
    - Interest expense $\text{Int}_i = \text{PV}_{i-1} \times w_d \times r_d$
- $\mathbf{PV_{t-1}} = \frac{\mathbf{CF_t + PV_t}}{\mathbf{1+r}} \rightarrow \mathbf{EI_t} = \boldsymbol{CF_t + (PV_t - PV_{t-1}) = PV_{t-1} \times r}$
- Market value $\text{M}_t = \text{PV}_t$ 未来现金流的折旧
- $\text{PV}_0 = \frac{\text{CF}_1}{1+r} + \frac{\text{CF}_2}{(1+r)\text{^}2} \cdots + \frac{CF_n}{(1+r)^n}$
- $\text{PV}_1 = \frac{\text{CF}_2}{1+\text{r}} + \frac{\text{CF}_3}{(1+r)^2} + \cdots + \frac{CF_n}{(1+r)^{n-1}}$
- $\text{PV}_0 = \frac{\text{CF}_1 + \text{PV}_1}{1+\text{r}} \rightarrow PV_1 + CF_1 = PV_0 \times (1 + r)$ 市值之间的关系
- $\text{PV}_1 = \text{PV}_0 \times (1 + r) - CF_1$
- $EI_1 = CF_1 + \text{PV}_1 - PV_0 = PV_0 \times WACC$ 时刻 1 的经济利润，就是初始市值的利息
- Economic rate of return = discount rate
- PV
  - $\boldsymbol{NPV = CF_0 + PV_0} \rightarrow \text{PV}_0 = NPV - CF_0$
  - $\text{PV}_1 = \text{PV}_0 \times (1 + r) - CF_1$

Economic Profit – 经济利润（净收入） = 经济收益 - 初始投入成本

- Profit in excess of dollar cost of capital invested in a project
- Capital 原始投资累计折旧
  - Initial investment, depreciation each year
  - $\text{Capital}_t = CF_0 - \sum_i D_i$

- Economic Profit = **NOPAT** − \$WACC = EBIT × (1 − t) − WACC × captial
- Economic Profit = $after\ tax\ cash\ flow - capital\ repayment$
  - $after\ tax\ cash\ flow = EBIT \times (1-t) + D$
  - $capital\ repyament = principle + interest = D + capital \times WACC$
  - Economic Profit = EBIT × (1 − t) − Capital × WACC
  - $\text{Capital}_{i+1} = Capial_i \times (1+r) - (D - Capital_i \times r) = Capital_i - D$
- Market value added
- 回报角度
  - 初始投资$|CF_0|$，初始时刻公司的价值经济收益PV(EI|WACC)
  - $\text{MVA} = \text{PV(EI|WACC)} - |CF_0| = NPV(EI|WACC)$
  - $\text{MVA} = \text{PV(EP|WACC)} = \text{NPV(EP|WACC)} = NPV(EI|WACC)$

Residual Income – 超额/剩余收益 - 股权价值

- Residual income = net income – equity charge
  - $\text{RI}_t = \text{NI}_t - \text{E}_{t-1} \times r_e$
  - $\text{NI}_t = (S - C - D - I) \times (1-t) = EBIT \times (1-t) - I \times (1-t)$
    - $= EBIT \times (1-t) - M_{t-1} \times w_d \times r_d \times (1-t)$ 减去了债务的利息
  - $\text{E}_t = Capital_t - M_t \times w_d$ 初始资本账面价值 – 债务的现值
  - $\text{RI}_t = EBIT \times (1-t) - M_{t-1} \times w_d \times r_d \times (1-t) - (C_{t-1} - M_{t-1} \times w_d) \times r_e$
- $\text{NPV(RI)} = \text{NPV(EP)} = \text{NPV(EI)}$ 风险加权价值都是一样

Claims Valuation approach

- After tax cash flow (NOPAT + depreciation) -> PV is company value
- Debt Cash flow
  - Principal payments $= \Delta\text{D}_t = -\Delta\text{M}_t \times w_d$
  - Interest $\text{D}_{t-1} \times r_d = M_{t-1} \times w_d \times r_d$
- Equity Cash flow
  - After tax cash flow – debt cash flow = net income + depreciation– debt principal payment
  - Operating cash flow = net income + depreciation
  - Dividends and share repurchase

	computation	Value
Cash flow	$\text{CF}_t = EBIT \times (1-t) + D$	Company value
Market Value	$\text{M}_t = \sum_{i=t+1} PV(CF_i)$	Company value is M_0 现金流的现值
Economic Deprecation	$\text{ED}_t = -\Delta M_{t-1} = M_t - M_{t-1}$	经济折旧，市值的降低，相当于本金
Economic Income (interest)	$\text{EI}_t = CF_t + \Delta\text{M}_t = CF_t - ED_t$ $= \text{M}_{t-1} \times r$	PV(EI)
Accounting Depreciation	$CD_t = D$	Assume linear depreciation, principal payment
Accounting Value	$\text{C}_t = C_{t-1} - D$	Capital book value
Account payment	$CP_t = D + C_{t-1} \times r$	Capital payment

Economic Profit	$\mathrm{EP_t} = CF_t - CP_t$ $= EBIT \times (1-t) - \mathrm{C_{t-1}} \times \mathrm{r}$	$\mathrm{V_c} = \mathrm{PV(EP)} + \mathrm{C_0}$
Residual Income	$\mathrm{RI_t} = NI_t - E_{t-1} \times r_e$	$V_e = \mathrm{PV(EI)} + \mathrm{E_0}$

	Economic	Accounting/Capital
Cash flow 现金流	$\mathrm{CF_t} = EBIT \times (1-t) + D$	
Present Value 现值	$\mathrm{M_t} = \sum_{i=t+1} PV(CF_i) = \mathrm{M_{t-1}} - \mathrm{ED_t}$	$\mathrm{C_t} = C_{t-1} - CD_t$
Deprecation 折旧本金	$\mathrm{ED_t} = -\Delta M_{t-1} = M_t - M_{t-1}$	$\boldsymbol{CD_t = D}$
Interest or Income 利息或者收入	$\mathrm{EI_t} = CF_t - ED_t = \mathrm{M_{t-1}} \times r$	$CI_t = C_{t-1} \times r$
现金流支付本金+利息	$\mathrm{MP_t} = ED_t + EI_t = \boldsymbol{CF_t}$	$\mathrm{CP_t} = CD_t + CI_t$ $= D + C_{t-1} \times r$
Economic Profit 现金流之差	$\mathrm{EP_t} = CF_t - CP_t$ $= EBIT \times (1-t) - \mathrm{C_{t-1}} \times \mathrm{r}$	
Residual Income	$\mathrm{RI_t} = NI_t - E_{t-1} \times r_e$ $= EBIT \times (1-t) - D_{t-1} \times r_d \times (1-t)$ $- E_{t-1} \times r_e$	$D_t = M_t \times w_d$ 基于市值 $E_t = C_t - D_t$ 账面价值

