

Topics

- Income statement
- Balance Sheet
- Cash flow statements
- Financial Analysis Techniques

Income Statements

GAAP & IFRS

- combine into one: comprehensive income statement
- separate: income statements and statements comprehensive income

Equation

- $\text{Net income} = \text{Revenue} - \text{expense}$

Revenue

- In the normal sales of goods and services
- Net Revenue 减去折扣和三包费用
 - $\text{Net revenue} = \text{revenue} - \text{estimated returns} - \text{allowance}$
 - Estimated return: **cash** discount, **volume** discounts
 - Allowance: **warranty** expense

Expense

- Amounts incurred
- Grouped by function and nature
- By function
 - COGS: raw material, labor, depreciation
- By nature
 - **Depreciation**: one account

Gains & Losses

- Gains & losses may or may not result from ordinary business activities

Equation

- $\text{Net income} = \text{Revenue} - \text{ordinary expense} + \text{gains} - \text{losses} + \text{other income} - \text{other expense}$

Controlling & Noncontrolling interest

- 有控股权时，计算净利润时需要减去 noncontrolling interest
- A firm has a **controlling** interest in a subsidiary, the pro rata shares of the subsidiary's income **not owned** by the parent is reported in parent's income statement as the **noncontrolling** interest (minority interest or minority owner's interest).
- The noncontrolling interest should be **subtracted** in computing net income

Presentation

- Single-step
 - All revenues are grouped
 - All expenses are grouped
- multi-step
 - Gross Profit = Revenue – COGS
 - EBIT/Operating Profit = Gross Profit – SG&A – Depreciation
 - Pre-tax Profit (EBT) = Operating Profit – Interest
 - +/- **unusual or infrequent** items
- Income from continuing operation = EBT – tax
- Net Income = - income from **discontinued** operation (net of tax)
 - Below the line: Extraordinary items (moved to unusual items)

Non-Recurring Items

- **Unusual or Infrequent**
- **Discounted** Operations
- **Extraordinary (not allowed any more)**

Unusual or infrequent items (above the tax line: pre-tax)

- **Unusual** in nature or **infrequent** in occurrence but not both
- Examples
 - **Gains or losses** from the sale of **assets** or part of a business. It is not a firm's **ordinary** operations
 - **Impairments, write-offs, write-downs, restructuring** costs
- Place
 - Included in the income from continuing operations
 - reported before tax
- Analysis Implications 审查
 - **Review** to determine whether they truly should be included when forecasting future earnings

Discounted Operations (below the line: net of tax)

- **Dates**
 - **Measurement date:** plan date 打算卖的日期
 - **Actual disposal date:** sale is completed 实际处置掉的日期
 - **Phase out period:** measure date -> actual disposal date
- **Past income statements** must be restated, separating P&L of discounted operations
- **Measurement date**
 - Accrual any estimated **loss** during the phrase period
 - Accrual any estimated **loss** on the **sale** of the business
- Actual disposal date
 - Report gain
- Analysis Implication 排除掉
 - **Exclude** it since it will not affect future net income

Extraordinary Items – (below the line: net of tax)

- GAAP: both unusual and infrequent

- Now
 - GAAP: not allowed after 2015-12-15
 - IFRS: not allowed

Accounting Change

- Change in accounting **principle** – **retrospective** 追溯
 - For comparability, restate previous statements
 - Inventory change
 - Exception: change to LIFO no need
- Change in accounting **estimates** – prospectively
 - Estimated life time
 - Analysis
 - Usual do not affect cash flow
 - Check impact on future operating results
- Prior-period adjustment
 - Change from **incorrect** accounting -> acceptable
 - Correction an accounting **error**
 - Change to all prior periods
 - Disclosure the nature of change and effect on net income
 - Analysis
 - Usual do not affect cash flow
 - May indicate weak internal control

Revenue Recognition

| IASB-Goods | IASB-Service | FASB |
|--|---|--|
| Probable flow of economic benefits | Probable flow of economic benefits | Realized or realizable And earned |
| Risk and reward of ownership is transferred | Stage of completion can be measured | Evidence of arrangement |
| No continuing control | | Product has been delivered Serviced has been rendered |
| Revenue can be reliably measured | Revenue can be reliably measured | Price is determined or determinable Seller is reasonably sure of collecting money |
| Cost can be reliably measured | Cost incurred and cost of completion can be measured | |

