

# Financial Analysis

## Module 29.1: Financial Statement Roles

### LOS 29.a: Steps in the Financial Statement Analysis Framework

- **Step 1: State the objective and context**
  - Define key questions: e.g., “Should we invest in this company’s bonds?”
  - Decide reporting format (memo, detailed report, presentation).
  - Consider time and resources available.
- **Step 2: Gather data**
  - Collect company’s financial statements (10-K, annual reports).
  - Industry reports, macroeconomic data.
  - Field research: interviews with management, suppliers, site visits.
- **Step 3: Process the data**
  - Adjust statements (e.g., leases capitalized).
  - Compute ratios: liquidity, profitability, leverage.
  - Prepare exhibits: graphs, common-size balance sheets.
- **Step 4: Analyze and interpret the data**
  - Compare with peers and historical data.
  - Identify risk factors and growth opportunities.
- **Step 5: Report conclusions or recommendations**
  - Ensure compliance with CFA Code and Standards.
  - Adapt report to audience (investors, management, regulators).
- **Step 6: Update the analysis**
  - Continuous monitoring of new data.
  - Adjust recommendations as conditions change.

## **LOS 29.b: Roles of Financial Statement Analysis**

- Uses accounting information to support **economic decisions**.
- Examples of decisions:
  - Buy/sell recommendations for equity or debt securities.
  - Assigning credit ratings.
  - Extending trade or bank credit.
- Analysts evaluate:
  - Past performance and financial position.
  - Future ability to generate profits and cash flows.
  - Risk factors impacting profitability and stability.

## **LOS 29.c: Importance of Regulatory Filings and Disclosures**

- **Standard-setters:**
  - **FASB (U.S.):** U.S. GAAP.
  - **IASB (International):** IFRS.
- **Regulators:**
  - SEC (U.S.), FCA (UK), ESMA (EU).
  - Members of **IOSCO** regulate 95% of global markets.
- **IOSCO Objectives:**
  1. Protect investors.
  2. Ensure fair, efficient, transparent markets.
  3. Reduce systemic risk.
- **SEC Example Requirements:**
  - Compliance with Sarbanes—Oxley Act (SOX 2002).
  - CEO/CFO certification of financial statements.
  - Auditor independence (cannot provide consulting services).
  - Internal controls effectiveness statement.

### **Financial Statement Notes (Footnotes):**

- Provide basis of presentation (IFRS vs U.S. GAAP, fiscal year end).
- Disclose accounting methods, assumptions, estimates.
- Contain details on acquisitions, legal contingencies, pensions, related parties.
- Segment disclosures:
  - Revenue (external + inter-segment).
  - Assets, liabilities, profit/loss.
  - CapEx, D&A, income taxes.
- Segments must account for  $\geq 75\%$  of external sales.

### **Management Commentary (MD&A):**

- Nature of business, strategy, past performance.
- Key risks, relationships, forward-looking statements.
- U.S. SEC requires MD&A to cover:
  - Liquidity and capital resources.
  - Effects of inflation.
  - Off-balance sheet obligations.
  - Critical accounting policies.

### **Audit Reports:**

- **Unqualified opinion (clean):** No material errors.
- **Qualified opinion:** Exceptions exist.
- **Adverse opinion:** Misstated or misleading.
- **Disclaimer:** No opinion possible (scope limitation).
- Key Audit Matters (KAMs) / Critical Audit Matters (CAMs) disclose:
  - Most significant accounting judgments.
  - Challenging/subjective areas of audit.

## LOS 29.d: Alternative Reporting Systems and Monitoring

- **Key issue:** IFRS vs. U.S. GAAP differences can distort cross-border comparisons.
- Example differences:
  - **IFRS:** Principle-based, allows revaluation of PP&E.
  - **U.S. GAAP:** Rule-based, historical cost model.
- Analysts must track:
  - New products and financial innovations.
  - Emerging accounting standards.
  - Significant changes in company disclosures.
- Sources: IASB, FASB websites, CFA Institute position papers.

## LOS 29.e: Additional Information Sources

- **Issuer sources:**
  - Earnings calls (Q&A with management).
  - Ad hoc presentations, press releases.
  - Direct communications with management / IR.
- **Public third-party sources:**
  - Industry reports, whitepapers, trade journals.
  - Government statistics.
  - Media and social media.
- **Proprietary third-party sources:**
  - Bloomberg, FactSet, Wind.
  - Analyst/consultancy reports.
- **Proprietary primary research:**
  - Commissioned studies.
  - First-hand product usage.
  - Technical expert consultations.