Capital Structure

Summary

- MM-theory
  - No tax: irrelevant
  - With tax: 100% debt
- **Cost of Capital with estimate equity**
  - Leveraged Equity $r_e = r_0 + \frac{D}{E}(r_0 - r_d)(1 - \mathrm{t})$
  - $WACC = w_d \times r_d \times (1-t) + w_e \times r_e$
- Debt increase
  - More tax shields
  - But more financial distress
- Equity increase
  - Agency cost
  - Information asymmetry - **signals**
- Pecking theory
  - Retained earnings > debt > equity
- Static trade-off theory
  - Consider financial distress: tradeoff
- Target capital structure
  - Exploit opportunities
  - Market value fluctuation
- Debt Rating
- Capital Structure Factors

MM1 (no tax) 1958 – irrelevance - value

- Value is unaffected by capital structure 资本结构和价值无关
- Assumptions
  - Perfectly competitive: No tax, no costs, no bankruptcy costs
  - Homogeneous expectation
  - **Riskless** borrowing and lending
  - No agency costs
  - Investment decisions are unaffected by financial decisions
- Firm value depends on asset size
- Value of leveraged firm = value of **unleveraged** firm
  - $\mathrm{V_L} = \mathrm{V_U} = \frac{\mathrm{EBIT}}{r_0}$

Cost of Equity

- $\mathrm{r} = \mathrm{w_d} \times r_d \times (1-t) + w_e \times r_e$
- $r_e = \frac{\mathrm{r}}{\mathrm{w_e}} - \frac{w_d}{w_e} \times r_d \times (1-t) = \frac{r}{E} \times (D+E) - \frac{D}{E} \times r_d \times (1-t)$
- $r_e = \mathrm{r} + \mathrm{r} \times \frac{\mathrm{D}}{\mathrm{E}} - \frac{D}{E} \times r_d \times (1-t)$
- $\boldsymbol{r_e = r + \frac{D}{E} \times (r - r_d \times (1-t))}$

MM2 (no tax) – 1966 – irrelevance - cost of equity

- Cost of equity increase linearly with the weight of debt
- $r = r_0$ (constant, **unleveraged** cost of capital)
- $r_e = r_0 + \frac{D}{E}(r_0 - r_d)$ (without tax)
    - r_0: cost of 100% equity, unleveraged
- $\beta_e = \beta_0 + \frac{D}{E}(\beta_0 - \beta_d)$
- $V_L = \frac{EBIT}{r_0}$ firm value with 100% equity

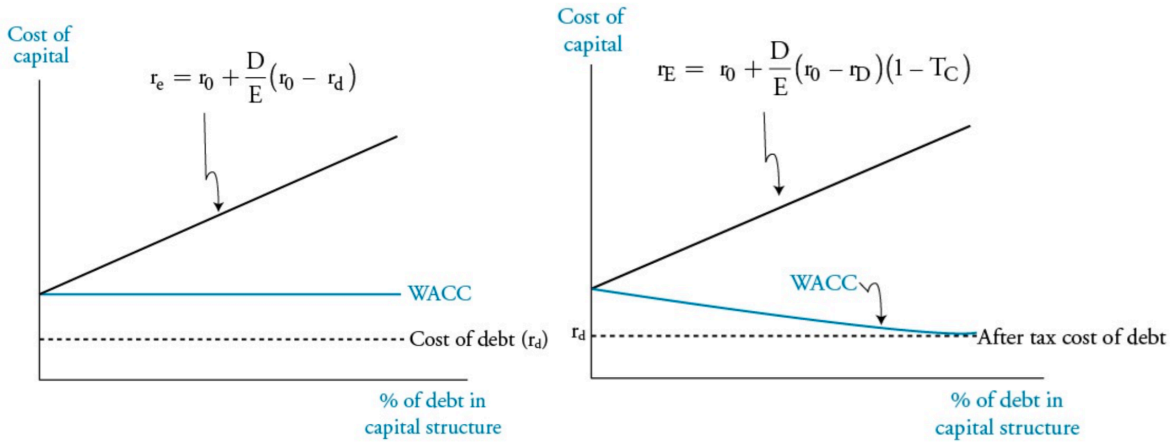
MM 1 (with tax) - value is maximized at 100% debt

- $NI = EBIT \times (1 - t) - \mathbf{Int} \times (1 - t) = EBIT \times (1 - t) - Int + Int \times t$
- 每期税盾是 $Int \times t = D \times r \times t$
    - 当成永续年金
    - 折现为 $Int \times \frac{t}{r} = D \times t$
- $V_L = V_U + \boldsymbol{D \times t}$ **(tax shield from debt)**
- $V_L = \frac{EBIT}{r_0} \times (1 - t)$ with 100% equity

MM 2 (with tax) – WACC is minimized at 100% debt

- $r_e = r_0 + \frac{D}{E}(r_0 - r_d)(1 - t)$
- $r = r_0 \times (1 - w_d \times t)$

	Without tax	With tax
MM1	$V_L = V_U = \frac{EBIT}{r_0}$	$V_L = V_U + D \times t = \frac{EBIT \times (1 - t)}{r_0}$
MM2	$r_e = r_0 + \frac{D}{E}(r_0 - r_d)$	$r_e = r_0 + \frac{D}{E}(r_0 - r_d)(1 - t)$
WACC	$r = r_0$	$r = r_0(1 - w_d \times t)$



Financial Distress Cots - debt

- **Expected costs**
    - Cost of financial distress and bankruptcy
        - Direct: legal and administrative fess

        - Undirect: Investment opportunities
    - Probability of financial distress
        - Operating and financial distress
        - Management quality and corporate governance structure
- Discourage use a large amount of debt

Agency costs of equity - equity

- Costs w.r.t. conflicts of interests
- Net agency cost of equity
    - Monitoring cost
        - Make reports, pay board of directors
        - Strong governance system -> reduce cost
    - Bonding cots
        - Premium for insurances
        - Non-compete agreements
    - Residual losses
        - Rest costs when the previous two does not provide a perfect guarantee