Long-term contract

- Percentage-of-complement (POC) 成本百分比法
 - $\text{Percentage} = \text{Cost} / \text{total cost}$ 百分比
 - $\text{Revenue} = \text{percentage} * \text{sales}$
 - $\text{Profit} = \text{revenue} - \text{cost} = \text{percentage} * (\text{sales} - \text{total cost})$
- IFRS non-reliable method (IFRS) 最后确认法

- Expense as incurred 费用先确认
- Revenue = expense (同等金额的收入) 收入匹配成本
- **Profit** is at the competition 盈利最后确认
- Completed-Contract method (CC) 完成法
 - Revenue, expenses, and profit: at the **complement** 所有都最后确认
- Rules
 - Service or licensing: recognize revenue **equally**
 - **Loss** is recognized immediately under IFRS and GAAP
- Outcome **can** be reliably measured
 - GAAP & IFRS: POC
- Outcome **cannot** be reliably measured
 - GAAP: CC 更加严格
 - IFRS: IFRS 无名法

| F/S | Items | POC | Completed Contract |
|-----|-------------------|---------|--------------------|
| CFS | Cash flows | Same | Same |
| I/S | Income volatility | Less | reverse |
| I/S | Net income | greater | reverse |

Instalment – Revenue recognition

- Sale is paid instalment
- GAAP
 - Certain: at the time in sale 立刻确认
 - Cannot be reasonable estimated: **installment** 分期确认，收入百分比法
 - **Sales** are **recognized** when case is received 先确认收入
 - **Expense and Profit** is recognized as cash is collected
 - **Expected profit: sales - cost**
 - 销售的百分比 乘以 总预期利润
 - $\frac{\text{Sale}_i}{\text{total sale}} \times (\text{Sale} - \text{COGS})$
 - Real estate
 - High uncertain: **cost recovery** 成本收回法
 - **Sales** are **recognized** when case is received
 - 没有收回之前，成本=sales
 - Profit is recognized only when case collected exceeds costs incurred
 - 累计现金的超过成本的部分
- IFRS
 - Outcome can be reliable
 - Revenue: at time in sale, **discounted** present value 折现现金流
 - Outcome not reliable: **cost recovery**

Barter Transaction

- GAAP
 - **Fair** value if historically received cash for such goods
 - Otherwise: **Carrying** value
- IFRS

- **Fair value** from similar **non-barter** transactions with **unrelated** parties

Gross and Net Reporting of revenues

- Gross revenue conditions
 - Primary **obligor** under the contract 主要负责
 - Bear the **inventory** risk and **credit** risk 库存和信贷风险
 - Able to choose **supplier**
 - Have reasonable latitude to establish the **price** 定价

Expense

- Matching principle 匹配原则
 - expensed are recognized in the same **period** as the **revenue**
- Inventory
 - Specific identification
 - FIFO: **limited** shelf life
 - **LIFO**: not deteriorate with age (coal)
 - Only in GAAP not in IFRS
 - Weighted average
- Depreciation/Amortization
 - Straight-line
 - Accelerated depreciation
 - More benefits in the early years and fewer
 - DDB: double straight rate
 - After n years: balance is $V \times (1 - \text{rate})^n$
 - The n-th year expense is $V \times (1 - \text{rate})^{n-1} \times \text{rate}$
- Bad debt and warranty 销售时候确认
 - in the period of **sale**

operating and non- operating components

- nonfinancial firm
 - investment income and financing expense -> non-operating
- financial firm
 - investment income and financing expense -> operating

EPS – Common Stock

- Capital structure
 - Simple: common stock, nonconvertible debt, nonconvertible preferred stock
 - Complex: **options, warrants, convertible** securities
- Basic
 - basic EPS =
$$\frac{\text{net income} - \text{preferred dividends}}{\text{weighted average number of common shares outstanding}}$$
- Shares
 - weighted by portion of year they were **outstanding**
 - (end of a year - issue date)/365 存活天数
 - stock dividend 股票分红 (乘以 (1+r) 倍)
 - 10% stock dividend -> 100 shares receive 10 shares