## Exhibit: Comparison Table

Source	Strengths	Limitations
Financial Statements	Audited, standardized (IFRS/GAAP)	Backward-looking, limited qualitative info
Management Commentary	Forward-looking, strategic insights	Partially unaudited, potential bias
Footnotes	Detail on assumptions, methods, risks	Complex, requires expertise to interpret
Audit Report	Provides assurance, highlights key issues	Only “reasonable assurance,” not absolute
Earnings Calls / Press Releases	Timely updates, direct access to management	Not audited, selective disclosure risk
Third-party Reports (Bloomberg, FactSet)	Independent analysis, benchmarks	Expensive, potential conflicts of interest
Proprietary Research	Tailored, unique insights	Costly, time-intensive

Table 1: Comparison of Information Sources in Financial Analysis

## Module 30.1: Revenue Recognition

### LOS 30.a: General Principles of Revenue Recognition

- **Core principle:** Revenue is recognized when control of goods/services transfers to the customer, not necessarily when cash is received.
- **Accrual basis:**
  - Credit sales → Revenue recognized at sale; Accounts Receivable created.
  - Cash received in advance → Recorded as *Unearned Revenue (liability)* until goods/services delivered.
  - Example: Magazine subscription → Cash received upfront, liability recognized, revenue recognized as issues delivered.
- **Revenue is reported net of:**
  - Returns
  - Allowances
  - Discounts
  - Warranty provisions

### Five-Step Model under Converged IFRS/US GAAP (IFRS 15 / ASC 606)

1. Identify the **contract (s)** with a customer.
2. Identify distinct **performance obligations**.
3. Determine the **transaction price**.
4. Allocate the transaction price to the performance obligations.
5. Recognize revenue when/as performance obligations are satisfied.

## Definitions:

- **Contract:** Agreement with enforceable rights/obligations; collectability must be probable (definition of “probable” differs under IFRS vs US GAAP).
- **Performance obligation:** Promise to deliver a distinct good/service.
  - Distinct if:
    1. Customer can benefit independently or with other resources.
    2. Transfer promise is identifiable separately.
- **Transaction price:** Expected amount of consideration (fixed or variable).
- **Revenue recognition:** Only when highly probable it won’t be reversed.
- **Indicators of control transfer:** Physical possession, acceptance, transfer of risks/benefits, legal title, right to payment.

## Revenue Recognition in Long-Term Contracts

- Revenue recognized **over time** if:
  1. Customer benefits continuously as supplier performs (e.g., maintenance contracts).
  2. Customer controls asset being created/enhanced (e.g., construction projects).
  3. Asset has no alternative use + supplier has right to payment for completed work.
- Measurement:
  - **Input method:**
  - **Output method:** Engineering milestones,
- Costs to secure contracts (e.g., sales commissions) must be **capitalized**.

## Examples (IFRS 15 Applications)

### 1. Long-term contract (Warehouse construction)

- Contract price = \$10m; total costs estimated = \$8m.
- Year 1: Costs incurred = \$4m (50% completion) → Revenue recognized =  $0.5 \times \$10\text{m} = \$5\text{m}$ .
- Year 2: Costs incurred additional \$2m → *Cumulative costs* = \$6m (75% completion). *Revenue to date* =  $0.75 \times \$10\text{m} = \$7.5\text{m}$ . Revenue recognized in Year 2 =  $\$7.5\text{m} - \$5\text{m} = \$2.5\text{m}$ .
- Equivalent to **Percentage-of-Completion Method**.

## 2. Acting as an Agent (Travel Agent)

- Ticket price = \$10,000.
- Commission = \$1,000 (no credit or inventory risk).
- Revenue recognized = \$1,000 (net).
- If treated as principal  $\rightarrow$   $Revenue = \$10,000$ ,  $Expense = \$9,000$ ,  $GP = \$1,000$ .
- **Gross profit margin differences:**
  - As principal:  $\frac{1,000}{10,000} = 10\%$ .
  - As agent:  $\frac{1,000}{1,000} = 100\%$ .

## 3. Franchising and Licensing (Fast Food Chain)

- Revenue categories:
  1. Company-owned restaurants.
  2. Franchise royalties & fees (deferred then amortized over franchise term).
  3. Supplies to franchisees (equipment, food).
- Royalties (e.g., 2% turnover) recognized when payable.

