FSA

- Intercorporate Investments
- Employee Compensation: Post-employment and Share Based
- Multinational Operations
- Analysis of Financial Institutions
- Evaluating Quality of Financial Reports
- Integration of Financial Statement Analysis Techniques

Intercorporate Investments

- **Financial Assets**
  - Classification
    - HTM, ASF (OCI), HFT (I/S)
    - Special: unrealized IFRS, AFS, debt, foreign exchange -> IS not OCI
  - **Treatment**
    - B/S
      - HTM at **amortized** cost (END=BEG + interest- coupon = BEG + amortized discount=BEG- amortized premium)
      - HFT and ASF: fair value
    - I/S (**debt: interest, equity: dividend, HFT: unrealized G&L**)
      - HTM: interest (=coupon + discount) 利息才是应计的 ignore coupon
      - HFT and ASF: interests (debt) and dividends (equities)
      - HFT: unrealized G&L
  - Reclassification
    - GAAP: all are allowed
      - HTM (amortization), ASF (OCI), HFT (I/S)
    - IFRS: only HTM and AFS
  - Impairment – HTM and AFS
    - B/S: fair value
    - I/S: realized loss (AFS unrealized G&L: OCI -> I/S)
  - Reversal – HTM and AFS
    - GAAP: not allowed
    - IFRS: only for **debt 债务**
- **Associates (20%-50%) - Equity method (joint venture)**
  - Investment value -> B/S
    - Initial: BEG = book value + excess value + goodwill = purchase price
    - Subsequent: END = BEG + equity income – dividend
  - Equity income -> I/S
    - net income
    - **- excess depreciation** expense caused by excess value
    - **- unrealized profit: intercompany transaction**
      - – profit * owned% * **unconfirmed**%
  - Reports
    - B/S
      - Initial: cash is reduced, investment account is set up
      - Subsequent: update
    - I/S: equity income
    - C/F: dividend
  - Impairment
    - GAAP: carrying value < fair value
    - IFRS: carrying value < recoverable amount
  - Reversal – not allowed 不可以
- **Combination (>50%) - Acquisition method – MI (可以看成备抵账号)**
  - **Combine**: revenue/expense (no NI)

    - **I/S**
        - Combine revenue/expense (no NI)
        - deduct **MI**
    - B/S
        - BV -> FV (use fair value)
        - Combine asset & liability (no equity)
        - Add **MI** in equity (total equity is increased)
        - Add **goodwill** in asset
    - Goodwill
        - full (GAAP only) and **partial**
        - partial goodwill = full goodwill * ownership%
    - Goodwill and MI
        - Full good will and full MI (based on total acquisition price)
        - Partial goodwill and partial MI (based on net **identifiable** asset)
    - Goodwill impairment
        - IFRS
            - Test: carry value < recoverable amount
            - Loss -> goodwill + noncurrent asset loss
        - GAAP
            - Test: carry value < fair value
            - Deduction: fair value – **implied** fair value (重新计算)
- SPE
    - VIE -> must be consolidated
        - Risks, rewards, control

Investment Classification

- Financial Asset
    - ownership <20%
    - no significant influence
    - Treatment: HTM, AFS, HFT
- Associates
    - Ownership between [20%,50%]
    - significant influence
        - Board of directors representation
        - Involvement in policy making
        - Material **intercompany** transaction
        - Interchange of managerial personnel
        - Dependence on technology
    - Treatment: equity
- Business Combination
    - Ownership >50%
    - Control
    - Treatment: Acquisition
- Joint Ventures
    - Treatment: equity
        - Proportionate used before

Financial Asset

- Recorded at cost (fair value at acquisition)
- Can be at fair value

Financial Asset - Classification

- Held for trading (HFS)
  - For the purpose of profit in near term
  - Hold for less than three months
  - Fair value
  - **Unrealized** P/L -> I/S
  - Interest & dividend -> I/S
- Designated at **fair value**
  - HTM or AFS assets can be designated at fair value
  - Treatment is similar to HFT
  - Reduce volatility and inconsistency
  - Unrealized G&L -> I/S
- Available for sale (AFS)
  - Fair value
  - **Unrealized** P/L -> BS/Equity OCI
    - IFRS, Debt, FX change -> I/S
    - When sold, removed from OCI and into I/S
  - Interest & dividend -> I/S
- Held to maturity (HTM) - debt
  - **Amortized** cost
    - Original cost + discount (-premium) 折旧（减掉优惠）
    - Present value of remaining cash flow (coupon + face) discounted at the market rate of interest at **issuance 发行时的利率**
  - Unrealized P/L -> ignore
  - Interest (**including amortization**) -> I/S

	Held-to-Maturity	**Fair Value Through Profit or Loss**	**Available-for-Sale**
Balance sheet	Amortized cost	Fair value	Fair value with unrealized G/L recognized in equity
Income statement	Interest (including amortization) Realized G/L*	Interest Dividends Realized G/L Unrealized G/L	Interest Dividends Realized G/L

$Amortized\ cost: END = BEG + Interest - Coupon$

Financial Asset - Reclassification – Unrealized P/L

- IFRS – HFT not allowed
  - Only between held for maturity and available for sale

- GAAP
  - All are allowed
- Rule
  - HFT: I/S (no matter in and out)
  - HFM: B/S amortization
  - AFS: B/S OCI

From	To	Unrealized Gain or Loss
Fair value through profit or loss*	Any	Income Statement (to extent not recognized)
Held-to-maturity	Fair value through profit or loss*	Income Statement
Held-to-maturity	Available-for-sale	Other comprehensive income
Available-for-sale	Held-to-maturity	Amortize out of other comprehensive income
Available-for-sale	Fair value through profit or loss*	Transfer out of other comprehensive income

Financial Asset – Impairment – realized loss (I/S)

- Apply: HTM and AFS (not for trading)
- GAAP
  - Impairment Test
    - Decline is not temporary
  - Impairment
    - B/S: Write down to **fair** value
    - I/S: realized loss
- IFRS
  - Impairment Test
    - Events occurred 已经发生的事件
      - Debt
        - Included: default, bankruptcy, reorganization, concessions from bondholders
        - Exclude: **downgrade**, liquid issue
      - Equity
        - Substantial decline in value
        - Change of business environment make it unlikely to recover to initial value
    - Future cash flow can be **reliably** estimated 现金流可靠估计
    - Occurrences of **future events** (regardless of probability of occurrence) are not recognized 未来的事件不考虑
    - HTM: discount using the effective interest at purchase 历史利率
  - Impairment
    - B/S: Write down to fair value

        - Debt
            - PV of future cash flow with the same **interest rate** when it was purchased 用当时的利率
    - I/S: realized loss
- AFS
    - Unrealized G&L in OCI + new loss -> I/S 以前的也需要当成 realized loss

Financial Asset – Reversal

- Apply: HTM and AFS
- GAAP
    - Not allowed
- IFRS
    - Only allowed for **debt** securities 只是债务
    - Debt (HTM and AFS): if recovery can be attributed to an event (i.e., credit upgrade)
    - Equity: not allowed

IFRS 9

- Classification
    - Amortized cost
    - FVPL
        - Classification is irrevocable
        - Derivative that are not used for hedging
        - Asset with embedded derivative -> whole (i.e., convertible bond)
    - FVOCI
- Reclassification
    - Equity: not allowed
    - Debt: only if business model has changed
- Impairment
    - Expected credit loss model (forward looking)

Associates 权益法

- Significant influence
- Equity method: One-line consolidation

Equity method – Value

- **Cost Option (most common)**
    - Initial: **at cost**
    - B/S: investment account in **noncurrent** asset
        - Will be reduced by dividend
        - END = BEG + NI - dividend
    - I/S: interest (no dividend) 分红不放在利润表里
    - C/F: dividend
- **Fair Value Option**
    - GAAP: all can use
    - IFRS:

        - only to VC, PE, mutual funds and similar entities
        - Decision is irrevocable
        - Any change in value -> I/S
        - I/S: **P/L and dividend 分红进入利润表**
        - What about unrealized G/L?

Equity Method – Investment Value Decomposition 价格分解法

- **Investment Value – non-current account**
    - $\mathbf{investment = (book\ value + excess) \times ownership\% + goodwill}$
    - Net identifiable asset **book** value * ownership% 被收购公司的账面价值
    - Net identifiable asset **excess** value * ownership% 被收购公司的超额价值
        - Excess value = fair value – book value
    - **Goodwill** (partial) **商誉**
- **Change**
    - Book value – interest and dividend 收入和分红 (被收购公司)
    - Excess value – excess depreciation 额外折旧
    - Goodwill – impairment 减值

Equity Method – Initial 报表初始化

- B/S 流动资产减少，非流动资产增加，平衡
    - Current asset: Cash is reduced by purchase price
    - non-current asset: **Investment value = purchase price**
    - liability and equity unchanged
- I/S
    - **Investment/equity** income 多一个投资收入
    - Revenue and expenses unchanged
- C/F
    - Dividend 分红不是收益，不会改变 I/S，但是会降低 investment account

Equity Method – Subsequent 报表更新

- B/S: **investment value update**
    - $\mathrm{BEG + equity\ income - dividend = END}$
- I/S: equity income
    - $\mathrm{Equity\ income} = (net\ income - excess\ depreciation - unconfirmed\ inter\ company\ profit) \times \mathrm{ownership\%}$
        - + net income 净收入
        - - excess depreciation 额外固定资产折旧
            - Excess purchase value over book value
        - – unconfirmed inter-company profit 内部交易
- C/F: dividend

Equity Method – Impairment

- GAAP
    - Test: carrying value < fair value
    - Reduction not temporary

    - Reduce to fair value
- IFRS
    - Carry value < recoverable amount
    - recoverable amount = **max (fair value – selling cost, value in use)**
    - By one or more loss events

Equity Method – Reversal

- IFRS & GAAP: not allowed

Equity Method – Intercompany Transactions

- The profit is **deferred** until it is **used or sold** to a third party
    - Only confirm a **portion** of the used or sold 使用或者出售的百分比
- Upstream
    - investee -> investor
    - investee: recognize all profit
    - investor: eliminate **unconfirmed** profit
        - $\textbf{investee profit} \times \textbf{unconfirmed}\% \times \textbf{ownership}\%$
- Downstream
    - Investor -> investee
    - Investor
        - Recognize all profit in IS
        - Reduce equity income by eliminating **unconfirmed**
            - $\textbf{investor profit} \times \textbf{unconfirmed}\% \times \textbf{ownership}\%$
- Example
    - Investor has 30% control, investor sell 40k goods for 50k to investee, and investee used 90%
    - Investor
        - Profit: 10k*0.3=3k
        - - unconfirmed equity income: -10*0.3*0.1 = 0.3k
        - Overall profit: 10k*0.3*0.9=2.7k