- Stock split 股票拆分 (乘以 m/n 倍)
 - 2-for-1: means 100 -> 200 shares
 - 3-for-2: means 100 -> 150 shares
 - M-for-n: means 1 -> m/n > 1
 - Total share partition unchanged
- Stock acquired 购买股票
 - Decrease
- Rules
 - Weight by days or months/12
 - Share are **included** from date of **issuance** 发行时开始计算
 - Reacquired are **excluded** from the data of **reacquisition** 回购时结束
 - Stock split or dividend is applied to all shares **prior** to it and to the **beginning-of-period**. 遇到后, 回退到开头, 乘法
- Diluted EPS
 - Diluted: options, warrants, convertible debt, convertible preferred stock
 - Decrease EPS once exercised
 - **Anti-diluted**: options, warrants, convertible debt, convertible preferred stock
 - Increase EPS once exercised
- Numerator 分子
 - Convertible preferred stock 分红
 - Add back **dividend** of the converted preferred stock
 - Convertible debt 税收收益
 - Add back the **after tax** of the debt: $\text{debt} * (1 - \text{tax}) * \text{time}$
 - Time is the time from converted to the end
 - Stock option and warranty
 - No adjustment to numerator
- Denominator 分母 – 加权法
 - Convertible preferred stock, Convertible debt
 - Number of common shares **created**
 - Options and warranty 要判断是否行权
 - When market price > exercise price 前提是市场价格高于行权价格
 - Treasury stock method 库存股法 – 用**平均**价格
 - Number of options N, Exercise price K, **average** market price: S
 - Repurchase from market: $N \times \frac{K}{S}$ 回购股票
 - Newly created: $N - N \times \frac{K}{S} = N \times \frac{S-K}{S}$ 新发行股票
- Diluted EPS Calculation
 - **Compute Basic EPS** 先计算基本的 EPS
 - **For an item, it is included only if is dilutive** 稀释才考虑
 - 单个的 EPS < basic EPS -> dilutive 考虑
 - **Diluted EPS = min(basic EPS, Diluted EPS)** 最小的值

Common-size statement

- Income and expense as a percentage of **revenue**
- exception is tax rate

- Effective tax = tax / pre-tax income
- Gross profit margin = gross profit / revenue
- Operating profit margin = Operating profit / revenue
- Pre-tax profit margin = Pre-tax / revenue
- Net profit margin = net profit / revenue

Comprehensive Income

- Exclude transaction with **shareholder** 排除股东交易
- Begin with **net income and add OCI**
- OCI
 - Unrealized gains & loss from available-for-**sale** securities 销售
 - Unrealized gains & loss from cash flow **hedging** derivatives 对冲
 - Foreign currency translation gains and losses
 - Adjustments for minimum pension liability
- IFRS
 - 2018, no longer available-for-sale classification, but still be able to choose it to treat as “financial asset measured at fair value through other comprehensive income”
 - Can choose Long-lived asset at **fair value** other than historical cost and also included in OCI

Balance Sheet

Balance sheet

- An item should be recognized if future economic benefit from the item is **probable** and the item's **value/cost** can be measured **reliably**.
 - Assets: resources that are expected to provide future economic benefits
 - Liabilities: require an outflow of economic resources
 - Equity: residual interest, net assets
- Access liquidity (short-term), solvency (long-term), ability to make distributions to shareholders.

Limitation

- A **mixture** of values: historical cost, amortized cost, fair value
- Not appear on the BS: reputation, firm's employees

Presentation

- IFRS & GAAP: **classified** balance sheet (current and non-current) -> liquidity
- IFRS
 - liquidity-based format (in order of liquidity) if more relevant and reliable
 - current and non-current: order is not important

Current & Non-Current

- Current assets 经营活动 (一年或者一个经营期的最大值)
 - Cash or assets that can be converted into **cash** or **used up** within **one year** or one operating cycle, whichever is greater.
 - One operating cycle: purchase -> sell -> collect cash
 - Reflect **operating** activities
- Current liabilities
 - Obligations within one year or one operating cycle
 - Includes: Held for trading, settlement within one year/cycle
- Working capital 流动性
 - Current asset – current liability
 - Reflect **liquidity**
- Noncurrent asset 投资
 - Reflect **investing** activity
- Noncurrent liabilities 长期融资
 - Reflect **long-term financing** activity

Current Assets

- Cash and cash equivalent
 - Short-term highly liquid investment
 - cash equivalent
 - T-bill, commercial paper, money market funds
 - Cash and equivalents are financial assets
 - Amortized cost or fair value
- Marketable securities – held-for-trade