Cost of asymmetric information – equity

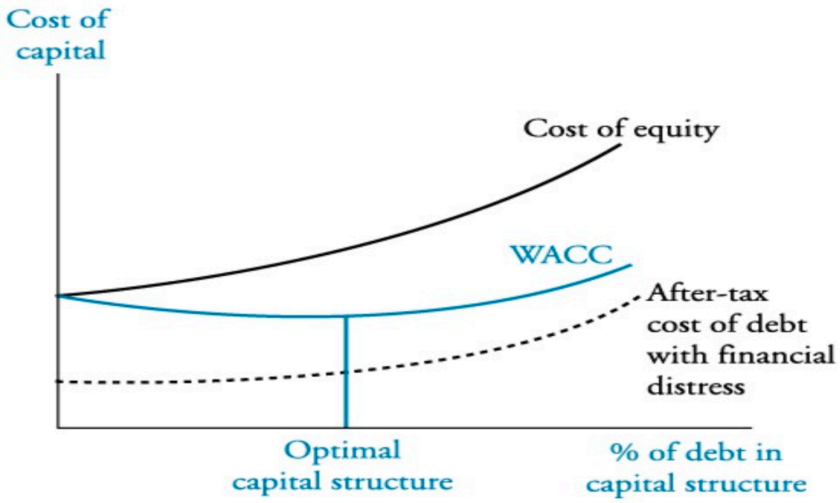
- Signals
    - Make fixed payment -> good
    - Issue equity -> overvalued stock
- Cost increase with equity

Pecking order theory – based on asymmetric information

- Make decisions that give **least** signals to investors
- Order
    - Internally generated earnings (retained earnings)
    - Debt
    - External equity (newly issues shares)
- Capital Structure is a **by-product** of financial choices

Static trade-off theory 平衡税盾和财务危机成本

- Balance between tax shield and financial distress costs
- $\mathrm{V_L} = V_U + D \times \mathrm{t} - \mathrm{PV(costs\ of\ financial\ distress)}$
    - Marginal benefit and marginal cost of financial distress



	Value (V_L) **Proposition I**	Cost of debt	Cost of equity (r_e) **Proposition II**	WACC (r)
Without tax	V_U Value unaffected by capital structure	Constant	$r_0 + \frac{D}{E}(r_0 - r_d)$ Cost of equity increase linearly	$r = r_0$ constant
With tax	$V_U + D \times t$ Debt increase value	Constant	$\boldsymbol{r_0 + \frac{D}{E}(r_0 - r_d)(1 - t)}$ Cost of equity increase linearly	$r_0(1 - w_d \times t)$ decrease to after-tax cost of capital
With financial distress	$V_U + D \times t - PV(distress)$ Trade-off	increase	increase	Convex (decrease and increase)

Managerial Decision Making (tax, financial costs)

- MM with no tax, no financial costs
  - Irrelevant
- MM with tax, no financial costs
  - 100% debt
- Static trade-off theory
  - Increase debt
    - increase tax shield
    - Increase cost of financial distress

Target capital structure

- Fluctuation reasons
  - choose to **exploit** opportunities in a specific financing source
  - market value **fluctuations**

Debt Rating

- Moody
  - Investment grade: Aaa, Aa, A, Baa
- S&P

    - Investment grade: AAA, AA, A, BBB
- Investment and speculative grade
- Grade affects cost of capital

Capital Structure Policies

- Change in capital structure **over** time
- Capital structure of **competitors** with similar business risk
- Company-specific risks
    - Agency cost, quality of corporate governance

International financial leverage - Differences

- Total debt
- Debt maturity
- Emerging market differences

International financial leverage - Factors

- Institutional and legal (worse -> use more leverage)
    - Strength of legal system
        - Weak: firm use more debt
        - Strong: less debt and longer maturities
    - Information asymmetry
        - High asymmetry: more debt and leverage
    - Taxes
        - Tax shield -> more debt
        - Low tax on dividend -> more equity
- Financial markets and banking system
    - Liquidity
        - Liquid – longer maturity debt
    - Reliance on banking system
        - More reliance -> more debt
    - Institutional investor presence
        - Pension and insurance -> more long-term debt
- Macroeconomic factors
    - Inflation
        - High inflation -> less debt or shorter maturity
    - GDP growth
        - High GDP -> more long-term debt
- Summary – from investor's point of view
    - Better situation -> lower debt and long-term debt, favor equity
    - High inflation -> lower debt and more short debt

Country-Specific Factor	Use of Total Debt	Maturity of Debt
Institutional and Legal Factors		
Strong legal system	Lower	Longer
Less information asymmetry	Lower	Longer
Favorable tax rates on dividends	Lower	N/A
Common law as opposed to civil law	Lower	Longer
Financial Market Factors		
More liquid stock and bond markets	N/A	Longer
Greater reliance on banking system	Higher	N/A
Greater institutional investor presence	Lower	Longer
Macroeconomic Factors		
Higher inflation	Lower	Shorter
Higher GDP growth	Lower	Longer

Dividend and Share Repurchase

Summary

- **Dividend Policy**
  - Cash dividend 影响公司，影响报表（资产和权益减少）
  - Cash dividend reinvestment plan
  - Stock dividend 不影响公司，只影响部分报表（留存收益 vs 股本）
  - Stock splits/merges 不影响公司，不影响部分报表
- **Dividend payout Theory 6 个理论**
  - Irrelevance, bird-in-hand (support dividend), tax aversion (against dividend)
  - Clientele effects (depends on client)
    - **Tax consideration** (after tax dividend = after tax capital gain)
    - $D \times (1 - \mathrm{T_D}) = \Delta \mathrm{P} \times (1 - \mathrm{T_C})$
  - Information asymmetry signal, agency costs
- **Dividend payout factors 6 个因素**
- **Dividend Tax**
  - Double-taxation system
    - $\text{effective tax rate} = \mathrm{T_{corporate}} + (1 - T_{corporate}) \times T_{individual}$
  - Split-rate: use a different rate for corporate
  - Imputation tax: corporate pay first, adjust (shareholder rate)
- **Dividend payout policies 3 种方法**
  - **Constant**: $\Delta D = \frac{Eearning_{target} \times payout - Dividend_{previous}}{years}$
    - **Stable dividend per share**
  - Stable: fixed dividend payout ratio (D/E), seldom use
  - **Residual**
    - capital -> equity -> residual earning (out of retained earnings)
    - dividend = retained earning – equity = RE – capital* E/A
- **Stock Repurchase**
  - Finance with surplus **earning** or **debt**
  - P/E and BVPS (net asset/P)
- **Dividend Safety**
  - Dividend payout = dividend / earning
  - Dividend coverage = earning / dividend
  - **FCFE coverage = FCFE / (dividend + repurchase)**
  - FCFE = CFO – FCInv + NB