Equity Method – Analysis

- B/S
    - One-line **investment account**
    - proportionate share of investee's equity
- I/S
    - One-line **equity income** account
- High earning
- Low leverage
    - Ignore investee's debt
- High margin ratios
    - Ignore investee's revenues
- Earning may be permanently reinvested, not in the form of dividend

Business Combination

- IFRS

- GAAP (A vs B)
  - Merger: A survive, B dead
  - Acquisition (both survive)
    - Parent subsidiary, minority interest
  - Consolidation
    - Both dead, a new one

Business Combination – Historical Methods 废弃的方法

- purchase method -> replaced by acquisition method
- pooling-of-interests
  - Treat them equally, simply combine them
  - Use **historical book** values (ignore fair value) 用账面价值
  - Operating results for prior periods are restated as though they are always combined
  - Ownership interests continue, former accounting bases are maintained
  - ROA, ROE, profit margin -> **high**

Acquisition Method – B/S 全加上 – 权益里加上 minor interest

- Rules
  - Simply add assets and liabilities' fair value 加资产和负债
    - Use fair value not book value
  - Ignore **equity** because of double counting 忽略权益
  - Asset should deduct cash paid 资产里减掉用于收购的现金
  - includes a MI account in equity 权益里增加一个 MI
  - Exclude intercompany transactions
- Total asset = asset + acquired asset – **cash paid**
- Total liability = liability+ acquired liability
- Total equity = equity + **MI**
  - **Acquired** equity is **ignored**
  - A new minority interest (MI) account is created
- $\mathbf{MI = acquired\ equtiy\ \times (1 - shares\%)}$
  - Acquired equity = cash paid + MI
  - $\text{cash paid} = \text{acquired qutity} \times \text{shares}\%$
- **因此总体 equity 增加 MI，为了平衡报表**

Acquisition Method – I/S 全加上 - 减去 minor interest

- combine revenue and expense
  - ignore net income
- deduct minority interest
  - $\mathbf{minority\ interest = acquired\ net\ income \times (1 - shares\%)}$

Acquisition Method – Goodwill

- $\text{purchase price} = \text{goodwill} + \text{identifiable fair value}$
- GAAP – full goodwill 假定全资收购
  - From subsidiary company or assume 100% acquisition
  - $\text{full goodwill} = \text{subsidiary fair value} - \text{subsidiary identifiable fair value}$

    - 450/0.75 – 560 = 40
- IFRS – partial and full
    - partial, from the parent company
    - partial goodwill = purchaes price − subsidiary identifiable fair value \ times % owned
    - 450 -0.75*560=30
- partial goodwill = full goodwill × %**owned**

Acquisition Method – Goodwill and MI

- full goodwill -> full MI
    - based on acquired company's fair value 整体价值
    - pay 600 buy 75% -> MI=600*0.25=150
- partial goodwill -> partial MI
    - based on acquired company's **identifiable net asset** fair value (fair value – full goodwill) 净有形资产价值
    - (470-40+120) * 0.25=140
- The difference balances the difference in goodwill

	Investee	**Investor (0.75)**	**Minority Interest (0.25)**	
总体	600	450=600*0.75	**150**	**Full MI**
有形	560	420=560*0.75	**140**	**Partial MI**
商誉	**40**	**30=40*0.75**	10	MI GW
	Full GW	**Partial GW**	MI GW	

Acquisition Method – Goodwill Impairment

- Goodwill
    - not **amortized**
    - test for impairment **annually**
    - cannot be **separated** from business
    - valued at reporting unit level
- cannot be separated from the business, measured at the reporting level
- IFRS （整体测试，可回收价值，整体减值，先 GW 再资产）
    - Test
        - Cash generating unit
        - Carrying value < **recoverable** amount
            - Recoverable amount = max (fair value - sell cost, value in use)
    - Reduction (goodwill & loss to non-cash asset)
        - $Diff =$ Carrying value $-$ **recoverable** amount
        - $GW_1 = \max(GW_0 - Diff, 0)$ 最大减值到 0
        - Impairment losses exceeding the goodwill value are allocated pro-rata to the unit's non-cash assets.
        - Non-cash asset on a pro rata basis: $\text{loss} = \min(\text{Diff} - \text{GW}_0, 0)$
- GAAP （整体测试，商誉减值）
    - Test
        - Reporting unit
        - Carrying value > **fair** value

- Reduction - goodwill
  - **Implied** GW – assume reacquire it
  - New GW = Max (Original GW - Implied GW,0)
  - 超过后不再减值

		Impairment Test	Impairment	Reversals
Financial Assets (HTM and AFS)	GAAP	Decline in carrying value is not temporary	B/S: Fair value I/S: loss	**NO**
	IFRS Debt	1) Future cash flows can be estimated reliably 2) one of events has **occurred**: default, bankruptcy, reorganization, concession from bondholders 3) exclude: **credit downgrade**, future events (regardless of its probability)	**Present value of future cash flow** discounted at **original** effective interest rate when it is **issued**	**Debt: ok** **Equity: NO**
	IFRS Equity	1) Substantial decline in carrying value 2) change in business environment make it unlikely to recover	B/S: fair value I/S: loss	
Associate	GAAP	Decline in carrying value is not temporary	B/S: Fair value I/S: loss	**NO**
	IFRS	By one or more loss events	Fair value	**NO**
Business Combination	GAAP	Carrying value of reporting unit < fair value	B/S: implied goodwill I/S: loss = goodwill – implied goodwill	
	IFRS	Carrying value of cash generating unit < **recoverable** amount	B/S: allocate reduction to goodwill and non-cash asset pro-rata	

Acquisition Method – Bargain Purchase

- Acquisition purchase price < fair value
- Goodwill = purchase price – net identifiable assets < 0
- treat the difference as **gain** in IS

Joint Venture

- GAAP & IFRS: equity method
- Proportionate consolidate -> expired 按照比率分配

Special Purpose Entities (SPE)

- Form
  - Corporation, partnership, joint venture, trust
- Motivation
  - Reduce cost of **financing**
  - 转移利润 2003 年前常见，税率低
- Control
  - Sponsor -> control over financing and operating
  - Third party -> **controlling** interest
- OBS
  - In the past, off balance sheet

Variable Interest entity (VIE)

- SPE with certain conditions
- **fully consolidate** 完全收购法
  - Parent must **fully consolidate** its subsidiary regardless of the equity investment if it is VIE
- FASB
  - At-risk **equity** is insufficient to finance activities without additional financial support (such as **unconditional** guarantees) 融资
  - Equity investors lack one of the following rights 缺少任意之一
    - Decision making **rights 决策权**
    - Obligation to absorb expected **losses 吸收损失**
    - Right to received expected **residual** returns **获得收入**
  - Must be consolidated by the primary beneficiary.
  - The entity that absorbs the majority of the risks and receives the rewards
- IASB
  - Still use SPE
  - IFRS 10, consolidated financial statement if it **controls** SPE

Contingent Assets and Liabilities

- IFRS
  - Contingent assets -> ignored
  - Contingent liabilities
    - Only those whose **fair** value can be **measured** reliably are recognized at the time of acquisition.
    - Later on, measured at the **higher** of initial value, or the best estimated of the amount needed to settle the liabilities
- GAAP
  - Contractual assets and liabilities 合同的
    - **Fair** values on the acquisition date
    - Later on, contingent assets, use the **lower** values
  - Non-contractual assets and liabilities 非合同的
    - Recorded if more likely than not they meet the definition of an asset or liability.

In-process R&D – 资产化

- **Capitalized** as **intangible** asset
- Subsequently impaired (unsuccessful) or amortized (successful)

Restructuring Costs – expense 费用化

- Expensed when incurred not capitalized

Ratios

- **net** income
    - All three methods the same
- Equity
    - Equity and proportionate the same = **original equity**
    - Acquisition: higher by MI
        - Full goodwill > partial goodwill
- Assets/liabilities
    - Acquisition > proportionate > equity = original in most cases
- Revenue/Expenses
    - Acquisition > proportionate > equity = original
- ROA/ROE/net profit margin
    - Acquisition < proportionate < equity

Compensation: Post-employment and Share Based

Summary

- Pension
  - PBO = PV (future pension obligation)
  - Balance Sheet
    - Funded status = PA – PBO = employer contribution - TPPC
  - **Total period pension cost**
    - TPPC = employer contribution - funded status (actual return)
  - Pension cost in P&L – expected return
    - IFRS (consistent)
      - Service cost (current + past) -> I/S
      - Interest cost (expense – expected asset return) -> I/S
      - Actuarial G&L/remeasurements -> OCI
    - GAAP (smooth)
      - Service cost + interest cost – expected return -> I/S
      - Past service cost -> amortization (OCI -> I/S)
      - Actuarial G&L -> OCI -> I/S using corridor approach
  - Plan Assumptions
    - Discount rate, rate of compensation growth, expected rate of return
    - Consistency: inflation vs. discount rate and rate of growth, expected rate of return vs. asset allocation
  - Analyst Adjustments
    - Net and gross
    - Comprehensive income (CI = NI + OCI)
    - I/S: GAAP -> IFRS (operating profit + pension cost – **service** cost, interest expense, **actual** return)
    - C/F: CFO/CFF and funded status
- Health care
- Share-based
  - Stock option (value based on grant date, amortization during service period between grant date and vesting date)

Pension Plan

- Deferred compensation
- DC 缴费确定
  - Employer make fixed contribution to **retired** account
  - **Expense** as incurred
  - Investment risk: employee
- DB 收益确定
  - Promise to make a certain payment after retirement
  - Employer set up entity (trust) funds to contribute assets
    - Funded status (assets and obligation)
      - Overfund
      - underfund
  - Factors

        - Future compensation, turnover, retirement age, mortality rates, discount
    - Investment risk: employer
- Other post-employment benefit
    - Similar to DBP
    - Health care
    - Investment risk: depends
    - usually underfunded
        - could possibly be **eliminated** if the costs become a burden
        - funding is **not** normally **required** by government regulation
    - recognize **expense** when earned in I/S
    - cash flow is not affected until paid

DBP – PBO

- PBO (projected benefit obligation)
    - Present value of defined benefit obligation (PVDBO)
- Stages - Backward (current -> retire -> death)
    - Future payment days: Working age, salary level, mortality rate
    - Date of **retirement** (PV of pension payment)
    - **current** date: PVO
- Assumption 基于未来的薪酬
    - Expected future salary increase
    - Going concern
    - Employee continue to work until retire

DBP – ABO

- ABO (accumulated benefit obligation)
- Assumption 基于当前的薪酬
    - **Current** compensation levels (ignore future increases)
    - **Liquidation** of pension obligation