- Financial assets that are **traded** in public market and value can be readily determined
- Examples
 - T-bill, bonds, notes, equity securities
- Details of investment in footnotes
- Accounts receivables
 - Report at net realizable value (NRV) = gross receivable – bad debt expense
 - When written off
 - Remove from BS due to uncollectible
 - Both gross receivable and **allowance account** are reduced
 - Disclose concentration of credit risk
 - Customer, geographic, industry
- **Inventories – held for sale**
 - Costs: purchase, conversion, necessary 资本化
 - Exclude: storage, abnormal, administrative, selling cost
 - **Standard** costing 标准成本法 (制造商, 成本)
 - predetermined materials, labor, overhead - manufacture
 - **Retail** costing 零售成本法 (价格-利润)
 - sale – profit
 - IFRS & GAAP (non-LIFO and non-Retail method)
 - Min (cost, NRV)
 - NRV = selling price – selling cost 卖出成本
 - **GAAP: LIFO or retail method LIFO 或者零售成本的**
 - Min (cost, market)
 - Market = replacement cost 替换成本
 - NRV – normal profit <= Market cost <= NRV 上下限
 - Written down: NRV or market < cost
 - Recovery:
 - GAAP disallowed, greater profit when it is sold
 - IFRS: ok, but up to previous written down amount
- Prepaid expense
- Deferred tax asset
 - Income tax expense < tax payable
 - Can be created from unused tax losses

Current liability

- Accounts payable – to supplier
- Notes payable and current portion of long-term debt
 - Notes payable: maturity < 1
 - current portion of long-term debt: **principle** portion
- accrued liabilities
 - expense recognized but not **due**
 - interest payable, wage payable, warranty expense
 - taxes payable?
- unearned revenue
 - deferred revenue, deferred income, unearned income

Non-Current assets – CFI (固定、无形、金融)

- PP&E
 - IFRS: cost or **revaluation** (gain in surplus **equity**)
 - GAAP: only cost
 - Land – no depreciation because of indefinite life
 - Test for impairment
 - IFRS – 使用或者卖掉
 - Test: carrying value < recoverable amount
 - recoverable amount = max (NRV, VIU)
 - written down
 - carrying value -> recoverable amount
 - recovery -> maximum previous written down
 - GAAP – 使用
 - Test: carrying value < undiscounted PV
 - Loss: carrying value - discounted PV
 - Carrying value -> fair value?
 - **Revaluation (fair value)** - IFRS 特有
 - Report at fair value – AD
 - Changes in fair value are reflected in equity
 - Surplus in **equity** 权益表, loss in income
- Investment property – IFRS 特有
 - IFRS: can be cost or **fair value** (gain & loss in **income** 利润表)
 - GAAP: no specific definition of investment property
- intangible assets 无形
 - identifiable
 - patents, trademarks, copyrights
 - IFRS: cost or fair value (only if active market exists)
 - GAAP: cost
 - Unidentifiable
 - Created Internally - R&D
 - GAAP: expense 费用化
 - IFRS: R: expense, D: capitalize
 - goodwill
 - Finite
 - Amortized and test for impairment
 - Indefinite
 - Only test for impairment
- Intangible asset - Good will 收购时才会有
 - Excessive purchase price over fair value of **identifiable** net assets in business acquisition
 - Good will – internally -> expense 费用化
 - Good will – impairment
 - income statement 减值进入利润表
 - Combined/Purchase Goodwill

- Adjusted equity = adjusted asset (without goodwill) – adjusted liability
计算净资产（不考虑 goodwill）
 - Goodwill = purchase price – adjusted equity 超过 equity 的额外值
- High income
 - A **higher** purchase price to goodwill and **less** to identifiable assets 高估商誉、做低固定资产价格
 - Goodwill no AM, 总体低 AM and AM, 导致高利润
- Ratios
 - Eliminate **goodwill** from BS and goodwill impairment charges from IS for **comparability** 去掉商誉和商誉减值
- Must be **expensed** not capitalized
 - Start up and training costs
 - Administrative
 - Advertising and promotion
 - Relocation and reorganization
 - Termination cost
- **Financial assets 金融资产**
 - Interest -> income 利息进入利润表
 - Historical cost 历史成本
 - Unquoted equity investments
 - Loans 放款
 - Receivables 应收账款
 - realized -> income statement
 - unrealized -> not reported
 - amortized cost: Held-to-maturity 摊销成本
 - debt acquired intend to hold to maturity
 - face value: Original issue price – principle payments + **discount** (or – amortized premium) – impairment
 - Sell at discount, 本金会增加, 因此加 discount
 - Sell at premium, 本金会减少, 因此减 premium
 - Subsequent changes in market values are **ignored**
 - Fair value (mark-to-market) 市值
 - Trading securities and derivate 交易和衍生品
 - Trading securities: less than **three** months
 - Unrealised and realized
 - **income statement (holding period gains and losses)**
 - Available-for-sale (AFS) 用于销售（中间地带，短期不买，长期不持有）
 - realized -> income
 - Unrealised -> equity **OCI**