Cash dividend Types 现金分红

- Regular cash dividend
- Extra or special or irregular dividends
  - Unusual circumstances
- Liquidating dividend
  - Whole firm or part of the firm is sold
  - A return **of** capital not return **on** capital

Cash Dividend Reinvestment Plan (DRP)

- Allow to reinvest all of part of cash dividend

- Advantages – firm
  - A diverse shareholder 多样化股东
    - Small shareholder can accumulate shares
  - Encourage a long-term investment 长期
  - No floating fee for new issue DRPs 减少发行费
- Advantages – shareholder
  - Purchase additional shares with no transaction cost 无交易费
  - Cost averaging 价格平均
  - Discount to market price 价格折扣
- Disadvantages
  - Additional record keeping for tax purpose 双重收税
  - Increase average cost
  - Fully taxed when they are paid – even if they are reinvested 获得时交税

Cash Dividend Accounting 减少现金和权益

- B/S: Reduce cash asset and equity
- No effect on shareholder wealth
  - Original price P_0, dividend is D, after dividend price is $\mathrm{P}_1 = P_0 - D$
  - Shareholder wealth is $\mathrm{P}_1 + D = P_0$
- Liquidity – worse
  - Cash ratio, current, quick ratio -> worse
- Leverage – worse
  - Financial leverage (Debt to equity) increase

Stock Dividend 股票分红

- Issue more shares, share price decrease, total **wealth** unchanged 总价值不变
- Shareholder **ownership** unchanged 控制权不变
- Usually not taxed since market value unchanged 一般不收税
- Advantages
  - Increase stock float and its **liquidity** 增加流动性
  - Attract small investors 吸引小投资者
    - Decrease stock price
  - Pay the same cash dividend per share
    - Effectively Increase cash dividend
  - Pay the same **amount** of cash dividend 总量不变->现金降低
    - The same payout ratio D/E
    - Effectively reduce cash dividend
    - Dividend yield D/P unchanged

Stock Dividend Effects

- 不影响公司，只影响部分报表（平衡留存收益和股本）
- 只影响股票相关的
- B/S: asset, liability, equity unchanged
- Ratios: current, cash, financial leverage unchanged
- Equity unchanged

    - R/E -> adds-in capital 留存收益变成资本
- The number of shares is increased
    - Price decrease
    - EPS decrease
    - P/E **unchanged**

Stock Split 股票拆分

- 等价于股票分红
- 不影响公司，不影响报表
- N-for-one -> split one into n shares
    - Equivalent to $(n-1)\times 100\%$ dividend

Reverse Stock splits/Stock Merge 股票合并

- 不影响公司，不影响报表
- No effect on the company
- Increase share prices
- Attract large institutional investors

Dividend Policy Theories

- Dividend irrelevance 无关
    - No effects on stock or cost of capital
    - Homemade dividend
- Bird in hand/dividend preference theory 股利是好的
    - A dollar of dividend > a dollar of capital gain
- Tax aversion 股利不好因为交税
    - Dividend pay a higher tax rate
    - Extreme: zero payout
    - US: dividend and capital gain the same tax
- Clientele effect 股利好不好取决于客户
- information asymmetry - signal
- agency cost – conflict of interest

Clientele Effect Theory 客户

- Tax considerations
    - High-tax-bracket investors prefer low dividend
    - Low-tax-bracket investors prefer high dividend
- Requirements of institutional investors
    - only hold dividend-paying stocks
- Individual investor preference
    - spend dividend while preserving the principle

Client Effect - Tax Consideration

- Assume dividend tax T_D, and capital gain is T_C
- Dividend D is equivalent to X capital gain
- After tax income are the same

- $D \times (1 - T_D) = X \times (1 - T_C) \rightarrow X = D \times \frac{1-T_D}{1-T_C}$
- When stock use dividend, stock price will **decrease** by $\Delta P = X$
  - $D \times (1 - T_D) = \Delta P \times (1 - T_C)$
  - Shareholder wealth unchanged
    - D dividend means X capital gain per dividend, so stock price should decrease by ΔP
  - 发放 D 分红等价于股价上涨了ΔP，要保证总价值不变，因此股价需要降低ΔP。

Information Asymmetry - Signaling

- Dividends are **sticky**
  - Do not increase or decrease
- Dividend initiation 开始分红
  - Positive: firm is optimistic about future 未来收入不错
  - Negative: lack of profitable projects 没有好的项目
- Unexpected increase
  - Strong future
- Unexpected decrease or omission
  - Negative: In trouble 未来收入有问题
  - Positive: better chance available, need to reinvest 有好的投资项目

Agency Costs – conflicts of interests

- Manager and shareholders 增加股利来降低代理成本
  - Manager tend to overinvest
  - **increase dividend** to reduce agency cost
- Shareholder and debtholders 股东和债权人
  - Solution: **Bond indenture** 债券契约，限制分红
  - Debtholder restrict dividend payment

Dividend Payout Factors

- Investment opportunities 好机会，分红低
  - Good chance, lower dividend
- Expected volatility of future earnings 不变
  - More volatility, not change
- Financial flexibility 财务灵活度高，分红低
  - Prefer to use **stock repurchase** 不需要承诺可持续
- Tax consideration
  - Low tax does not mean high dividend
    - Tax are paid when dividend is received 收到就需要交税
    - Capital gain taxes are paid only when shares are sold 卖掉才交资本里利得税
    - Tax-exempt institutions 免税机构
    - Capital gains may not have to paid in all
- Floating costs 成本高，分红低

    - Issue stock with 3%-7% floating fee
    - High floating fee -> lower dividend
- Contractual and legal restrictions 限制分红
    - Impairment of capital rule: dividend < retained earning
    - Debt covenants
        - Bond holders

Tax Considerations

- Double-taxation system 双重收税
    - Taxed at both corporate and individual level
    - effective tax rate $= \mathrm{T}_{\mathrm{corporate}} + \left(1 - T_{corporate}\right) \times T_{individual}$
    - $= \mathrm{T}_{\mathrm{corporate}} + T_{individual} - T_{corportate} \times T_{individual}$
- Split-tax corporate tax system – Germany 双重收税，不同利率（企业税率低）
    - Corporate dividend uses a lower tax rate
        - Earning for dividend tax < earning to be retained tax
    - Individual level tax – unchanged
- Tax imputation tax system 企业先交税，个人再补交或者退税，用个人税率
    - Tax are paid at the corporate level but are attributed to the shareholder
    - First tax: corporate level $T_{corporate}$
    - Second tax or return: individual tax – tax paid $T_{individual} - T_{corporate}$
        - > 0 -> pay more
        - < 0 -> tax return
    - tax base: **net income** × payout ratio