DBP – VBO

- VBO (vested benefit obligation)
- ABO + vesting schedule
- 按照比例成熟

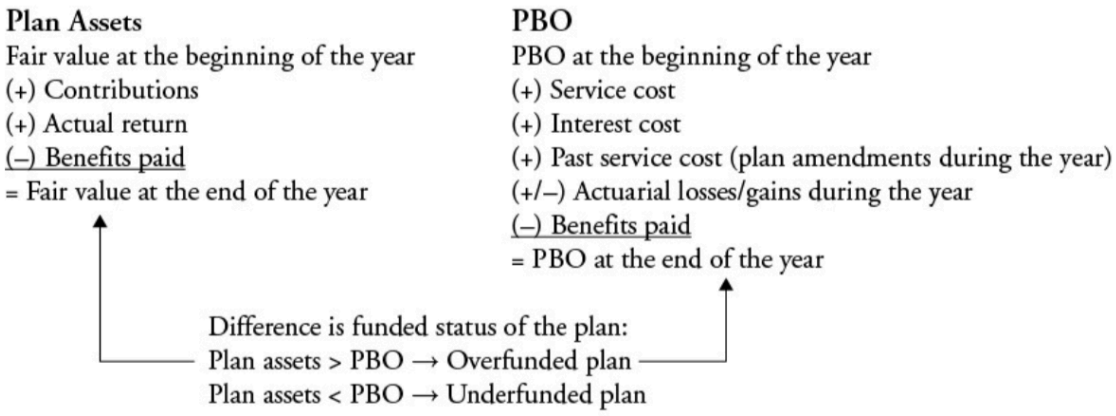
Balance Sheet

- Reporting the net DBP
    - Defined contribution, do not appear on BS.
    - Defined benefit plan, report the over or underfunded status, not the separate assets and obligation.
    - If over funded, the amount is subject to a **ceiling** as PV of future **economic** benefits
- **Plan Assets**
    - END = BEG + employer contribution + actual return – benefit paid
- **PBO**

    - END = BEG + current service cost + interest cost + past service cost + actuarial loss (– actual gain) – benefit paid
- **Fund Status**
    - Funded **status** = plan assets fair value – PBO
    - Underfunded -> liability
        - Funded **status** < 0 -> deficit, liability
    - Overfunded -> Asset (there is a cap)
        - Funded **status** > 0 -> surplus, overfund, asset 有上限
        - Overfund leads to economic benefits
            - Lower future contribution 少交钱
            - Future withdrawals (refunds) 可以提取出来
        - Limit the asset recognition to PV of future refunds or reduced contributions 财报上用最
        - Asset = min (funded status, PV(future benefits))

PBO Components

- **Current service cost**
    - PBO during the current period
    - Employer's share in service cost
- **Interest cost**
    - Increase in obligation due to passage of time
    - Beginning obligation * discount rate
- **Past service costs – Plan amend 计划调整，只能往上调整**
    - Retroactive benefits awarded to employees when a plan is **initiated** or **amended**
    - IFRS: **expensed** immediately 费用化
    - GAAP: **amortized** over average service life of employees 资产化
- Changes in **actuarial** assumptions
    - Gains and losses that result from changes in variables
    - Gain -> reduce PBO, loss -> increase PBO
- Benefits paid to employees
    - Reduce PBO



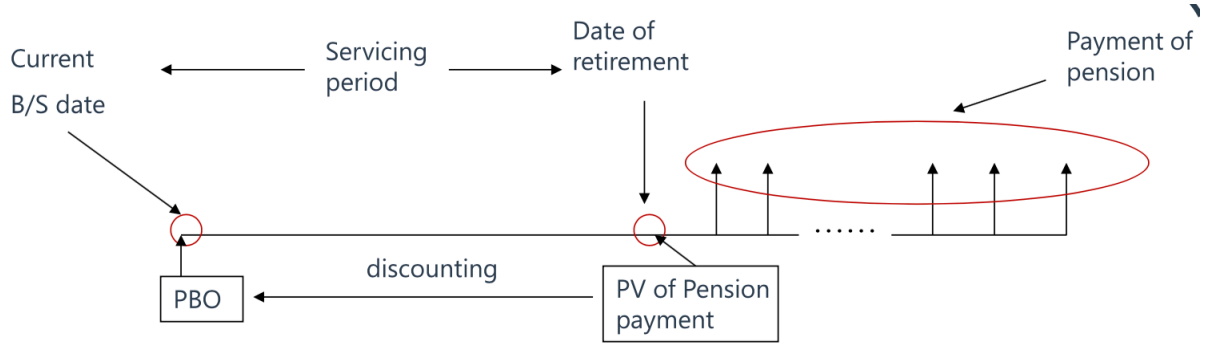
PBO - Basic 在年底计算

- **Future salary**

    - Current salary is S_0
    - Each year salary grows at R_{salary}
    - Work for N years
    - Grows $N-1$ times, at the end of each year except the last year
    - **Future salary** is $\mathrm{S_n} = S_0 \times \left(1 + R_{salary}\right)^{N-1}$
- Future pension payment
    - Payment is R_{payout} percentage of future salary
    - Future payment is $\mathrm{PMT_t} = \mathrm{S_N} \times R_{payout} \times t$
    - $\mathbf{PMT_t} = \boldsymbol{PMT_1} \times \mathbf{t}$ 每年线性增加
- PV on retirement
    - $\mathrm{PV_{retirement}} = \mathrm{FV}(\mathrm{PMT_t}, \mathrm{N_{retire-to-death}}, \text{discount rate})$
    - $\boldsymbol{PVR_t} = \boldsymbol{PVR_1} \times \boldsymbol{t}$ 每年线性增加
    - $\boldsymbol{PVR_1}$: annual unit credit at time of retirement per service year
- PBO: PV at **end** of year t 每年线性增加 + 复利
    - $PV_t = \frac{\mathrm{PVR_t}}{(1+r)^{N-t}}, \mathrm{i} = 1,2,\cdots$ 因为是每年年末计算，少折旧一次

PBO – Induction 推导

- First year
    - $PBO_1 = PV_1 = \frac{\mathrm{PVR_1}}{(1+R)^{N-1}}$
- Current service cost at time t 当期服务费，每服务一年而增加的费用
    - $\boldsymbol{SC_t = PV_1 \times (1+r)^{t-1}}$ **复利**
- Interest cost 利息费
    - $\boldsymbol{IC_t = PV_{t-1} \times r}$
- PBO: PV at **end** of year t 每年线性增加 + 复利
    - $PV_t = PV_{t-1} + PV_{t-1} \times r + PV_1 \times (1+r)^{t-1}$
        - 之前的 + 利息 + 当期服务费（第一年服务费的 FV）
    - $PV_2 = PV_1 \times (1+r) + PV_1 \times (1+r) = 2 \times PV_1 \times (1+r)$
    - $PV_3 = PV_2 \times (1+r) + PV_1 \times (1+r)^2 = 3 \times PV_1 \times (1+r)^2$
    - $\boldsymbol{PV_t = t \times PV_1 \times (1+r)^{t-1} = t \times SC_t}$ **当期服务费的 t 倍**
- Second year
    - $PBO_2 = PV_2 = 2 \times \mathrm{PV_1} \times (1+r) = \mathrm{PBO_1} + PBO_1 \times r + PBO_1 \times (1+r)$
    - $interest$: $PBO_1 \times r$ 利息，去年的利息
    - Current service cost: $PBO_1 \times (1+r)$ 去年的现值，每年公司增加的支出



Total Period Pension Cost (TPPC)

- $FS_0 = A_0 - L_0$
- $FS_1 = A_1 - L_1 = (A_0 + \Delta A) - (L_0 + \Delta L) = FS_0 + (\Delta A - \Delta L)$
- Change in fund status $\boldsymbol{\Delta FS = FS_1 - FS_0 = \Delta A - \Delta L}$
- $\Delta A = employer\ contribution + asset\ return -$ paid benefits
- $\Delta L = current\ service\ cost + interest + past\ service\ cost \mp gains\&loss - paid\ benefits$
- $-\Delta FS = current\ service\ cost + interest + past\ service\ cost \mp gains\&loss - asset\ return - employer\ contribution$ (borrow money from pension plan)
- $\boldsymbol{\Delta FS = employer\ contribution - TTPC}$
- $\boldsymbol{TTPC = employer\ contribution - \Delta FS}$ 总费用=投入+员工借款
  - $=$ current service cost $+$ interest $+$ past service cost $\mp$ gains&loss $-$ **actual** asset return
- Employer's contribution adjusted for change in funded status
- employer contribution leads to reduction of cash
- Expense is either paid or delayed

Disclose

- Discount rate
  - Based on current rates of return on high quality corporate bonds with durations consistent with the durations of benefits
- Rate of increase in compensation
  - Pay-related plan
  - **Final-pay plan**
  - Final-average-pay plan 退休前几年的平均工资
  - Career-average-pay plan
- vesting

Periodic Pension Cost I/S

- current service cost -> I/S expense
- interest -> I/S (discount)
- **expected** asset return -> I/S (return rate)
  - GAAP 用期望汇报而不是真实回报，为了**平滑**
    - Expected asset return not actual asset return
  - IFRS -> IS 是市场回报率，为了**简化**
    - Assume expected return rate equals to **market** discount rate
    - Combine with interest
    - Net interest expense/income = interest – expected asset return
- **Past service cost -> OCI or I/S**
  - GAAP -> OCI (amortized) 平滑
    - OCI and amortized over the **remaining service** life of affected employees.
    - 摊销的进入 IS，余下的留在 OCI。比如 100 费用，10 年，IS: -10，OCI: -90。
  - IFRS -> I/S (expense)
    - Reported in periodic pension cost in P&L immediately

- **Actuarial gains/losses -> OCI**
  - Two components 其实包含两项（change in assumption and asset returns）
    - Assumption gains due to change in assumptions
    - Asset gain = actual asset return – expected return
    - **Total gain = assumption gain + asset gain**
    - - gain + loss
  - IFRS -> OCI (not amortized, remeasurements) 为了**简化**
  - GAAP -> amortized in IS, rest unamortized in OCI 平滑
  - OCI
    - Loss: negative 利润的减少
    - Gain: positive 利润的增加
  - Corridor Approach 小于 10%不摊销，大于的话，多余的才摊销
    - Beginning balance of actual G/L (Unamortized G/L) > 10% max (beginning PBO, beginning Assets) 大于初始的 10%
      - **Excess** (actuarial-10%) over remaining service life -> IS (amortization) 需要摊销
      - Rest 10% -> OCI
    - Else
      - OCI (not amortized)
  - Corridor Approach Example
    - PBO: 5m, plan asset: 4.85m, actuarial loss: 0.61, 10 years average remaining working lives
    - 0.61 > 0.1*5 => need amortization
      - 0.5 -> OCI
      - 0.11 -> Amortize
        - each year 0.11/10=11k 摊销额外的
- 汇总
  - GAAP -> 平滑摊销（OCI 逐步进入 IS, OCI -> IS）
    - Past service -> OCI (amortized)
    - Actuarial G/L -> amortized in IS and rest unamortized OCI.
    - 所有部分都会在 IS 里出现，要么是费用，要么是摊销。
    - OCI -> Equity
    - NI -> R/E -> Equity
  - IFRS -> 不平滑不摊销 expense in IS or unamortized OCI
    - 只有 actuarial G/L 在 OCI，其余在 IS
    - Service cost (current and past) -> expense
    - Interest cost and expected return -> net interest expense/income
      - Assume the same rate
      - $\text{net interest income (expense)} = \text{Funded status} \times \text{rate}$