| <i>Historical Cost</i> | <i>Amortized Cost</i> | <i>Fair Value</i> |
|-----------------------------|-----------------------------|-------------------------------|
| Unlisted equity investments | Held-to-maturity securities | Trading securities |
| Loans and receivables | | Available-for-sale securities |
| | | Derivatives |

Non-current liabilities - CFF

- Long-term financial liabilities
 - Some at **amortized** cost (if not issued at face amount)
 - Issue price – principal payment + discount or (-premium)
 - Some at fair value
 - Held-for-trading, derivative, non-derivate but hedged by derivative
- Deferred tax liabilities 非流动负债

Equity (capital, retained earnings from IS, OCI)

- Contributed capital (**issued** capital) – Common stock
 - Par value
 - Additional paid-in capital = Proceeds – par value
 - Stocks (**authorized > issued > outstanding**)
 - Authorized: may be sold
 - Issued: have been sold
 - Repurchased - stock
 - Outstanding: issued – treasury stock
- Preferred stocks
 - Can be **debt or equity**, depending on the terms
 - Equity: perpetual preferred stock that is non-redeemable
 - Debt: calls for **mandatory redemption** in fixed amounts
- Noncontrolling interest (minority interest) 要被扣除掉
 - Minority shareholder's **pro-rata share** of net assets (equity) subsidiary that is **not wholly owned** by the parent.
- Retained earning
 - Net income - dividend (both common and preferred)
- Treasury stock 减少 equity
 - Acquired but not retired
 - Reduction in equity since use money to purchase
 - No voting rights, no dividend
- Accumulated OCI
 - AOCI = all changes in equity – NI – shareholder transactions
 - CI = NI + OCI

Common-size balance sheet

- Percentage of **total assets**
- Strategy: growing with goodwill
- Liquidity

- Current asset = (cash + marketable securities) + account receivable + inventory
- Current = current asset / current liability
- Quick = (current asset - inventory) / current liability (acid-test ratio)
- Cash = (cash + marketable securities) / current liability
- Solvency
 - Long-term debt to equity
 - Total debt-to-equity (负债/权益)
 - **Financial leverage** = total assets / total equity (资产/权益) A/E
 - Debt ratio = total debt / total assets (负债/资产)
 - **Debt: interest-bearing**

Cash-Flow

Cash Flow

- Information about liquidity, solvency, financial flexibility

Cash Flow Sources

- Income statement items
- Changes in balance sheet accounts

Classification (GAAP)

- CFO: affect net income
 - Cash collected/paid
 - Sale proceeds/acquisition from **trading** securities 交易型证券
 - Tax paid 所有税都是经营活动
 - **Interest and dividend received (from investing)**
 - **Interest paid (financing)**
- CFI: buy/sell long-term assets and certain investment 关注利息（投资，交易）
 - Fixed assets: buy/sell 固定资产的买卖
 - Debt and equity investments: buy/sell 债务和权益的买卖
 - **Loan** 发放贷款，目的是为了利息
- CFF: capital structure 关注本金（融资，发行）
 - Debt 发行和赎回债务
 - Stock 发行和回购股票
 - **Dividend paid** 支付分红
- 总结
 - 利息和分红都放到 **operating**，除了支付的分红还放在 **financing**

IFRS

- 收到的 Interest and dividend **received**
 - can be under operating or **investing** 收到的可以是投资或者经营
- 支出的 Interest and dividend **paid**
 - can be under operating or **financing** 支出的可以是融资或者经营
- 税收 Tax **任意**，默认是经营，除非和投资和融资交易有关
 - usually under operating, unless expense is associated with an investing or financing **transaction**
 - Sale land with 1m, tax is 160k.
 - GAAP: inflow: 1m, outflow: 160k
 - IFRS: can 840 net outflows