Dividend Policy

- Stable dividend 增加比例
    - Align dividend growth rate with **long-term** earning's growth rate
    - Target payout adjustment model
        - $\Delta \mathrm{D} = (Expected\ Earning_{current\ year} \times payout - D_{last\ year}) \times \frac{1}{n}$
          平均分配到 n 年
    - dividend per share constant
- Constant dividend payout 固定比例
    - $\frac{\mathrm{D}}{\mathrm{E}}$ fixed dividend payout ratio
- Residual dividend 最优资本结构
    - Factors
        - Investment opportunity schedule (IOS)
        - Target capital structure
        - Access to and cost of external capital
    - Steps
        - capital **budget**: fin the optimal capital **budget** 最优资本预算
        - Capital structure: the amount of equity needed （equity 需求）
        - Meet equity with **retained earnings** (equity 和留存收益差别)
        - Pay the residual earnings as dividend（余下的）
            - **Dividend = retained earning - equity**

    - Advantages
        - Simple to use
        - Management can pursuit goals without being constrained by dividend
    - Disadvantages
        - **Unstable** dividend
- Long-term residual dividend
    - 预测长期的资本需求
    - 把多余收入的平均分配到每年
        - Excessive are distributed as **share repurchase**

Share repurchases Methods

- Open market options
- Fixed price tender offer 邀约收购，提前固定价格和成本，可能失败
    - Fixed number of shares at fixed price
    - Oversubscribed: pro-rata
- Dutch auction
- Repurchase by direct negotiation
    - A premium or discount to market

Share Repurchases Financing – EPS

- 相当于投资股票，如果股票收益高于融资成本，那么 EPS 增加
- Original
    - $\text{EPS} = \frac{\text{Earning}}{Shares}$
- Finance with surplus earning
    - EPS = Earning / rest shares
    - I/S: net income is not affected
- Finance with debt
    - $\text{EPS} = \frac{\text{Earning}-\text{after tax debt interest D}\times r\times(1-t)}{Shares - repurchased\ shares}$
    - After-tax cost or Interest = cost * after-tax interest rate
    - I/S:
        - Net income decrease (need to pay **interest**) 要支付利息
- Impact
    - Earning yield = **current** EPS / **repurchase** price 收购价格
    - B/S
        - Asset and equity decrease
        - Leverage ratio (D/E) increase
        - Cost of capital increase
    - I/S – surplus earning
        - Earning yield > interest income and earnings -> EPS increase
    - I/S – finance with debt
        - Earning yield > after-tax cost of financing -> EPS increase

BVPS (net asset book value per share)

- $\text{BVPS} = \frac{\text{equity}}{\#\text{shares}}$

- Define net asset book value B, number of shares N, stock price S, stock repurchase money M
- $\mathrm{BVPS}_0 = \frac{B}{N}$ and $\mathrm{BVPS}_1 = \frac{B-M}{N-\frac{M}{S}}$
- BVPS increase condition
  - $\frac{B-M}{N-\frac{M}{S}} > \frac{B}{N} \rightarrow \frac{B}{S} > N \rightarrow \frac{B}{N} > S \rightarrow BVPS_0 > S$
- 原始 BPVS 大，之后也大

Stock Repurchase Rationales

- Potential tax advantages
  - If the tax rate on capital gains are lower than that of dividend
- Share price support/signaling
- Added flexibility
  - No long-term commitment
  - Market timing
- Offsetting dilution from employee stock options
- Increase financial leverage

Indicator	Cash div.	Stock div.	Stock split	Repurchase
No. of shares	No changes	Increase	Increase	Decrease
Stock price	Ex-div	Ex-div (pro-rata)	Pro-rata decrease	Increased if signal is positive
EPS	No change	Decrease	Decrease	Uncertain
P/E	Decrease	No change	No change	Uncertain
Market value	Decrease by cash paid	No change	No change	Decreased by cash paid
Share owned by individual	No changes	Increase	Increase	Depends
Ownership value	Decrease in value but same in % of ownership	No changes	No change	Increase

Dividend Safety

- Dividend payout ratio
  - High dividend, not sustainable
- Dividend coverage ratio
  - Net income / dividend
- FCFE coverage ratio
  - $\frac{\mathrm{FCFE}}{\mathrm{dividend+repurchase}}$
- $\mathrm{FCFE} = \mathrm{CFO} - \mathrm{FCInv} + \mathrm{net\ borrowing}$

Corporate Performance

Stakeholders

- Internal
  - Stockholders
  - Board members
  - Managers
  - Employees
- External
  - Customers
  - Suppliers
  - Creditors
  - Governments
  - Unions
  - Local communicates
  - General public

Stakeholder impact analysis (SIA)

- Identify relevant stakeholders
  - **Most importance**: customers, employee, and stockholders
- Identify **interests and concerns** for each group
- Identify **demands** for each group
- **Prioritize** the importance of various stakeholders
- Identify the strategic challenges these conflicting demands pose

Principal-agent relation (PAR)

- Entities
  - Shareholders
  - Management
  - **BOD: independence, qualification**
- Information asymmetry
- Control
  - Setting goals and behaviors
  - Reduce **information asymmetry**
  - Remove **misbehave** agents

Unethical Behavior

- Self-dealing
  - Corporate assets for personal use
- Information manipulation
  - Misleading financial information, hide health risks
- Anticipative behavior
  - Pursuit of monopoly power
- Opportunistic exploitation
  - Violation of negotiated terms when it is believed they will not have the power to resist
- Substandard working conditions

- Environment degradation
- Corruption

Philosophies

- **Friedman** Doctrine (stockholder theory) 股东理论
  - Only social responsibility of business is to create profits 只为了赚钱不考虑道德
- Utilitarian 实用主义者，多数人获利
  - Best decisions produce the great good for the greatest number of people
- Kantian ethics 尊严
  - Deserve dignity and respects
- Rights theories 人权
  - Human rights
- Justice theories 自由
  - Distribution of **economic output**
  - Veil of ignorance
  - Principle
    - Amount of basic liberty
    - Once equal basic liberty is ensured, inequality in basic social goods is ok

Corporate Governance

Objectives

- Eliminate or reduce conflicts of interests 利益冲突
- Use company's assets in a manner consistent with the best interests of investors and other stakeholders 有效使用资产

Business Form

- Sole proprietorships
  - Manager and owners are the same
  - Creditors and suppliers
- Partnership
  - Two or more owners/managers
  - **Unlimited** liability, shared among partners
  - Law firms, real estate firms, advertising agencies
- Corporations
  - Legal entities that have rights similar to those of an individual person
  - US: 20% business, but generate 90% revenues
  - Advantages
    - Easier to raise funds
    - Owners no need to be industry experts
    - Stakes are transferable, unlimited life
  - **Limited** liability