GAAP

- purpose: smooth 平滑
  - 所有项目都会进入 I/S，要么是全部，要么是摊销部分
- pension cost in I/S

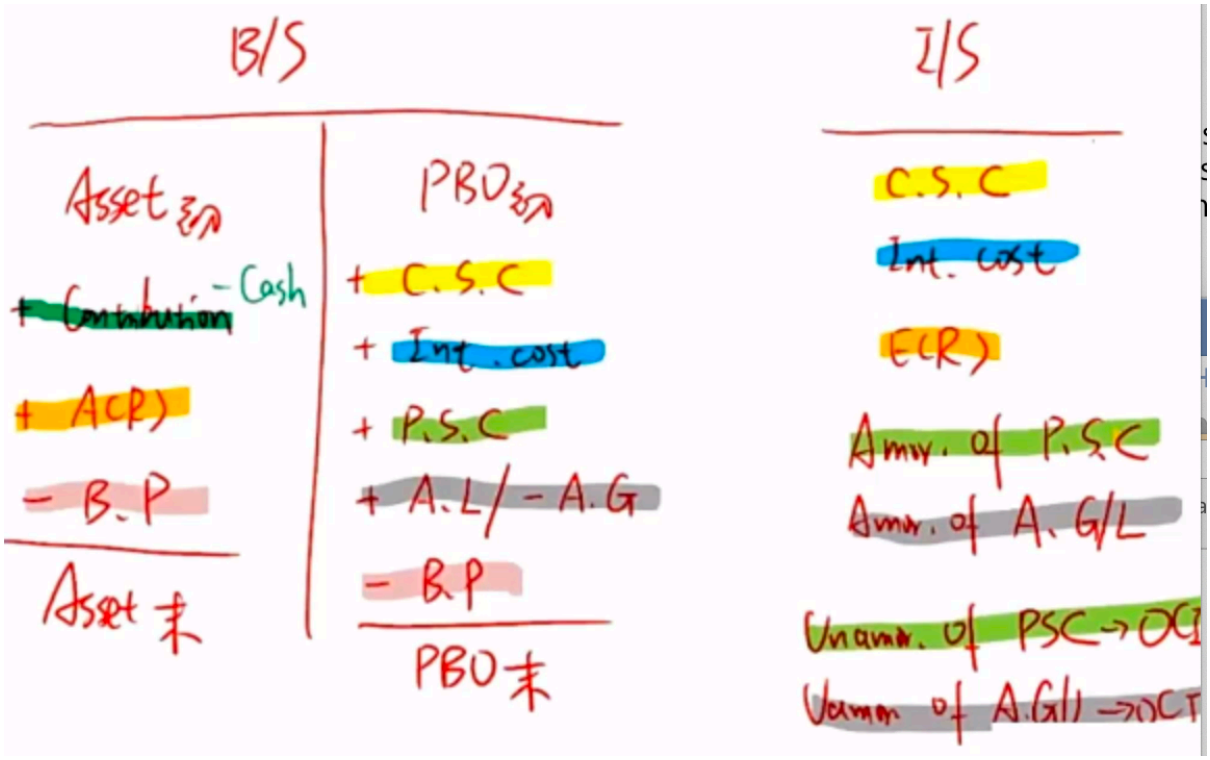
    - current service cost + interest cost - expected asset return + **amortization** of past service cost + **amortization** of actuarial G&L and net asset return using corridor approach
- pension cost in OCI: unamortized 未被摊销的
    - **unamortized** past service cost - **unamortized** actuarial G&L - **unamortized net** asset return (actual-expected) gain
- amortization: over the remaining services

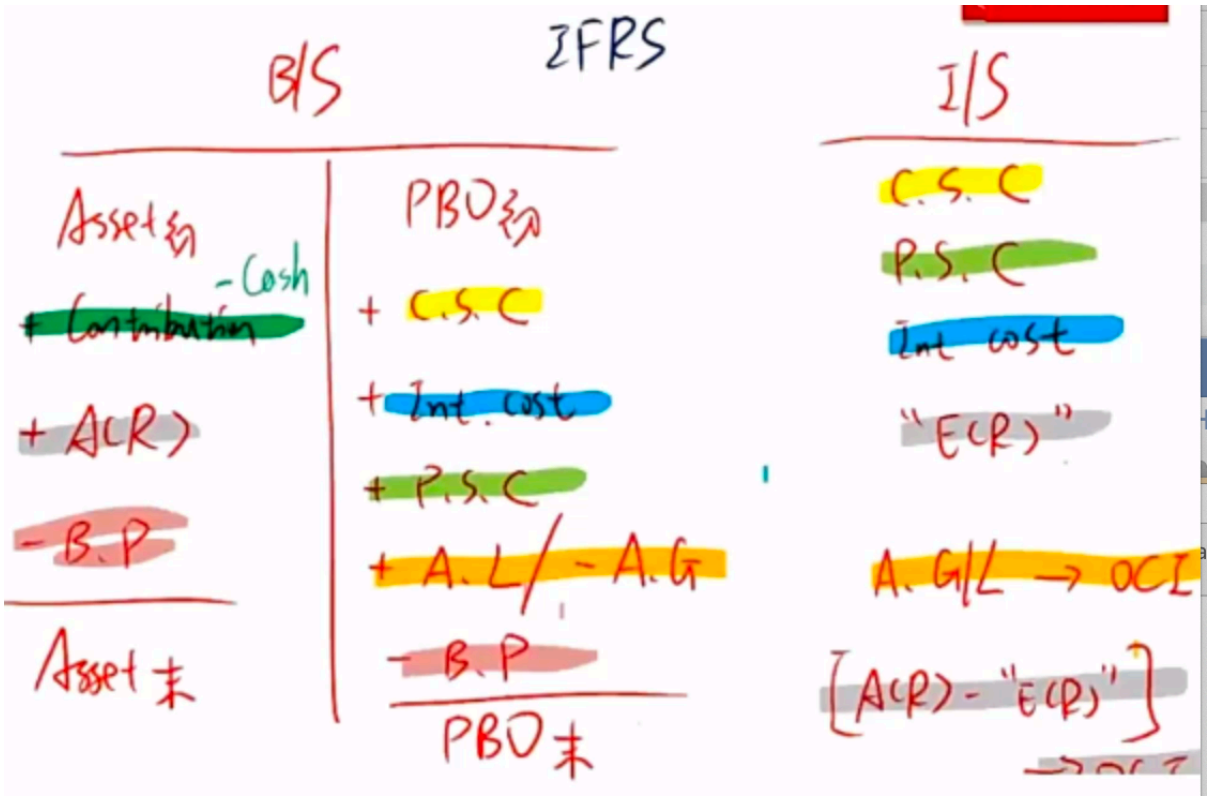
IFRS

- purpose: simplify 简化
    - 一个项目只进入一个地方，要么是 I/S，要么是 OCI
- pension cost in I/S 服务费和利息费
    - service cost + **net** interest cost
    - current service cost + past service cost + interest cost - expected asset return using **discount** rate
- pension cost in OCI 真实期望差异调整费用
    - 2 项假设：asset return and plan assumptions/parameters
    - – assumption actuarial G&L – net (actual-expected) asset return
    - – gain + loss

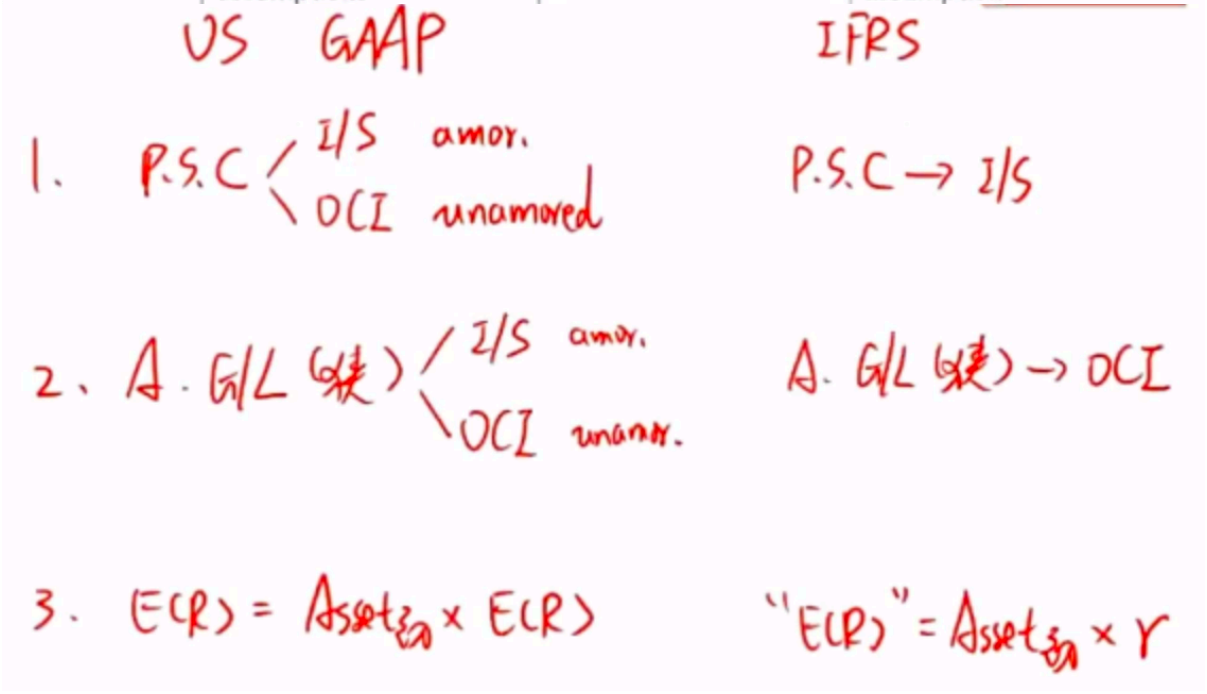
Component	U.S. GAAP	IFRS
Current service cost	Income statement	Income statement
Past service cost	OCI, amortized over service life	Income statement
Interest cost	Income statement	Income statement
Expected return	Income statement	Income statement*
Actuarial gains/losses	Amortized portion in income statement. Unamortized in OCI.	All in OCI—not amortized (called 'Remeasurements')

*Under IFRS, the expected rate of return on plan assets equals the discount rate and net interest expense/income is reported.