Non-cash investing and financing activities 非现金交易

- Not reported in CF
 - Buy asset by financing provided by seller
 - Exchange debt to equity
- Must be **disclosed** in footnote or supplement to the cash flow

Methods

- Direct and indirect
- **Direct** is more encouraged, but indirect is mostly used
- Differ in operating activities
- The investing and financing activities are the same

Direct

- Each item is converted to **cash** receipts or payments
- Source and use of cash

Indirect

- **Net income** is converted to cash flow by making adjustments
- Transactions affect **net income** but not **cash** transactions
 - + **Noncash** expense (depreciation and amortization)
 - - **nonoperating** items (gains & losses)
 - changes in balance sheet accounts resulting from accrual accounting events
 - - asset change
 - + liability change
- Advantage
 - Focus on the difference between **net income** and **operating** cash flow

Disclosure GAAP 鼓励直接法，但是要求间接法

- GAAP
 - Direct method should reconcile NI to CFO (indirect method)
 - Indirect method: no need
 - IFRS: no
- Interest and taxes
 - IFRS: separately
 - GAAP: in the CF or footnote

Cash Flow - BS

- Operating 流动
 - **Most** Current assets and current liabilities
- Investing 非流动资产
 - Noncurrent assets
- Financing 非流动负债
 - Noncurrent liability and equity

Equations

- sales = cash **collected** + Δ account receivable
- purchase = cash paid + Δ account payable 现金角度
- purchase = COGS + Δ inventory 货物角度

Note

- CFO is calculated differently, but the result is the same under both method
- The calculation of CFI and CFF is identical under both method

- **Inverse** relationship between changes in **assets** and changes in cash flows
 - Use cash to buy asset
- **Positive** relationship between changes in **liabilities** and changes in cash flows
 - Liability increase cash
- Sources of cash are positive and uses of cash are negative

Direct

- cash collected
- cash used in production (cash input): COGS
- cash **operating** expense: SG&A
- cash paid for interest
- cash paid for taxes
- **不考虑折旧**

CFI 资产 (买卖资产, GAAP 里无利息和分红)

- **gross** asset accounts resulting from investing: PPE, intangible, investment securities
- **不考虑折旧**
- 假定：买资产一次性现金付完，卖资产也是的(收入=成本+盈利)
- Buy a new asset 资产的增加由于现金的支付导致
 - If old assets are sold during the period
 - $\Delta \text{gross asset} = \text{cash paid for new asset} - \text{gross cost of old asset sold}$
 - $\rightarrow \text{cash paid for new asset} = \Delta \text{gross asset} + \text{gross cost of old asset sold}$
- Sell asset (gain = -loss) 卖资产
 - $\text{gain} = \text{cash received} - \text{asset book value}$
 - $\rightarrow \text{cash received} = \text{asset book value} + \text{gain}$
- $\Delta \text{gross asset} = \text{cash paid} - \text{cash received} + \text{gain}$
- 计算现金流时直接算资产的减少
 - 原则：减掉 BS 的变化，加上 IS (gain)
 - Δasset
 - $\Delta \text{asset} + \text{gain}$ 盈利是现金流

CFF 债务 (bond, common stock, dividend paid)

- $\text{net cash flow from creditors} = \text{new borrowing} - \text{principle paid}$
 - 借款 - 本金还款
- $\text{net cash flow from shareholder} = \text{new equity issued} - \text{share repurchase} - \text{cash dividend paid}$
 - 发行股票 - 回购股票 - 支付的分红
- $\text{dividend declared} = \text{dividend paid} + \Delta \text{dividend payable}$
- $\text{dividend declared} = \text{NI} - \Delta \text{Retained earning}$
- 计算现金流时直接算负债的增加
 - 原则：加上 BS 的变化，减掉 IS (dividend declared)
 - Bond: Δbond
 - Equity: Δequity
 - $-\text{dividend paid} = \Delta \text{dividend payable} - \text{dividend declared} < 0$

total cash flow

- $CFO + CFI + CFF = \Delta \text{cash account}$

Indirect (balance sheet and income) ($NI = NO + NI + NF$)