Principle-agent Relation

- Managers and shareholders
  - Use funds to expand firm size
  - Excessive compensation
  - Investing in risky ventures
  - Not taking enough risk
- Directors and shareholders
  - Lack of independence
  - Board members have personal relationships with management
  - Consulting or other business agreements with the firm
  - Interlinked boards
  - Overcompensated

BOD

- Responsibility
  - Institute corporate values
  - Complies with all legal and regulatory requirements
  - Long-term strategic objectives
  - Management responsibilities
  - Evaluate CEO
- Effective
  - Composition of board of directors
  - Whether they are independent
  - Independent chairman

    - Qualification of directors
    - How board is elected
        - Annually or staggered
        - Staggered boards do allow for **continuity** of the knowledge and experience in the company, which is essential for good corporate governance.
    - Self-assessment practices
    - Frequency of separate **session** for independent directors
    - **Audit** committee and audit oversight 审计
    - **Nominating** committee 提名
    - **Compensation** committee 薪酬
    - Independent or expert legal counsel 法务
    - Statement of governance polices
    - Disclosure and transparency
    - Insider and related-party transactions
    - Responsiveness to shareholder proxy votes

ESG factors

- Environment
- Social
- Governance
    - Labor rights or occupational safety
    - Governance structure

Violation of ESG Risks

- Legislative and regulatory risk 监管
- Legal risk 诉讼
    - Lawsuits
- Reputational risk – important 名誉
- Operating risk 停产
    - Be forced to modify an operation or shut it down
- Financing risk 罚款
    - ESG factors will result in a **monetary** cost to the firm or shareholders

Corporate Governance system

- Direct and significant impact on company value
- Effective
- Ineffective
    - Financial disclosure risk
    - Asset risk
    - Liability risk
    - Strategic policy risk

Mergers and Acquisitions

Summary

- **Forms of integration 收购形式**
  - Statutory, subsidiary, consolidation
- **Types of merges 收购类型**
  - horizontal, vertical, conglomerate
- **Motivation 收购冬季**
  - **Bootstrapping EPS** (purchase low P/E stock), tax, diversification
- **Industry life cycle**
  - Development, growth, mature, stable, decline
- **Forms of acquisition 收购方式**
  - Stock purchase 购买股权 - shareholder
  - Asset purchase 购买资产 - company
- **Method of payment 支付方式**
  - Securities offering (overvalued price, dilute equity, share risk, not confident)
  - Cash offers (increase leverage, confident)
- **Attitude of Target management 收购态度**
  - Friendly merger offers
  - Hostile merge offers
- Takeover Defense
- **Antitrust - HHI index**
  - $\mathrm{HHI} = \sum_i (p_i \times 100)^2$
- Valuation a Target Company 估值
  - Discounted cash flow
    - FCFF -> firm value
    - **Equity** = firm value – debt
  - Comparable company (market price + takeover premium)
    - Comparable company value: $\mathrm{E(S)}$ for minority interest
    - takeover premium: $\mathrm{TP} = \frac{\mathrm{DP-SP}}{SP}$ for take over
    - final price $\mathrm{V} = \mathrm{E(S)} \times (1 + \mathrm{TP})$
  - comparable transaction
    - take over price (premium is already included)
- **Bid Valuation**
  - Post-merger value of an acquirer
    - $\mathrm{V_{AT}} = V_A + V_T + S - C$
  - Post-merger number of stocks of acquirer $\mathrm{N_{AT}} = N_A + N_{new}$
    - Conversion ratio: f, means new stock $N_{new} = N_T \times f$
  - Post-merger stock price of acquirer $\mathrm{X_{AT}} = \frac{V_{AT}}{N_{AT}} = \frac{V_A + V_T + S - C}{N_A + N_{new}}$
    - Cash Purchase $\mathrm{X_{AT}} = \frac{V_A + V_T + S - C}{N_A}$ (现金减少，股票不变)
    - Stock purchase $\mathrm{X_{AT}} = \frac{V_A + V_T + S}{N_A + N_{new}}$ （现金不变，股票增加）
  - Purchase Price P_T

        - Cash Purchase $P_T = C$
        - Stock purchase $P_T = N_{new} \times X_{AT}$
    - Gains – synergy Gain $= \ \mathrm{S} = \mathrm{Gain_T} + Gain_A$
    - Gains accrued to the target 收购溢价
        - $Gain_T = TP = P_T - V_T$
    - Gains accrued to the Acquirer 收购净利润
        - $Gain_A = \mathrm{S} - \mathrm{TP}$

Terms

- Acquisition
    - Buy part of another company
- Merge
    - Absorb the entire company
- Acquire/bidder
- Target

Forms of integration

- Statutory merger 吸收合并
    - Acquire all the assets and liabilities
- Subsidiary merger 收购
    - Target company becomes a subsidiary
    - Well-known brand
- Consolidation 整合
    - both cease and forms a new one

Types of merges

- horizontal merger 规模和市场份额，降低成本
    - similar business or competitors
    - pursuit of **economies** of scale, increase market **power**
- vertical merger
    - move up/down the product supply chain
    - **forward** integration -> move towards customers
        - **收购下游企业，收购供货商**
    - **backward** integration -> move towards raw materials
        - **收购上游企业，收购供应商 supplier**
- conglomerate merger 混合收购
    - complete separate industries
    - there are synergies
        - reduce volatility of total cash flow
        - diversification

Motivation

- synergies
    - increase revenue: cross-selling, raise price, increase market share
    - reduce costs: horizontal
- achieving more rapid growth 增长

    - faster than organic growth
- increased market power 市场份额
- gaining access to unique capabilities 获得特别的能力
    - R&D
- Diversification 分散风险
- **Bootstrapping EPS 增加营收**
- Personal benefits for managers
    - Company size and pay
- Tax benefits 避税
    - One has taxable income, other have tax loss carryforward
- Unlocking hidden value
- Achieving **international** business goals
    - Multinational companies to achieve cross-border business goals
    - Taking advantage of market inefficiencies
    - Working aground disadvantageous government policies
    - Use technology in new markets
    - Product differentiation
    - Provide support to existing multinational clients