B/S
I/S
Asset 期初
+ Contribution - Cash
+ ACR)
- B.P
Asset 末
PBO 期初
+ C.S.C
+ Int. cost
+ P.S.C
+ A.L/-A.G
- B.P
PBO 末
C.S.C
Int. cost
ECR)
Amor. of P.S.C
Amor. of A.G/L
Unamor. of PSC → OCI
Uamor of A.G/L → OCI


B/S
IFRS
I/S
Asset 期初
+ Contribution - Cash
+ ACR)
- B.P
Asset 末
PBO 期初
+ C.S.C
+ Int. cost
+ P.S.C
+ A.L/-A.G
- B.P
PBO 末
C.S.C
P.S.C
Int cost
"ECR)"
A.G/L → OCI
[ACR) - "ECR)"]

IFRS Component	IFRS Recognition	U.S. GAAP Component	U.S. GAAP Recognition
Service costs	P&L	Current service costs	P&L
		Past service costs	OCI, amortised to P&L over the service life of employees.
Net interest income/ expense	(P&L) Amount=Net pension liability or asset * interest rate	Expected return on plan assets	(P&L) Amount =Plan assets * expected return.
		Interest expense on pension obligation	P&L
Remeasurements: OCI and **not** subsequently amortised to P&L		Actuarial G&L: P&L/(more commonly) OCI and subsequently amortised to P&L using the corridor or faster recognition method.	
Net return on plan assets	Net return on plan assets = actual return – (plan assets * interest rate)	Differences between the actual and expected returns on plan assets	Amount= actual return – plan assets * expected return
Actuarial gains and losses	Actuarial G&L = Changes in a company's pension obligation arising from changes in actuarial assumptions	Actuarial gains and losses	Actuarial G&L = Changes in a company's pension obligation arising from changes in actuarial assumption



Presentation

- GAAP
  - Aggregated and presented as a **single** line item
- IFRS
  - Components may be **separately**

Disclosure

- Parameters
- Disclosure periodic pension cost in the **notes** to financial statements

Capitalizing Pension Costs

- Costs included in the cost of production of goods (labor cost in work-in-progress or finished goods) may be **capitalized** as part of **ending inventory** value.
- When this inventory is sold, the costs can be **expensed** as a component of **COGS**.

Periodic pension cost

- Reported Pension expense
  - In income statement
  - Depends on accounting system
  - Use **expected** return on plan assets
- Total periodic pension cost (TPPC)
  - Is the true cost
  - Does not depend on accounting system
  - Use actual return on plan assets
  - **TPPC = IS + OCI**

Plan Assumptions

- They are in notes to the financial statements
- Discount rate 高质量企业债券
  - High quality fixed income investments with a maturity profile similar to future obligation/yield on high quality corporate bond
  - Affects PBO and periodic pension cost
  - Not risk free
  - Not the company's own cost of debt
  - Not company's overall cost of capital
- Rate of compensation growth
  - Average annual rate of compensation increase
  - Affects PBO and periodic pension cost
- **Expected** return on plan assets
  - Long-term rate of return on the plan's **investment**
  - Reduce pension cost in P&L
  - Differences between expected return and actual return are deferred.
  - Only under GAAP
  - IFRS uses discount rate

Plan Assumption Effects

- Increase discount rate
  - Reduce present value, reduce PBO
  - Lower **current service** cost
  - Interest cost could increase or decrease
    - Reduce interest (PBO * discount) because PBO is reduced more
    - Unless the plan is **mature**, the interest rate could increase
- Decrease compensation growth
  - Reduce future benefit payment -> reduce PBO
  - Reduce current service cost and interest
- Increasing expected return on assets – GAAP
  - Reduce pension cost in P&L

- **Not affect** plan asset, benefit obligation or funded status
- **Increase Life**
  - Current service cost -> no effect
  - PBO increase
  - Interest increase

Effect on…	Increase Discount Rate	Decrease Rate of Compensation Growth	Increase Expected Rate of Return
Balance sheet liability	Decrease	Decrease	No effect
Total periodic pension cost	Decrease*	Decrease	No effect
Periodic pension cost in P&L	Decrease*	Decrease	Decrease**

*For mature plans, a higher discount rate might increase interest costs. In rare cases, interest cost will increase by enough to offset the decrease in the current service cost, and periodic pension cost will increase.

**Under U.S. GAAP only. Not applicable under IFRS.

Post-employment benefits

- Compensation rate -> Health care inflation rate
  - This will become constant -> ultimate health care trend rate
  - Decrease near term inflation rate, decrease ultimate health care rate, reduce the time to reach the ultimate health care trend rate

Consistent Check

- Discount rate and compensation grow rate -> **inflation**
- Expected return -> asset **allocation**

Analyst Adjustments

- Gross vs. net pension assets/liabilities
  - Use net because can controls
  - Affect ratios
  - Analyst: net -> gross
- Difference in assumptions
- **TPPC**: Difference in GAAP and IFRS in periodic pension cost (ID vs. OCI)
  - GAAP
    - current service cost + interest – E(R) + **amortized** previous service cost + **amortized** previous service cost
  - IFRS
    - current service cost + interest – E(R using discount rate) + **previous service cost**
    - actuarial gain/loss -> OCI (not amortized)
  - Can use total pension cost
  - Comprehensive cost CI = NI + OCI

- **I/S: Differences due to classification**
  - GAAP
    - **only one line** -> operating expense
  - **IFRS Various line items**
    - Service cost -> operating expense
    - Interest -> nonoperating expense
    - Actual asset return -> nonoperating income
  - GAAP -> IFRS 多个项目
    - **Excludes** any amortization 不考虑摊销的费用
    - pension cost = service cost + interest cost – **expected** return
    - **Operating profit**: + **pension cost** – **service cost** （只考虑服务费）
    - **Interest cost**: +interest cost (利息费)
    - **Nonoperating income**: + **actual** return on assets （真实投资收益）
    - 等价于 EBIT 增加了 actual return – expected return

Cash Flow Adjustment

- Total cash outflow of the firm: employer contribution
- Funded status
  - >0: overfund, reduce obligation, repayment 当成还款
  - <0: underfund, borrow money **应该被当成融资**
- Accounting: CFO (operating)
- Analyst: may change it to CFF and CFO
- If difference between cash flow and periodic pension cost is material
  - Reclassify **after-tax** difference from operating -> financing 从经营变成融资
- $\Delta FS = \text{contributed} - \text{TPPC}$ borrow money from employee
  - $\text{CFO} \rightarrow \text{CFO} + \Delta FS \times (1 - t)$ 还钱减少经营现金流
  - $\text{CFF} \rightarrow \text{CFF} - \Delta FS \times (1 - t)$ 借钱增加融资现金流
- Underfund – cash **inflow** in financing
  - $-\Delta FS > 0$ is the money borrowed
  - CFF increase, CFO decreases
- Overfund - cash **outflow** in financing
  - $\Delta FS > 0$ is the repayment money
  - CFF decrease, CFO increase

Share-based Compensation

- Forms
  - Equity settle: stock options, stocks
  - Cash bonus: stock appreciation rights, phantom shares
- **Contingent** stocks/options
  - **Vesting** date: the first date it can be **exercised**
  - **Service period**
    - The **grant** date to the **vesting** date
- Disadvantage
  - Risk taking
  - Dilute shareholder interest

Stock Options 期权

- Dates
  - **grant** date: grant options
  - **vesting** date: the first day can actually exercise options
  - **service period:** vesting date - grant date
  - **exercise date:** actual exercise date
- Fair Value
  - **fair** value is determined on the **grant** date 发行时的市场价值
  - Pricing
    - Observable market price of similar options
    - **model**-based: BSM or binomial model 用这个最多
  - Model-based 模型估计法，会影响费用
    - The Greeks affects the initial **valuation** of the stock options granted, which determines the expense recognized.
- Expense Amortization
  - **Amortize** over the **service** period (vesting date – grant date) 服务锁定期
    - Do not using exercise date
    - Convert amortization expense to fee based on number of **months**
  - Recognition of expense has no net impact on **total equity**
  - Decrease NI and R/E, increase in paid-in capital, **no change** in equity
- Example (issue - reporting)
  - 2019-07 issue 100 shares, 2024-07 can exercise, 2025-07 exercise it
  - Share price is 2, option fair value is 1, and exercise price is 3
  - Fair value: 100*1/5 = 200
    - 2024-2019=5 years
    - Use Option fair value 用期权的价值，不是股票的价格或者行权价格
  - 2019 expense: 200*6/12 = 100 要期权当年流通的时间
- Pricing
  - Market-based
  - BSM or binomial model
- Lower value
  - Lower volatility, a shorter term, lower risk-free rate
  - Higher expected dividend
- Advantage
  - no cash
- Disadvantage
  - estimate its value
- Notes
  - When company exercise option, will recognize expense, reduce tax paid and increase CFO.

Stock Grants – 股权

- **Fair Value**
  - **fair** value is determined on the **grant** date

    - Pricing
        - based on the fair market value of the stock on the day of the grant
        - expenses are not affected by the stock's volatility 不影响后续的费用
- **Expense**
    - it is allocated **over** the service period
- Stocks
    - Restricted stock
        - Has a vesting period
    - Performance stock
        - Contingent on performance goals
        - allocated over the **expected** service period
        - increase the incentive for management to **intervene** in the external financial reporting process
        - introduces the potential for management to select accounting policies or estimates that may increase the metric and hence increase their compensation

Stock appreciation rights - CASH

- Difference between a **stock appreciation** right and **an option** is the form of payment
- Increase in the price of firm stock over a **predetermined** amount
- Limited downside risk, unlimited upside potential
- Advantages
    - No share is issued, no dilution to shareholders
- Disadvantages
    - Current period cash outlaw

Phantom stock - CASH

- Similar to stock appreciation rights except the payoff is based on performance of a **hypothetical stock** instead of the firm's **actual** shares.
- Private held firms and firms with highly illiquid stock

Multinational Operations

Summary

- Transaction (transaction date, reporting, settlement date)
- Translation
  - Currencies: **Local, functional, reporting**
  - Methods: **temporal, current**
  - Computation
    - Temporal: BS -> IS (remeasurements gains & losses)
      - BS: current, nonmonetary: historical
      - IS: average, COGS & depreciation: historical, measurement G&L
      - Equity related: historical (common stock, dividend)
    - Current: IS->BS (CTA)
      - IS: average
      - BS: current, CTA
      - Equity related: historical (common stock, dividend)
  - Exposure
    - Temporal: net monetary asset
    - Current: net asset
- Hyperinflation
  - Definition: 26% for three years
  - GAAP: temporal method
  - IFRS: **restate** (adjust for inflation or price index) + current
    - Non-monetary: restate
- Tax
- Growth: volumes, prices, FX gains & losses