- Income 里包含了所有的行为：经营、投资、融资
- 一起影响 NI 的都需要考虑
- - NI: investing (**noncurrent asset**)
 - - gains
 - + losses
- - NF: **financing**
 - - gains
 - + losses
- income
 - + noncash expenses (**depreciation**)
 - - noncash revenue
- Balance sheet **operating** accounts (-current asset + current liability = - working capital)
 - - change in asset **current** account 减掉资产的增加
 - Inventory (-COGS), receivable (sales)
 - + change in liability **current** account 加上负债的增加
 - Accounts payable (purchase), wage payable, interest payable
 - Tax payable
 - 不考虑 dividend
 - + change in **noncurrent** liability account
 - tax deferred tax
- $CFO = NI + NCC - \text{Working Capital}$

Undirect Method -> Direct Method

- need
 - income statement + undirected CF
- cash collected from customers
 - $\text{sales} - \Delta \text{accounts receivable} + \text{unearned revenue}$
- Cash paid to supplier
 - $\text{COGS} + \Delta \text{inventory} - \Delta \text{accounts payable} - \text{inventory write_off}$
 - + **depreciation** if they have been included in COGS ?
 - Inventory: Write-off (no cash flow, reduce inventory, increase COGS)

Analysis

- Early stage
 - Negative operating cash flow, financed by debt and equity
- Operating cash flow
 - Increase in earning
 - Decrease in noncash working capital – not **sustainable**
 - Liquidating inventory and receivable
 - Increase payable
 - Earning quality: operating cash flow and net income

Common-size cash flow

- Cash flow 标准化 1
 - => percentage of **revenue**. 总收入
 - Suitable for identify **trends** and **forecast** future cash flow
- Cash flow 标准化 2
 - Or => inflow / total **inflow** 总收入百分比
 - Outflow / total **outflow** 总流出百分比

Free cash flow

- Cover capital expenditures
- Free cash flow to the firm (FCFF)
 - Cash flow to all investors: **equity and debt**
 - **$FCFF = NI + NCC + \text{int} * (1 - \text{tax}) - FCInv - WCInv$**
 - Net income
 - + no cash charge (depreciation and amortization)
 - Int: interest
 - FCInv: fixed **capital** investment (net capital expenditures)
 - 只是固定资产 buy/sell fixed asset
 - WC INV: working capital investment 流动资产
 - **$CFO = NI + NCC - WCInv = \text{净收益} + \text{AD} - \text{流动资本}$**
 - **$-WCInv = \text{current asset} - \text{current asset}$**
 - **$FCFF = CFO - FCInv + \text{int} * (1 - \text{tax})$**
 - 经营现金流 – 固定资产投资 + 税后利息
 - IFRS: no need to adjust interest expense which is included in financing
 - IFRS: if dividend is operating, need to add **dividend (not tax deductible)**
- Free cash flow to equity (FCFE)
 - **$FCFE = CFO - FVInv + \text{net borrowing}$**
 - 经营现金流 – 固定资产投资 + 净借款
 - Net borrowing = debt issued – debt repaid
 - IFRS : add dividend if it is considered as operating
- Ratios
 - Cash flow to revenue = CFO / net revenue
 - Cash return on asset ratio = CFO / average total asset
 - Cash return on equity ratio = CFO / average total equity
 - Cash -to -income ratio = CFO / operating income
 - Cash flow per share = (CFO – **preferred** dividend) / weighted average #shares outstanding
 - IFRS: if dividend were classified as operating, need to **add** it back
- Coverage ratios
 - Debt coverage = CFO / total debt
 - Interest coverage = (CFO + interest paid + taxes paid) / interest paid
 - IFRS: if interest paid were in financing, no need to adjust interest
 - (CFO + taxes paid) / interest paid
 - Reinvestment ratio

- CFO / cash paid for long-term asset
- Debt payment ratio
 - CFO / cash long-term debt repayment
- Dividend payment ratio
 - CFO / dividends paid
- Investing and financing ratio
 - CFO / (cash out from investing and financing activities)
 - Purchase asset + repayment debt principle + pay dividend

Financial Analysis Techniques

Ratio

- Limitation
 - Not useful in isolation
 - Difficult to compare by different accounting treatments
 - Difficult to find Industry ratios when in multiple industries
 - No single ratio

Common-size

- Vertical BS: asset
- Vertical IS: revenue/sales
- 垂直分别除
- Horizontal 水平, 以第一年为主, 第一年全是 1
 - Trend over time
-
- **Operating** cycle = DOH + DSO
- **Cash** conversion cycle = DOH + DSO – DOP (payable)