## 4. Service vs License (Software Supplier)

- **Case A: License with continuous updates.** Revenue recognized over contract life.
- **Case B: License “as is”.** Revenue recognized at outset; updates covered in separate contract.
- **Cloud service (SaaS).** Revenue recognized over subscription life (service).

## 5. Bill-and-Hold Agreements

- Customer pays ahead of shipping; normally  $\rightarrow$  *deferred revenue*.
- Revenue may be recognized before delivery if:
  - Customer requests arrangement.
  - Goods are identified as belonging to customer.
  - Goods are complete and ready to ship.
  - Supplier cannot redirect goods.

## Required Disclosures (IFRS 15 / ASC 606)

- Disaggregation of revenue (by product/service category).
- Assets & liabilities from contracts (balances, changes).
- Outstanding performance obligations + allocated transaction prices.
- Management judgments on timing/amount of revenue.

## Exhibit: Examples of Revenue Recognition

Scenario	Revenue Recognition	Implications for Analysis
Credit Sale	Recognized at sale (A/R created)	Cash flow timing differs from revenue; analysts adjust for working capital.
Advance Payment (Magazine subscription)	Initially liability (unearned revenue); recognized as delivered	Liability inflates until service performed.
Long-term Contract	Over time using input/output methods	Smooths revenue; requires estimate reliability.
Agent vs Principal	Agent → $\text{Net revenue (commission only)}$ . Principal → $\text{Gross revenue}$	Gross margin ratios differ; important for comparability.
Franchise Fees & Royalties	Fees deferred, amortized; royalties when payable	Analysts separate recurring vs one-time revenue streams.
Software License vs SaaS	License revenue upfront vs over contract term	Recognition timing significantly affects earnings profile.
Bill-and-Hold	Recognize if customer controls goods	May accelerate revenue; analysts should check substance.

Table 2: Revenue Recognition Scenarios and Implications

## Module 30.2: Expense Recognition

### LOS 30.b: General Principles of Expense Recognition

- **Definition (IASB):** Expenses = decreases in economic benefits during an accounting period in the form of:
  - Outflows or depletions of assets
  - Increases in liabilities
  - Resulting in decreases in equity (other than distributions to owners)
- **Accrual vs Cash Basis:**
  - **Cash basis:** Expense when paid.
  - **Accrual basis:** Expense when economic benefit is consumed.
- **Three recognition methods:**



1. **Matching principle:** Match expense with revenue generated (e.g., COGS, warranty provisions).

2. **Capitalization:** Record as asset → *amortized/depreciated as benefits consumed*.

2. **Expensing as incurred:** Period costs (admin, rent, utilities).

- **Conservatism vs Aggressiveness:**

- Expensing earlier = conservative.
- Deferring via capitalization = aggressive.

### Example: Matching Principle with Inventory

- Firm sells 100 units during the year.
- Beginning inventory = 20 units @ \$400 total.
- Purchases = 90 units (various costs). Units available = 110.
- Ending inventory = 10 units (8 from most recent purchase, 2 from prior).
- **Matching:** Remove 10 units from COGS → *report them as inventory (asset)*.
- Ensures COGS = cost of 100 units sold.

**Note:** If exact identification is not possible → *use cost flow methods* :

FIFO (First-in, First-out)

LIFO (Last-in, First-out)

Weighted Average Cost

### Capitalization vs Expensing

- **Capitalization:**

- Expected future economic benefit → *recorded as asset*.
- Cost spread via depreciation, amortization, or depletion.
- Land and indefinite-life intangibles (goodwill) not amortized.

- **Expensing:**

- No future benefit or highly uncertain → *expense immediately*.
- Reduces current pretax income fully in period incurred.

- **Subsequent expenditures:**

- **Extend life/increase benefits** → *capitalize*.
- **Maintenance/repairs** → *expense*.

### **Example: Northwood Equipment**

- Equipment cost = \$250,000 (incl. freight + taxes).
- Installation = \$10,000 → *capitalize*.
- Training = \$7,500 → *expense* (*benefit employees, not asset*).
- Repairs & maintenance = \$35,000 → *expense*.
- Motor rebuild = \$85,000 → *capitalize* (*extends life*).