Exposure

- Transaction
- Multinational firm invest in subsidiaries – translation

Foreign Transaction

- Three dates: transaction, reporting/payment
- Exchanges rates: transaction $\mathrm{X_t}$, reporting $\mathrm{X_r}$, payment $\mathrm{X_p}$
- Settled **before** reporting: transaction < **payment** < reporting
  - IS: **realized** gain or loss $(\mathrm{X_p} - \mathrm{X_t})$
  - BS: adjust asset/liabilities
- Settled after reporting: transaction < reporting **< payment**
  - Reporting date
    - IS: unrealized gain or loss $(\mathrm{X_r} - \mathrm{X_t})$
    - BS: adjustment based on $\mathrm{X_r} - X_t$
  - Payment date
    - IS: additional gain or loss $(\mathrm{X_p} - \mathrm{X_r})$
- Foreign currency depreciation
  - Asset loss and liability gain

Currency

- Local – subsidiary location 注册
    - Currency of the country being referred to
- Functional – subsidiary **operation 开展业务**
    - By management
    - Currency of **primary economic** environment where it operates
    - Generate and expends cash
    - Set price, finance
    - Can be local or some other currency
- Presentation – parent 母公司
    - Parent company prepare its FS

Functional Currency – IFRS 优先级

- **Influence sale prices** for goods and services
- **Competitive** forces and regulations
- Influences labor, material, and other costs
- Funds were generated
- Operating activities are retained
- **Summary**
    - sales > competition > input costs > funds

Translation Methods

- Local -> functional: **temporal** method (remeasurement)
- Functional -> reporting: **current** method (translation)

Independence

- Independent: functional ~= reporting -> **current** method 独立
- Well-integrated: functional = reporting -> **temporal** method 一体化

Hyperinflation

- GAAP
    - Functional currency = presentation currency -> use temporal methods
- IFRS
    - Subsidiary's FS are restated for inflation
    - Use the **current** exchange rate

Exchange Rates

- Current rate – reporting date
    - The rate on the BS
- Average rate – transaction-to-reporting period

    - Average rate over the reporting period
- Historical/actual rate – transaction date
    - The rate that was in effect the original transaction occurred

Temporal Methods

- Monetary assets/liabilities -> **current** rate 货币型，用当前利率
    - 未来现金流固定
    - Assets: Cash, receivables
    - Liabilities: payable, short-term and long-term debt 基本所有负债
- Nonmonetary assets/liabilities -> **actual** rate 非货币型，用历史利率
    - 未来现金流不固定，价格不确定，随着市场变化
    - Assets: inventory, fixed/capital assets, intangible assets
        - inventory 存货买过多次，分别用不同的利率，也可以用加权平均汇率
    - Liabilities: Unearned/deferred revenue 预收账款（货物还没有给）
- Nonmonetary assets/liabilities with fair value -> **current** rate
- Equity
    - Capital -> actual rate 历史汇率
    - R/E -> balancing 剩余法
- Revenue -> average rate 平均利率
- Expense 默认是平均利率
    - related to nonmonetary assets -> **actual** rate 非货币型的费用，保持一致
        - COGS, depreciation expense, amortization expense
        - COGS 和 inventory 的汇率需要考虑 cost flow method
    - other expenses -> **average** rate
        - SG&A
- Dividend -> **actual** rate
- Remeasurement gains/losses -> IS
    - More volatile net income

Temporal Method - Inventory and COGS – depend on cost flow

- FIFO
    - Inventory -> recent
    - COGS -> old
- LIFO
    - COGS -> recent
    - Inventory -> old
- Weighted Average
    - COGS -> weighted average
    - Inventory -> weighted average

Current Method

- I/S -> average rate 平均汇率
    - Dividend -> actual rate (declared)
- B/S -> current rate 当前利率 (Assets/liability/whole equity -> current)

    - Equity -> current 整体用当前利率
        - Common stock -> actual rate 历史利率
        - R/E -> balancing = equity – common stock 差值?
- Cumulative translation adjustment (CTA in OCI)
    - $\mathrm{A} = \mathrm{L} + \mathbf{E} + \mathbf{CTA}$
- Translation gain/loss
    - $\Delta\mathbf{CTA} = \mathbf{CFA}_{\mathbf{end}} - \boldsymbol{CTA}_{\boldsymbol{begin}}$

Current and Temporal

- Current 方法是统一处理
- Temporal 对非货币型资产和负债，用历史利率
- Current: 先 I/S，再 B/S (CTA)
- Temporal 是先 B/S，再 I/S（remeasurement G/L）

Accounts		Exchange rate (temporal method)	Exchange rate (current rate method)
Asset and Liabilities	Monetary	Current	
	Non-monetary	Historical	Current
Equity	Capitals	Historical	
	R/E	Balancing	

- **Monetary:** receivables and payables
- **Non-monetary:** inventory, fixed assets, intangibles, deferred revenue (U/R).

Accounts		Exchange rate (temporal method)	Exchange rate (current rate method)
Revenues and expenses		Average	
Exceptions of expenses	COGS	Historical	Average
	Depreciation	Historical	Average
Gains and Losses	Translation G/L	I/S (Affecting retained earnings, no CTA)	B/S, (equity, resulting in **CTA,** cumulative translation adjustment)

Current Method Steps

- FX G/L -> OCI

    - Asset – Liabilities = Equity = capital + RE + CTA
    - 利润表计算出留存收益，负债表里在权益里去平衡
- I/S -> average rate (dividend -> actual rate)
    - $\Delta RE = NI \times average\ rate - D \times actual\ rate$
- B/S -> current rate
    - $new\ equity = (asset - liability) \times current\ rate$
- Equity
    - Capital/common stock -> actual rate
    - R/E: $\mathrm{RE}_0 + \Delta RE = RE_1$
    - OCI: CTA
    - $new\ equity = capital\ \times actual\ rate + RE_0 + \Delta RE + CTA$
- Overall
    - $\text{Asset: current} - \text{Liability: current} = \text{capital: actual} + \mathrm{RE}_0 + \text{NI: average} - \text{dividend: actual} + \mathbf{CTA}$

Temporal Method Steps

- FX G/L -> I/S
    - $\text{Revenue} - \text{Expense} + \text{FX G\&L} - \text{Dividend} = \Delta\text{RE}$
    - 负债表里计算出留存收益，利润表里去平衡
- B/S
    - Monetary assets/liabilities -> current
        - Inventory -> ending inventory rate
        - $new\ monetary\ equity = (monetary\ asset - monetary\ liability) \times current\ rate$
    - Nonmonetary assets/liabilities -> actual
        - $new\ nonmonetary\ equity = (nonmonetary\ asset - nonmonetary\ liability) \times actul\ rate$
    - Equity (capital + RE)
        - $new\ equity = \ new\ equity + new\ nonmonetary\ equity$
        - Capital -> actual rate
        - $\boldsymbol{RE_1} = \ new\ equity - capital\ \times actual\ rate$
        - $\boldsymbol{\Delta RE = RE_1 - RE_0}$
- I/S
    - Revenue – average
    - COGS -> actual 对应 inventory （需要推算）
        - 原始采购金额 $\text{purchase} = \ \text{COGS} + \Delta\text{Inventory} \rightarrow \$\text{purchase}$ (用平均汇率或者题目给定的汇率)
        - 新的汇率 $\$\text{purchase} = \$\text{COGS} + \$\mathrm{Inv}_1 - \$Inv_0$
        - $\$\text{COGS} = \$\text{purchase} + \$\mathrm{Inv}_0 - \$Inv_1 = \text{purchase} \times \text{average rate} + \mathrm{Inv}_0 \times rate_0 - Inv_1 \times rate_1$
        - 年初和年末的汇率不一样，采购的汇率也不一样。
    - Depreciation -> actual 对应 fixed assets
    - Rest expenses > average
    - **Remeasurement G/L**
    - $\mathrm{NI}_{\mathrm{before}} + FX\ G\&L\ - \text{Dividend} \times \text{actual rate} = \Delta\text{RE}$

Exposure

- Current methods 大部分是资产
  - Net assets/equity - current rate
  - Most are **assets**
  - Loss: when foreign currency is depreciating
  - Elimination: **difficult**, need to set equity to zero
- Temporal methods 大部分是现金负债
  - Net **monetary** assets - current rate
  - Most are monetary **liabilities**
  - Loss: when foreign currency is appreciating
  - Elimination: sell nonmonetary assets to reduce monetary liabilities

Ratios

- Pure-ratios -> not affected under current method
- Mixed-ratios (most are IS/BS)
  - Use the **end-of-period** balance sheet numbers
    - 有些需要用平均的地方，这里都用期末的值
  - $\text{ROA} = \frac{\text{NI}}{\text{Asset}} = \frac{average}{current}$
  - $\text{ROE} = \frac{\text{NI}}{\text{Eqity}} = \frac{average}{current}$
  - $\text{A. R Turnover} = \frac{\text{Sales}}{\text{average A.R}} = \frac{average}{current}$
    - 理论 A.R 期初和期末的平均，应该用平均汇率

Scenario	Pure B/S and pure I/S ratios (compared with original subsidiary's)	B/S and I/S mix ratios (compared with original subsidiary's)
C$ appreciating	The same (current ratio, quick ratio, LTD-to-capital)	ROA: Lower ROE: Lower Turnovers: Lower
C$ depreciating	The same (current ratio, quick ratio, LTD-to-capital)	ROA: Higher ROE: Higher Turnovers: Higher

Compare

- Foreign appreciating or depreciating?
- Numerator: which rate
- Denominator: which rate

LC depreciation	Temporal	Current rate
Current ratio	Higher	Lower
Quick ratio	Same	Same
A/R turnover	Same	Same
Inventory turnover (LIFO FIFO uncertain)	Uncertain	Uncertain
Fixed asset turnover	Lower	Higher
Gross profit margin	Lower	Higher
Net profit margin, ROE, ROA (Translation gain/loss uncertain)	Uncertain	Uncertain
Interest coverage	Lower	Higher
Ltd-to-total capital	Lower	Higher (equity used mixed rate)

Accounts receivable turnover ratio

- sales/average accounts receivable
- average rate for sales
- **year-end** rate for accounts receivable (accounts receivable are a monetary asset for the temporal method)

Current ratio

- **(cash + AR + inventory) / current liability**
- temporal method
  - the monetary (cash and A/R) – current rate
  - non-monetary (**inventory**) – historical rate
  - current liability – current rate
- current rate method – current rate
  - all are translated at the balance sheet rate