Bootstrapping EPS 换股收购，增加营收

- A high P/E firm acquires a low P/E firm -> higher EPS
- High P issue new stock to purchase low P/E firm
- Low firm market $\mathrm{P_l} \times n_l$, earning E_l, EPS_l
- High firm market $\mathrm{P_h} \times n_h$, earning E_h, EPS_h
- Issue new common high shares to purchase all shares of low firm
    - $P_l \times n_l / P_h$
- After acquire
    - New stock price is P_h 高价公司换股
    - Number of shares is $n_h + P_l \times n_l / P_h$
    - Market capitalization: $\mathrm{P_h} \times n_h + \mathrm{P_l} \times n_l$
    - Earning: $EPS_h \times n_h + EPS_l \times n_l$
    - New EPS = $\frac{EPS_h \times n_h + EPS_l \times n_l}{n_h + P_l \times n_l / P_h}$
- 营收相加，股票数量减少。因为用**少量**高价股买了以前的低价股

Industry Life Cycle 企业生命周期

- Pioneer / development phase 资本、资源
    - Motivation: gain access to capital, share management talent
    - Horizontal, conglomerate
- Rapid growth phase 资本、扩张
    - High profit margins, competition low
    - motivation: gain access to capital, expand
    - Horizontal, conglomerate
- Mature growth phase 经营，规模效应
    - New competition, still chance for above-average growth
    - Motivation: increase operational efficiencies, economies of scale

    - Horizontal, vertical
- Stabilization phase 减低成本，提高管理
    - Reduced growth
    - Motivation: economic of scale, reduce cost, improve management
    - Horizontal
- Decline phase 存货、新增长
    - Consumer tastes have shifted
    - Overcapacity/shrinking profit margins
    - Motivation: survive, operational efficiencies, acquire new growth
    - Horizontal, vertical, conglomerate

Industry Life Cycle Stage	Industry Characteristics	Merger Motivations
Pioneer/development	▪ Unsure of product acceptance ▪ Large capital requirements and low profit margins	▪ Gain access to capital from more mature businesses ▪ Share management talent
Rapid growth	▪ High profit margins ▪ Accelerating sales and earnings ▪ Competition still low	▪ Gain access to capital ▪ Expand capacity to grow
Mature growth	▪ Lots of new competition ▪ Still opportunities for above-average growth	▪ Increase operational efficiencies ▪ Economies of scale/synergies
Stabilization	▪ Competition has reduced growth potential ▪ Capacity constraints	▪ Economies of scale/reduce costs ▪ Improve management
Decline	▪ Consumer tastes have shifted ▪ Overcapacity/shrinking profit margins	▪ Survival ▪ Operational efficiencies ▪ Acquire new growth opportunities

Forms of acquisition 收购方式

- Stock purchase 股权收购，发行新股 – 股东层次
    - Pay to shareholders 支付给股东

    - Shareholder should approve the transaction 需要授权
    - Shareholder pay tax on gains, target's tax losses can be used 股东交税
    - Assumes target's liability 承担负债
- Asset purchase 资产收购，融资收购 – 管理层次
    - Pay to company 支付给公司
    - No need to approve if less than 50% 不一定需要授权
    - Company pay capital gains taxes at the corporate level 公司交税
    - Usually avoids targets' liability 没有负债

	Stock Purchase	**Asset Purchase**
Payment	Made directly to target company shareholders in exchange for their shares	Made directly to target company
Approval	Majority shareholder approval required	No shareholder approval needed unless asset sale is substantial
Corporate taxes	None	Target company pays capital gains taxes
Shareholder taxes	Shareholders pay capital gains tax	None
Liabilities	Acquirer assumes liabilities of target	Acquirer usually avoids assumption of target's liabilities

Method of payment

- Securities offering
    - Exchange ratio 换股比率
        - One target's stock for X acquirer's stock
    - Number of shares of the target company 股票数量
    - Value of acquirer's stock price on the deal is completed 结束时股价
- Cash offers
    - Use cash to buy stock

Method of payment Analysis

- Distribution between risk and reward for the acquirer and target shareholder
    - Securities: borne by the acquire 低风险、低收益，悲观
    - Cash offers: confident in the synergies 高风险、高收益，乐观换股
- Relative valuations of companies involved 估值
    - Securities: Acquirer overvalue -> stock purchase 高估，用股票
- Changes in capital structure 资本结构
    - Securities: issue new stock, **dilute** shareholders' ownership 稀释股权
    - Cash offers: borrow money, raise financial **leverage** 财务杠杆

Attitude of Target management

- Friendly merger offers
    - Definitive merger agreement
- Hostile merge offers 管理层反对
    - Management is against it
    - **Bear** hug: acquirer goes to BOD 直接去董事会
    - If bear hug fail 股东
        - Tender offer 买股权
            - Buy directly from shareholders
        - Proxy battle 代理人，替换董事会和管理层
            - Approve a new “acquirer approved” BOD
            - New BOD replace management

Takeover Defense

- Pre-offer takeover defense
- Post-offer takeover defense

Pre-offer takeover defense

- **Poison pill - shareholder 毒丸计划**
    - Flip-in pill 低价买入自己的股票
        - Current shareholder can buy at discount
    - Flip-over pill 少见，打折购买收购方的股票
        - Target shareholder can buy acquirer’s stock at discount
    - Dead hand provision 终止计划的话，需要股东大会的批准
- Poison put - bond holders 债务人
    - Bondholder demand immediate repayment of their bonds
    - Additional cash burden
- Restrictive takeover laws 法律
    - Find a place whose laws are restricted
- Staggered board 董事会结构
    - Split the board into 3 groups
    - At least two years
- Restricted voting rights 限制投票权
    - Restrict stockholders whose shares above some threshold unless approved by BOD 收购方获得后，无法投票，需要等待
- Supermajority voting provision for mergers 超额投票权
    - 需要比如 80%以上同意。默认是 51%
- Fair price amendment 公允价格
    - Unless a **fair price** is offered to current shareholders
- Gold parachutes - management 金色降落伞
    - Give management a lucrative cash payout if they leave the company after merge

Post-offer takeover defense

- Just say no - shareholder

- Litigation 起诉 – 拖延时间
  - Lawsuit against acquirer
- Greenmail 绿色欺诈 – 股票买回
  - A payoff to potential acquirer to terminate the hostile takeover attempt
- Share repurchases 回购股票 自由现金
  - Repurchase with surplus cash, Increase leverage
- Leveraged recapitalization 融资回购
  - Repurchase with debt financing
- Crown jewel defense 皇冠明珠 – 资产出售
  - Sell a subsidiary or major asset to a neutral third party
- Pac-man defense 方向恶意收益对方的股票
  - Make a counteroffer to acquire the acquirer
- White knight defense 白骑士收购
  - A friendly third party
  - Winner curse: winner to overpay in a competitive bidding
- White squire defense 白衣护卫，比白骑士低一等
  - A junior knight
  - Buy a substantial minority stake 买股票