### **Example: Chair Ltd. (Impact of Capitalization vs Expensing)**

- Equipment cost = £12,000, useful life = 4 years, straight-line depreciation.
- Annual revenue = £30,000, operating margin = 40%, tax = 30%.

### **Impacts:**

- **Income Statement:**
  - Capitalization: Expense spread (£3,000/year depreciation).
  - Expensing: Entire £12,000 in Year 1.
  - Result: Expensing = lower NI in Year 1, higher NI in later years. Capitalization smooths earnings.
- **Balance Sheet:**
  - Capitalization: Higher assets (equipment net of depreciation), higher retained earnings.
  - Expensing: No asset recorded → *low equity in early years*.
- **Cash Flow Statement:**
  - Capitalization: Cash outflow → *investing activities*.
  - Expensing: Cash outflow → *operating activities*.
  - Expensing gives full tax benefit upfront, capitalization spreads it.
- **Ratios:**
  - Asset turnover = lower if capitalized (assets higher).
  - Net profit margin = higher in Year 1 if capitalized.
  - ROE = higher in Year 1 if capitalized, lower in later years.

## Capitalized Interest

- When firm builds asset for own use or resale → *interest during construction is capitalized*.
- Treatment:
  - Included in asset cost.
  - Expensed later via depreciation (if held for use) or COGS (if held for sale).
- Cash flow effect:
  - Capitalized interest → *investing outflow*.
  - Expensed interest → *operating outflow (GAAP) or operating/financing (IFRS)*.
- **Analyst adjustment:** Add capitalized interest back to interest expense for solvency ratios.

## Example: Willock AG

- EBIT = €160m, reported interest expense = €80m.
- €20m capitalized, €10m depreciation from prior capitalized interest.
- Adjusted EBIT = €160m + €10m = €170m.
- Adjusted interest = €80m + €20m = €100m.
- Interest coverage =  $\frac{170}{100} = 1.7$  (vs reported  $\frac{160}{80} = 2.0$ ).

## R&D Costs

- **IFRS:**
  - Research costs → *expensed*.
  - Development costs → *capitalized if criteria met (e.g., feasibility, intent to use/sell)*.
- **U.S. GAAP:**
  - R&D → *expensed*.
  - Software development: expensed until technological feasibility, then capitalized.

- **Analyst adjustment:**
  - Expense capitalized development costs for comparability.
  - Remove amortization of past capitalized costs.
  - Adjust CFO downward (include costs in operations).

## Bad Debt & Warranty Expense Recognition

- Matching principle requires recognition **at time of sale**.
- Estimates involved → *risk of earnings management*.
- Analyst checks:
  - Compare to peers (e.g., unusually low warranty expense).
  - Assess whether estimate changes reflect real improvements or manipulation.

## Exhibit: Capitalization vs Expensing — Financial Statement Effects

Aspect	Capitalization	Expensing
Income Statement	Spreads cost over asset life (depreciation)	Entire cost in Year 1
Balance Sheet	Higher assets (PP&E), higher equity (retained earnings)	No asset, lower equity early
Cash Flow Statement	Outflow under investing activities	Outflow under operating activities
Tax Effect	Tax benefit spread over years	Immediate tax benefit in Year 1
Ratios	Lower asset turnover, smoother NI, higher margins in Year 1	Higher turnover, volatile NI, margins lower in Year 1
Earnings Profile	Smooth, less volatile	Front-loaded cost, volatile earnings

Table 3: Comparison of Capitalization vs Expensing

## Module 30.3: Nonrecurring Items

### LOS 30.c: Financial Reporting Treatment and Analysis of Nonrecurring Items

#### 1. Unusual or Infrequent Items

- **Definition:** Events that are unusual in nature or infrequent in occurrence, and **material** enough to affect decisions.
- **Examples:**

- Gains/losses from sale of assets or business units (not part of ordinary operations).
- Impairments, write-offs, write-downs.
- Restructuring costs.
- **Reporting:**
  - Included in *income from continuing operations*.
  - Reported **before tax**.
- **Analyst consideration:**
  - Should assess whether such items are truly nonrecurring.
  - Some firms report “one-off” charges frequently → *signals recurring issues*.
  - Adjust forecasts by excluding these from “core” earnings if justified.