Operating profit margin

- margin = (Sales - COGS)/Sales
- temporal method
  - sales – average
  - COGS - historical rate (depends on when the **inventory** was purchased)
  - COGS = purchase: average + begin inventory: begin historical rate – ending inventory: ending historical rate
- Current method
  - Sales – average rate
  - COGS – average rate

Hyperinflation

- inflation
  - inflation more than 100% over three years, each year more than 26%

    - current method -> lower
    - but nonmonetary assets/liabilities are not affected because local currency values increase to offset the impact of inflation
- GAAP -> temporal
    - Consider functional currency to be the parent's reporting currency
    - Use temporal method
- IFRS -> restate + current
    - Restate for inflation and use **current** method
    - 计算方法和 temporal 方法类似
    - B/S – 年初（或者采购时间）到年底的指数升值
        - monetary assets/liabilities -> no adjustment
        - Nonmonetary assets/liabilities -> change in price index (1 + inflation rate)
            - $\text{adjusted price} = \text{historical price} \times \frac{\text{price index } \textbf{balance sheet} \text{ date}}{\textit{price index } \textbf{\textit{acquisition}} \textit{ date}}$
            - $= historical\ price \times (1 + inflation\ rate)$
        - shareholder **equity** (other than retained earnings) are restated
            - price index from the beginning of the period or the date of **contribution** if later
        - **retained earnings** is the plug figure to balance BS
            - **net income** is the plug figure
    - **I/S – 平均到年底的指数升值**
        - All income statement **items** are restated by multiplying the change in the price index from the date the transaction occurs
            - $\text{adjusted price} = \text{historical price} \times \frac{\text{price index } \textbf{balance sheet} \text{ date}}{\textbf{\textit{average}}\ price\ index}$
        - **Net purchasing power gain or loss** based on net monetary asset or liability exposure.
            - Monetary assets -> loss
            - Monetary liabilities -> gain
    - Formulas (RE -> NI -> net purchase power)
        - $\mathbf{RE_1} = \text{assets} - \text{liabilities} - \text{capital}$
        - $\boldsymbol{NI = \Delta RE + dividend}$
        - $\text{revenue} - \text{expense} + \text{net purchase power G\&L} = \text{NI}$
    - Example
        - Begin Index: 100, end index: 150, average index: 125
        - | | Begin | end |
        - | Cash | 5000 | 8000 |
        - | Payable | 2000 | 2000 |
        -
        - Initial:
            - Begin Cash: loss -5000*(150-100)/100=-2500
            - Change in Cash loss: -3000*(150-125)/125=-600
            - Payable gain: 2000*(150-100)/100=1000
            - Change in Payable gain: 0
            - Total purchase power: -2500-600+10000=-6900

Disclosure

- Many subsidiaries
- Same industry but different translation methods
    - Current -> CTA
        - Solution: add **change in CTA** to IS (not totally resolved)
    - Temporal -> measurement gains/losses in IS
- Non-owner changes in equity -> net income
    - Unrealized gains & losses from available-for-sale securities **to net income**
        - To compare with held-for-trading securities
- Surplus -> net income
    - Dirty-surplus: Gains and losses reported in equity
    - Clean-surplus: add gains and losses in equity to **net income**

Tax

- Statutory tax rate
    - Tax code of the home country
- effective tax rate
    - tax expense / pretax profit
- factors
    - mix of profits from different countries
    - changes in tax rates
- Foreign transactions can increase or decrease effective tax rate

Sale Growth

- factors
    - volumes and prices -> sustainable
    - due to appreciation of FX -> **non-sustainable** 汇率波动不可持续
- organic growth in sales excludes
    - effects of acquisitions/divestitures
    - Currency effects
- management's historical performance
    - Analysts should consider the foreign currency effect on sales growth for evaluating management's historical performance.
    - Foreign currency fluctuations are out of management's control.
- IFRS, debt, available for sale, FX G&L -> I/S

Major Sources of Foreign Exchange Risks

- exposure
    - Transaction
    - Translation
- MD&A Disclosure
    - Impact of currency value changes on profits
- Analysts
    - Hedging tools to manage currency exposures

Analysis of Financial Institutions

Banks and insurance companies

Financial Institutions

- Systemic importance
  - Inter-dependencies, contagion effect
- Regulated
  - Capital requirements, minimum liquidity, limits on risk-taking
- Assets
  - Financial assets: loans, securities at fair value

Basel III Three pillars

- MCR
  - Minimum capital requirements based on risk
  - Risk weighted assets
- LCR
  - Liquidity ratio
    - Hold liquid assets to meet 30-day stress scenarios
- SFR
  - Stable funding relative to liquid needs over **one**-year
  - Stable: long term > short term
  - Type: interbank > consumer

CAMELS framework

- Capital adequacy
- Asset quality
- Management
- Earnings
- Liquidity
- sensitivity

Capital Adequacy

- RWA: risk weighted assets
- Total Capital
  - Tier 1
    - CET1: common equity (most important)
      - Common stock, paid-in capital, retained earnings, OCI
    - Other
      - Subordinated with no maturity and no contractual dividends
      - Preferred stock with **discretionary** dividends
  - Tier 2
    - Subordinated with original maturity larger than five years
- Capital Requirements
  - 4.5% CET1
  - 6% Tier 1
  - 8% total of RWA

Asset Quality

- Loans: amortized cost
- Securities: debt and equities
- Equities: fair value
- **Credit risk**
    - Debt securities
    - Loans
    - Off-balance-sheet liabilities
- **Loan Loss Provisions**
    - **Allowance for loan losses**: contra asset account to loans
    - **Provision for loan losses:** expense subject to management discretion
    - **Actual** losses (net of recoveries) are **written off** against these provisions
    - Ratios
        - Allowance to nonperforming loans
        - Allowance to net loan charge-offs

Management Capabilities

- Control the level of risks taken.
- Risk management and control is critical for banks.
- Internal control and governance systems
    - Set levels for maximum allowable risks
    - Continuously measure and monitor the myriad risks
- Earnings
    - High if **adequate** as well as **sustainable**
    - Tends should be positive and accounting estimates should be unbiased
- Major source of earnings is from investment in **securities**
- Fair value hierarchy
    - Level1: **quoted** market prices of **identical** assets
    - Level2: **observable** but **not quoted** prices of identical assets
        - Quoted prices of similar assets
        - Quoted prices of identical assets in non-active markets
        - Observable interest rates, spreads, implied volatility
    - Level 3: **non-observable** and hence subjective
- Typical bank
    - Sources: net interest income, service income, trading income
    - Trading income is most volatile, the rest two are more sustainable

Liquidity Position

- LCR (liquidity coverage ratio)
    - $\text{LCR} = \frac{\text{high liquid assets}}{\text{expected cash outflows}} \geq 100\%$
        - High liquid assets: can be easily convertible into cash
        - Expected outflow one-month need in a **stress scenario**
- NSFR (net stable funding ratio)
    - $\text{NSFR} = \frac{\text{available stable funding}}{\text{required stable funding}} \geq 100\%$
        - Funding sources

            - Deposits from retail and small business are stable than corporate clients
        - Required funding: composition and maturity distribution of asset base
- Concentration of funding
    - Lack of diversification
- Maturity mismatch
    - Asset maturities differ from liabilities

Market Risk

- Market risks: **interest** rate, currency values, volatility of security prices
- Interest rate risk:
    - Differences in maturity, rates, and repricing frequency between assets and liabilities
- Increase duration risk
    - Borrow more short-term and lend long term
- Change in shape of yield curve
- Value at risk (VaR)

Other factors

- Government support
- Government ownership
    - Strategic importance
- Bank Mission
    - Profit-making
    - community: community development
    - global banks: well-diversified asset bases
- Culture
    - Diversity of bank assets
    - Restatements
        - Accounting restatements due to failure of internal controls
    - Management compensation
        - Excessive risk-taking
    - Adjust loan provisions relative to actual loss speed

General Company factors

- Competitive environment
- Off-balance-sheet assets/liabilities
    - Segment information
    - Currency exposure
        - Large global banks trading in currencies

Insurance

- Revenue
    - Premium
    - Float: income earned on premium between collection and payment
- P&C vs L&H

    - P&C: lumper claim, shorter contract duration
    - L&H: stable and predictable claim, longer contract duration

P&C Insurance

- Major income: **premium**
- Diversify risk: reinsure
- Property
    - Loss due to insured events
- Casualty/liability insurance
    - Protect again a legal liability (often to a third party) due to occurrence of a covered event
- Multiple peril policy
    - Cover both property and casualty losses

P&C Profitability

- Margin cyclical
    - Soft pricing
        - High competition, cut price -> slim or **negative** margins
        - Losses -> leave or stop
    - Hard pricing
        - Less competition -> fatter margins
- Cost of writing new policies
    - Direct-to-customer
        - Bear the fixed cost of staffing
    - Agency model
        - Pay variable commission
- **Combined ratio (费用/净收益)**
    - $combined\ ratio = \frac{total\ insurance\ expense}{net\ premium\ earned}$
    - $< 100\% \rightarrow gain \rightarrow\ hard\ market$
    - $> 100\% \rightarrow loss \rightarrow\ soft\ market$
- combined ratio $=$ expense ratio $+$ underwriting loss ratio
    - $underwriting$ expense ratio $= \frac{underwriting\ expense\ including\ commissions}{net\ premium\ \boldsymbol{earned}}$
    - $underwriting\ loss\ ratio = \frac{claims\ paid + \Delta loss\ reserves}{net\ premium\ \boldsymbol{written}}$ 损失（偿付+准备金）
- expense ratio $\rightarrow$ operation efficiency
- underwriting loss ratio $\rightarrow$ underwriting standards
- GAAP sometime use net premium earned for both ratios
- Loss reserve
    - Estimated value of unpaid claims

Other Ratios

- loss and loss adjustment expense ratio $= \frac{\text{loss expense+loss adjustment expense}}{\text{net preimum earned}}$
- $dividend\ to\ policyholders = \frac{dividend\ to\ policy\ holders}{net\ preimums\ earned}$ (liquidity)
- $combined\ ratio\ after\ dividend\ (CARD) = combined\ ratio - dividends\ to\ policy\ holders\ ratio$ (total efficiency)

Other

- **Investment Returns**
    - Return ratio = total investment income / invested assets
    - Diversification
    - Remove unrealized gains and losses
- Liquidity
    - Fair value hierarchy
- Capitalization
    - No global standards
    - Solvency II

L&H Insurance

- Major income: premiums + investment income
- Term-life: make payments if death occurs
- Diversification
    - Premium more stable
- Earning
    - Judgement and estimates
    - Capitalize cost and amortize it
- Investment returns - major
    - Longer float period
    - **Investment** return a key component
    - **Long-term debt**
- Liquidity -> not a major concern
    - Predictable
- Capitalization
    - No global standards
    - Solvency II

Evaluating Quality of Financial Reports

Summary

- Quality
  - reporting (decision-useful) and earning quality (sufficient and sustainable)
- Earning quality
- Cash flow quality
- Balance sheet quality

Quality

- Reporting quality 真实性
  - Decision-useful
  - Enable **assessment**
- Earnings quality 足够可持续
  - Sufficient and Sustainable
  - Increase company value
- Questions
  - Compliant, decision-useful, high earning quality
- Biased accounting: aggressive or conservative
- Earnings smoothing

1. GAAP compliant and decision-useful, high-quality earnings.
Go to page 155
2. GAAP compliant and decision-useful, low-quality earnings.
3. GAAP compliant but not decision-useful (biased choices).
4. Non-compliant accounting.
5. Fraudulent accounting.