Antitrust - HHI index

- $\text{HHI} = \sum(MS_i \times 100)^2$

Post-Merger HHI	Industry Concentration	Change in Pre- and Post-Merger HHI	Antitrust Action
Less than 1,000	Not concentrated	Any amount	No action
Between 1,000 and 1,800	Moderately concentrated	100 or more	Possible antitrust challenge
Greater than 1,800	Highly concentrated	50 or more	Antitrust challenge virtually certain

Discounted Cash Flow Valuation - Free cash flow (FCF)

- free cash flow model
  - two-stage or three-stage
- develop pro forma financial estimates
- calculate free cash flows
  - $\text{NI} + \text{Int} \times (1 - \text{t}) \rightarrow$ unleveraged NI 加上税收利息
  - $+ \Delta\text{DTL} \rightarrow$ NOPLAT deferred tax
  - $+$ D net nonchash charges
  - $-$ change in working capital
    - working capital $=$ noncash current asset $-$ current liabilities (exclude short term debt)
  - $-$capital enditures capex
  - $=$ Free cash flow FCF

- find discount rate
    - WACC adjusted
- Determine the terminal value
    - Constant growth model
        - $\mathrm{V_T} = \frac{FCF_T \times (1+g)}{r-g}$
    - Market multiple
        - $\mathrm{V_T} = FCF_T \times \left(\frac{P}{FCF}\right)_{multiple}$
- Discounted values for the first stage and terminal values
- FCFF -> firm value
- Equity = firm value - debt

Comparable Company Analysis 相似公司的平均

- Identify the set of comparable firms
    - Same industry, similar size and capital structure
- Calculate various relative value measures based on current market prices of companies in the sample 计算比例
    - Enterprise value $\mathrm{EV} = \mathrm{debt} + \mathrm{equity} - \mathrm{cash} - \mathrm{investment}$
        - EV/free cash flow, EV/EBITDA, EV/sales
    - Price multiple **用市场价格**
        - P/E, P/S, P/B, P/CF
- Calculate descriptive statistics for the relative value metrics and apply measures to the target firm 估值，价格倍数
    - Mean, median, range
    - $\mathrm{Value} = \mathrm{EPS} \times \left(\frac{\mathrm{P}}{\mathrm{E}}\right)$ minority interest value
    - 多种倍数法的平均
- Estimate a takeover premium 收购溢价
    - $\mathrm{TP} = \frac{\mathrm{DP}-\mathrm{SP}}{SP}$
        - TP: take over premium
        - DP: deal price per share
        - SP: stock price per share
    - Find similar premiums and use average
- Calculate the estimated takeover price for the target as the sum of estimated stock value based on comparable and the takeover premium
    - Compare it to the estimated synergies from the merger to make sure the price makes economic sense
    - $\text{final price} = \mathrm{E(SP)} \times (1 + \mathrm{TP})$

Comparable Transaction 可比收购交易

- focus on recently **acquired** firms 关注被收购的公司，溢价已经被考虑在收购价格里了，因此不再单独考虑溢价
- Identify a set of recent takeover transactions
- Calculate relative values measures based on completed **deal** prices. 用**收购价的倍数**

- Calculate descriptive statistic for the relative value metrics and apply those measures to the target firm.

Bid Valuation - Cash Vs. Stock Payment

- Post-merger **value** of an acquirer 收购后总价值
  - $\mathrm{V_{AT}} = V_A + V_T + S - C$
  - V_A: pre-merger value of acquirer
  - V_T: pre-merger value of target
  - S: synergies created by the merger 收购后产生的价值
  - C: cash paid to the target shareholders 现金
- Post-merger number of stocks of acquirer $\mathrm{N_{AT}} = N_A + N_{new}$ 收购后股票数量
  - Acquires stocks N_A and price X_A
  - target stocks N_T and price X_T
  - Conversion ratio: f, means new stock $N_{new} = N_T \times f$
  - $N_{new} \times X_A = N_T \times X_T \rightarrow \mathrm{f} = \frac{\mathrm{X_T}}{A}$
- Post-merger stock price of acquirer $\mathrm{X_{AT}} = \frac{V_{AT}}{N_{AT}} = \frac{V_A+V_T+S-C}{N_A+N_{new}}$ 收购后股票价格
  - Cash Purchase $\mathrm{X_{AT}} = \frac{V_A+V_T+S-C}{N_A}$ (现金减少，股票不变)
  - Stock purchase $\mathrm{X_{AT}} = \frac{V_{AT}}{N_{AT}} = \frac{V_A+V_T+S}{N_A+N_{new}}$ （现金不变，股票增加）
  - Mixed purchase
- Purchase Price P_T 收购价格
  - Cash Purchase $P_T = C$
  - Stock purchase $P_T = N_{new} \times X_{AT}$
- Gains accrued to the target 收购溢价
  - $Gain_T = takeover\ preimum = P_T - V_T$
- Gains accrued to the Acquirer 收购利润
  - $Gain_A = \mathrm{S} - \mathrm{TP}$
    - S: 收购后的多余收入
    - TP: 收购的多余成本
- $\mathrm{S} = \mathrm{Gain_A} + Gain_T$ 整价值等于 2 个公司的盈利之和

Effect of Price

- Acquirer
  - Pay lowest possible price $\mathrm{V_T}$
- Target
  - Receive the highest possible price $\mathrm{V_T} + S$

Effect of Payment 相反需求

- Confidence in the estimate of merger synergies
- 收购方：确信时用 cash，不确定时用 stock 收购
- Confident
  - Acquirer: pay cash, target: receive stock
- Not confident
  - Acquirer: pay stock, target: receive cash

Create Value

- Short-term
  - Acquirer: drop due to winner's curse, target: gain
  - Managerial hubris: **overestimate** synergies
- Long-term
  - Less than peers due to failure to capture promised **synergies**
- Positive return
  - Strong buyer
  - Low premium: a low takeover premium
  - Few bidders
  - **Favorable** market reaction

Divestiture (disposal of assets) 剥离

- Equity carve-outs 直接剥离，新股东
  - Create a new independent company 剥离一块业务
  - Issued in public offering of stock 单独上市融资
- Spin-offs 原始股东 – 不会有现金
  - Crete a new independent company
  - Shares are owned by parent company
  - Parent does not receive cash in the transaction
- Split-offs 置换股权
  - Shareholder parent ownership -> new company share
  - 老股东用老股权置换新公司的股权
- Liquidation
  - Breaking up a firm and sell its assets piece by piece.
  - bankruptcy

Restructuring

- division no longer fits into management's long-term strategy
- lack of profitability
- individual parts are worth more than the whole
  - reverse synergy
- infusion of cash
  - financial difficulty