## 2. Discontinued Operations

- **Definition:** Component of business that is physically and operationally distinct, and management has decided to dispose of.
- **Phases:**
  - **Measurement date:** When formal plan to dispose is announced.
  - **Phaseout period:** Between measurement date and disposal.
- **Accounting treatment:**
  - Reported separately in income statement, **net of tax**, after continuing operations.
  - Prior-period statements restated for comparability.
  - Losses during phaseout and estimated loss on sale recognized at measurement date.
  - Gains only recognized when disposal completed.
- **Analyst treatment:**
  - Exclude discontinued operations from future earnings forecasts.
  - Consider disposal impact on firm’s future cash flows and structure.

### 3. Changes in Accounting Policies, Estimates, and Errors

- **Types of accounting changes:**

1. **Accounting policy changes:** (e.g., inventory method, capitalization vs expensing).
  - Require **retrospective application** unless impractical.
  - Enhances comparability across periods.
  - Example: IFRS 15 revenue recognition → *allowed modified retrospective application* (a)
2. **Accounting estimate changes:** (e.g., useful life of asset, bad debt allowance).
  - Require **prospective application**.
  - Do not affect prior periods; only future results.
  - Do not directly affect cash flows.
3. **Corrections of errors / prior-period adjustments:** (e.g., correcting from non-GAAP to GAAP method).
  - Require **retrospective restatement**.
  - Disclosure required (nature of error and impact).
  - May indicate weak internal controls.

- **Analyst adjustments:**

- Scrutinize policy changes for earnings management.
- Adjust comparability when firms adopt different policies.
- For estimates, determine whether changes reflect genuine new information or manipulation.

### 4. Changes in Scope and Exchange Rates

- **Changes in scope:** Acquisitions, mergers, or disposals → *affect comparability of financial statements*
- **Exchange rates:** Affect overseas subsidiaries' revenues, expenses, and assets when translated to reporting currency.
- **Disclosure:** Not explicitly required, but analysts should monitor.

## Exhibit: Summary of Nonrecurring Items Treatment

Item	Reporting Treatment	Analyst Implications
Unusual / Infrequent Items	Included in continuing operations (before tax)	Adjust if not truly one-off; recurring charges reduce quality of earnings
Discontinued Operations	Separate line, net of tax, after continuing operations; prior periods restated	Exclude from future earnings forecasts; assess disposal impact on cash flows
Change in Accounting Policy	Retrospective application (unless impractical)	Improves comparability, but check for management bias
Change in Accounting Estimate	Prospective application	No restatement; assess impact on future earnings
Correction of Errors (Prior-period Adjustment)	Retrospective restatement; disclosure required	May signal weak internal controls; usually no cash flow effect
Change in Scope (M&A)	Not separately disclosed	Reduces comparability; analyst should adjust historical trends
Exchange Rate Effects	Not separately disclosed	Affects revenues/assets of foreign subsidiaries; adjust for FX volatility

Table 4: Nonrecurring Items — Reporting Treatment and Analyst Considerations

### Key Analytical Insights

- Nonrecurring items distort earnings comparability.
- Analysts should focus on **income from continuing operations** as basis for forecasting.
- Frequent “one-off” losses may reveal poor operations or aggressive accounting.
- Restatements (policy or error corrections) improve comparability but highlight potential internal control issues.
- Scope and FX changes → *require careful normalization in trend analysis*.

## Module 30.4: Earnings Per Share (EPS)

### LOS 30.d: Basic and Diluted EPS — Principles and Calculations

#### 1. Overview

- EPS = most widely used measure of corporate profitability for publicly traded firms.
- EPS is reported only for **common stock**.
- **Capital structure types:**

- **Simple:** Only common stock, nonconvertible debt, nonconvertible preferred.  $\Rightarrow$  Report only **basic EPS**.
- **Complex:** Contains potentially dilutive securities (options, warrants, convertible bonds, convertible preferred).  $\Rightarrow$  Report both **basic and diluted EPS**.

## 2. Basic EPS

### Formula:

$$\text{Basic EPS} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Weighted average number of common shares outstanding}}$$

- Preferred dividends are subtracted (common shareholders' claim).
- Common dividends are **not** subtracted.
- Weighted average shares = shares outstanding adjusted for:
  - Issue or repurchase (time-weighted by days/months).
  - Stock splits/dividends  $\rightarrow$  *applied retroactively to beginning of year and prior periods*.