Measurement and Timing

- Affect multiple items
- Revenue/expense cognization timing
- Contingent liability

Classification Issues

- Affects one item

Biased Accounting

- Mechanism
- Warning sign

Biased Accounting - Profitability

- Mechanism
  - **Aggressive** revenue recognition
    - Channel stuffing, bill and hold, outright fake sales
  - Lessor use of finance lease classification

    - Classify non-operating income as operating income
    - Classify operating expense as non-operating expense
- **Warning sign**
    - Revenue growth higher than peer
    - **Receivables** growth **higher** than revenue growth
    - Operating cash flow **lower** than operating income
    - Unexplained boost to operating margin
    - High proportion of revenue is received in final quarter

Biased Accounting – Assets/Liabilities

- Mechanism
- Warning sign
    - High **goodwill** relative to total asset
    - Use of special purpose entities (SPE)
    - Large off-balance-sheet liabilities
    - Large fluctuations in DTA/DTL
    - Current assets -> noncurrent assets

Business Combination – Acquisition Method

- Both tend to inflate stock price
- Stock acquisition
    - Bypass cash flow statement
    - Inflate stock price
- Underestimate identifiable assets
    - Increase goodwill
- Fair value adjustment
    - Excess depreciation which reduces future profits
- Overestimate Goodwill
    - Not amortized
    - Increase future profits
    - Impairment -> future, one-off, non-recurring

Beneish Model – M-score of earning manipulation 造假

- probit regression model: M-score-> **earning manipulation**
- Probability
    - P(M-score) = N(score)
- **High probability -> high earning manipulation**
- -1.78，值越大，造假的概率大
- DSR (+)
    - $\text{DSR} = \frac{\left(\frac{\text{Recevialbe}}{\text{Sales}}\right)_{t-1}}{\left(\frac{\text{Recevialbe}}{\text{Sales}}\right)_{t}}$ 应收增加
- **GMI (+)**
    - $\text{GMI} = \frac{GM_{t-1}}{GM_t}$ 利润下滑
- AQI (+, t/t-1) 无形资产
    - $\text{T} = 1 - \frac{\text{PPE+CA}}{\text{TA}} = \frac{\text{IA}}{\text{TA}}$

    - Excessive capitalization
- SGI (+)
    - $\text{SGI} = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$ 压力大
- **DEPI (+)**
    - $\text{DEPI} = \frac{\text{DEP}_{t-1}}{\text{DEP}_t}$ 折旧费减少
- SGAI (-)
    - $\text{SGAI} = \frac{\left(\frac{\text{SGA}}{\text{Sales}}\right)_t}{\left(\frac{\text{SGA}}{\text{Sales}}\right)_{t-1}}$ 费用增加，操纵概率小
- **Accruals (+) 计提、预提**
    - $\text{Accruals} = \frac{income\ before\ extraoridnary - cash\ flow\ from\ operations}{\text{total assets}}$
- LEVI (-)
    - $\text{leverage ratio} = \frac{\text{D}}{\text{A}}$
    - 刚刚上升，操纵概率小
- Limitation
    - Only accounting data

Altman Model – Z-score

- 破产的概率
- 值越大，破产的概率大
- Limitation
    - Only accounting data
    - Single-period static data

High quality

- Sustainable
    - Recur in the future
- Adequate
- Regression Persistence
    - $\text{E}_t = \alpha + \beta E_{t-1} + \epsilon$
    - Higher beta means better
- Earning = Cash + Accruals
    - $\text{E}_t = \alpha + \beta_1 cash\ flow + \beta_2 Accurals\ + \epsilon$
    - $\beta_1 > \beta_2$
- Accrual = normal/non-discretionary + discretionary/residual
    - $Accurals_t = \alpha + \sum \beta_i\ normal\ accurals\ factors + \epsilon_t$
    - ϵ_t: residual are discretionary accruals

Mean Reversion

- Extreme Revert back to normal
- High accruals -> revert faster

Cash flow

- Start-up: negative CFO and CFI, positive CFF
- Positive OCF

- Timing and classification
- Trading securities -> operation
- Available for sale -> investing

Balance Sheet

- Complete
    - Off-balance-sheet
    - Operating Lease -> capitalize
- Unbiased Measurement
    - Pension liability
    - Goodwill
    - Inventory valuation
    - Investment in debt or equity with no readily available value
    - Impairment of PP&E
- Clear Presentation

Sources

- FS
- Auditor report
- Notes to financial statements
- Management discussion and analysis (MD&A)
- SEC form NT
- Financial press

Integration of Financial Statement Analysis Techniques

Source of Earning - ROE

- ROE
  - $ROE = \frac{NI}{average\ equity} = \frac{NI}{Revenue} \times \frac{Revenue}{average\ asset} \times \frac{avg\ asset}{avg\ equity}$
  - $ROE = \frac{NI}{EBT} \times \frac{EBT}{EBIT} \times \frac{EBIT}{Reveue} \times \frac{Revenue}{average\ asset} \times \frac{avg\ asset}{avg\ equity}$
  - $ROE = tax\ burden \times interest\ burden \times EBIT\ margin \times asset\ turnover \times financial\ leverage$
- Analysis
  - Main driver
  - Source of income
    - Whether income is generated **internally** or **externally**
- Equity method – remove its effects
  - If income from associates or joint ventures is a **significant** source -> remove it
  - I/S: performance exclusively from its own asset base
    - Assume investee is profitable, it will decrease firm's earning and **net profit margin and tax burden**
    - $NI' = NI + equity\ income \rightarrow\ tax\ burden = \frac{NI - equity\ income}{EBT}$
  - B/S: remove investment noncurrent account
    - Decrease asset base and increase **asset turnover**
  - Leverage
    - Do not change financial leverage unless required

Asset Base

- Goodwill

Capital Structure

- Debt, liabilities

Capital Allocation

- Segment (more than 10% assets or revenues)
- Revenue%, EBIT%, assets%, capex%
- Capex%/asset%: higher means allocate more
  - >1: allocate more, on **growing** basis
- **EBIT%** vs capex%/assets%
  - Confirm whether allocate to most profitable segment
- Cash~ EIBTDA = EBIT + DA 逼近现金流
- **Cash%/**asset% vs. EBIT%

Earning Quality - Accruals

- Earning = cash + accrual
- B/S approach
  - $\mathrm{OA} = \mathrm{A\ (asset)} - \mathrm{cash}$ 去掉现金
  - $\mathrm{OL} = \mathrm{L\ (liablities)} - \mathrm{debt}$去掉现金负债 short and long term
  - $\mathrm{NOA} = \mathrm{OA} - \mathrm{OL} = (\mathrm{A} - \mathrm{L}) - (cash - debt)$

    - $\textbf{Accural} = \Delta\text{NOA} = \text{NOA}_{\text{end}} - NOA_{begin}$ 新增的预提
    - $\textbf{Accural ratios} = \frac{\Delta\text{Accural}}{NOA_{avg}} = \frac{\text{NOA}_{\text{end}} - NOA_{begin}}{(\text{NOA}_{\text{end}} + NOA_{begin})/2}$
- C/F approach
    - $\text{Accural} = \text{NI} - \text{CFO} - \text{CFI}$ 总利润-现金利润（经营和投资）
        - 为什么不减去 CFF，因为润资现金流不会影响 NI
    - $\textbf{Accural ratios} = \frac{\textbf{Accural}}{\textbf{NOA}_{\textbf{avg}}}$

Cash Generated from Operations (CGO)

- $\textbf{CGO} = \textbf{EBIT} + \textbf{noncash charges} - \textbf{increase in working capital}$
    - Add back interest and taxes
- $\textbf{CGO} = \textbf{OCF}\ (\textbf{CFO}) + \textbf{noncash charge}$
- IFRS
    - Interest -> CFO -> add back
    - Interest -> CFF -> no need to adjust

CGO related

- CGO / operating income
- CGO / asset: cash return on asset
- CGO / reinvestment (capex)
- CGO / total debt
- CGO / cash interest paid

Market Value Decomposition

- Standalone of parent value
    - Associate's on FX, convert it to reporting currency
    - Earning: average rate

Off-Balance-Sheet Financing

- Operating lease
    - Rental expense
- Financial lease
    - Asset, liability, depreciation expense, interest expense
- Debt guarantees
- Sales of receivables with recourse
- Take-or-pay

Operating Lease

- B/S: nothing
- I/S: rental expense
    - periodic lease payment = rental expense
- C/F: periodic lease payment (payment) $\textbf{V}_{\textbf{payment}}$

Financial Lease

- Purchase asset with debt
- $\textbf{V}_{\textbf{lease}}$: **present value** of the remaining lease payments

- B/S
  - asset $\mathbf{V_{lease}}$
  - liability $\mathbf{V_{lease}}$
- I/S
  - depreciation expense (based on asset) $\mathrm{V_{depreciation}} = \frac{\mathbf{V_{lease}}}{\boldsymbol{N}}$
  - interest expense (based on debt) $\mathrm{V_{interest}} = \mathbf{V_{lease}} \times \boldsymbol{r}$
- C/F
  - periodic lease payment (payment) $\mathbf{V_{payment}}$

Analytics: Operating Lease -> Financial Lease

- EBIT: $\mathrm{EBIT_{new}} = EBIT_{old} + V_{payment} - \mathrm{V_{depreciation}}$
- Interest: $\mathrm{Interest_{new}} = Interest_{old} + V_{interest}$
- Interest coverage ratio
  - $\frac{\mathrm{EBIT_{new}}}{Interest_{old}} \rightarrow \frac{\mathrm{EBIT_{new}} + \mathrm{V_{payment}} - V_{depreciation}}{Interest_{old} + V_{interest}}$
- equity unchanged
- leverage increase (more debt)
- depreciation and interest expense
  - higher in the beginning and lower in the end
- net income
  - lower in the beginning and higher in the end
- interest coverage ratio
  - lower in the beginning and higher in the end