Activity

- Inventory turnover = **COGS** / average inventory = $315/36=8.75$
 - Days of inventory on hand (DOH) = $365 / \text{inventory turnover}$
- Receivable turnover = **sales** / average receivable = $421/40=10.53$
 - Days of sales outstanding (DSO) = $365/ \text{Receivable turnover}$
- Payable turnover = **purchase** / average payable
 - = COGS / average payable (COGS is used when purchase is not available)
-
- Asset turnover = revenue / average total asset
 - Capital intensive -> 1
 - Retail -> 10
- Fixed asset turnover = revenue / average **net** fixed asset
 - Minus accumulated depreciation
-
- Working capital turnover = revenue / average working capital
 - Net working capital = WA – WL

Liquidity

- WA = (cash + marketable securities) + receivable + inventory
- Current = WA / WL
- Quick = (WA - inventory) / WL
- Cash = (cash + marketable) / WL
- Defensive interval
 - (WA - inventory) / average daily expenditure
 - daily expenditure = COGS + SG&A + R&D
- operating cycle = days sales outstanding + days of inventory on hand

- cash conversion cycle = days sales outstanding + days of inventory on hand – number of days payables

Solvency (debt and coverage)

- debt-to-equity = total debt / equity = D/E
 - total debt = long-term debt + **interest-bearing** short-term debt
- debt-to-capital = total debt / (total debt + equity)
 - capital = short-term and long-term debt + preferred stock + equity
- debt-to-assets = total debt / assets = D/A
- **financial leverage = total assets / total equity = A/E**
- **interest coverage = EBIT / interest**
- fixed charge coverage = (EBIT + lease payment)/(interest + lease payment)

Profitability ratio

- net profit margin = NI / revenue
- gross profit = revenue – COGS
- EBITDA
- EBIT (operating) = revenue – COGS – SG&A
- EBT = EBIT – interest (pretax margin)
- EAT = EBT - tax
- NI = EAT +/- below the line adjusted for tax (discontinued operations)
- NI – preferred dividend = income available to common
-
- ROA = net income/ average total assets
 - $ROA = (NI + interest * (1-tax)) / \text{average total assets}$
- Operating Return on asset = EBIT / average total asset
- ROTC (total capital) = EBIT / average total capital
 - Short-term + long-term + equity
- ROE = net income / average total equity (include preferred stock)
- Return on **common** equity = (net income - preferred dividend) / average total equity
 - Similar to EPS

DuPont

- ROE = net income / average equity
 - = net income / revenue * revenue / average equity
 - Net profit margin * equity turnover
 - = net income / revenue * revenue / average asset * average asset / average equity
 - Net profit margin * asset turnover * **leverage** ratio
- Five
 - $NI / EBT * EBT / EBIT * EBIT / \text{Revenue} * \text{revenue} / \text{average assets} * \text{financial leverage ratio}$
 - $NI / EBT = \text{Tax burden} = 1 - \text{tax rate}$
 - $EBT / EBIT = \text{interest burden}$
 - $EBIT / \text{Revenue} = \text{EBIT margin}$

Dividend

- Sustainable growth rate: proportion of net income that's retained
 - $G = RR * ROE$
 - RR: retention rate: **reinvested** earning
- Retention rate = (net income to common – dividend declared) / net income available to common = **1 – dividend payout ratio**
- **Dividend payout = D / E = dividend per share / EPS**
 - E: NI – preferred dividend

Business Risk

- $CV = \text{std} / \text{mean}$ (coefficient of variation)
- Capital adequacy: to equity capital
- VaR
- Reserve requirement
- Liquid asset requirement
- Net interest margin = interest / interest-earning assets

Business segment: >10% revenue or asset

Geographic segment

- BOTH: report segment data

Pro Forma

- COGS% fixed
- **purchase = cash paid to supplier + Δ account payable**
 - 采购 = 现金支付 + 应付账款变化
 - $\text{purchase} = \text{cash paid} + (\text{ending payable} - \text{beginning payable})$
- **purchase = COGS + Δ inventory**
 - 采购 = 销货成本 + 库存变化
 - $\text{purchase} = \text{COGS} + (\text{ending inventory} - \text{beginning inventory})$
- **sales = cash received from customer + Δ account receivable**
 - 销售 = 现金收入 + 应收账款变化
 - $\text{sales} = \text{cash received} + (\text{ending receivable} - \text{beginning receivable})$