### Example — Weighted Average Shares (Johnson Co.):

- 10,000 shares at start.
- April 1: issue 4,000 shares.
- July 1: 10% stock dividend (retroactive adjustment).
- Sept 1: repurchase 3,000 shares.

Weighted Average Shares = time-adjusted and dividend-adjusted count (new shares)

### Example — Basic EPS (Johnson Co.):

- Net income = \$10,000.
- Preferred dividends = \$1,000.
- Weighted average shares (from above) = used in denominator.
- Cash dividends to common (\$1,750) ignored in EPS.

$$\text{Basic EPS} = \frac{10,000 - 1,000}{\text{Weighted Avg. Shares}}$$



### 3. Diluted EPS

#### Definition:

- Diluted EPS considers effects of all **potentially dilutive securities**.
- **Dilutive security**: reduces EPS if converted (included).
- **Antidilutive security**: increases EPS if converted (excluded).

#### Formula:

$$\text{Diluted EPS} = \frac{\text{Net income available to common (adjusted)}}{\text{Weighted average shares outstanding} + \text{shares from conversion (if dilutive)}}$$

#### Adjustments:

- **Convertible Preferred Stock**: Add back preferred dividends to numerator if dilutive.
- **Convertible Debt**: Add back after-tax interest expense:
$$\text{Adj. Net Income} = \text{Net Income} + \text{Interest} \times (1 - t)$$
- **Options/Warrants**: Use Treasury Stock Method:
  - Assumes exercise proceeds used to buy back shares at average market price.
  - Net increase = new shares issued – shares repurchased.

### 4. Worked Examples

#### Example 1 — Convertible Preferred Stock (ZZZ Corp.)

- Net income = \$4.35m.
- Shares outstanding = 2m.
- Preferred stock = \$5m par, 7% dividend, convertible 1.1 shares per \$10 par.
- Step 1 — Basic EPS:

$$\text{Basic EPS} = \frac{4.35m - 0.35m}{2m} = 2.00$$

- Step 2 — Diluted EPS:
  - New shares =  $(5m / 10) \times 1.1 = 550,000$  shares.
  - Add back preferred dividends (\$0.35m).
  - Diluted EPS:

$$\frac{4.35m}{2.55m} = 1.71$$

- Since diluted EPS (1.71) < basic (2.00) → *dilutive*.

### Example 2 — Convertible Debt (YYY Corp.)

- Net income available = \$2.5m.
- Shares outstanding = 1m.
- Basic EPS = 2.50.
- Convertible bonds = 2,000 bonds  $\times$  \$1,000  $\times$  5% = \$100,000 interest.
- Tax rate = 30%.
- Step 1 — Extra shares if converted:

$$2,000 \times 120 = 240,000$$

- Step 2 — Add back after-tax interest:

$$100,000 \times (1 - 0.30) = 70,000$$

- Step 3 — Diluted EPS:

$$\frac{2.5m + 70,000}{1m + 240,000} = 2.07$$

- Since  $2.07 < 2.50 \rightarrow$  *dilutive*.

### Example 3 — Stock Options/Warrants (XXX Corp.)

- Net income = \$1.2m.
- Shares = 500,000.
- Basic EPS = 2.40.
- Options outstanding = 100,000 @ \$15 exercise price.
- Average market price = \$20.
- Step 1 — Shares issued if exercised = 100,000.
- Step 2 — Proceeds = 100,000  $\times$  15 = 1.5m.
- Step 3 — Shares repurchased = 1.5m / 20 = 75,000.
- Step 4 — Net new shares = 25,000.
- Step 5 — Diluted EPS:

$$\frac{1.2m}{500,000 + 25,000} = 2.29$$

- Options are dilutive since  $2.29 < 2.40$ .

## 5. Summary Table — Basic vs Diluted EPS

Case	Numerator Adjustment	Denominator Adjustment
Basic EPS	Net income – preferred dividends	Weighted average shares outstanding
Convertible Preferred	Add back preferred dividends if dilutive	Add new shares if converted
Convertible Debt	Add back interest $\times (1 - \text{tax})$ if dilutive	Add new shares if converted
Options/Warrants	No adjustment	Treasury stock method: new shares – repurchased shares
Antidilutive Securities	Excluded	Excluded (ignored in denominator)

Table 5: Basic vs Diluted EPS Adjustments

## 6. Key Analyst Considerations

- Always test each potential security separately for dilution.
- Exclude antidilute securities even if they are convertible.
- Stock splits/dividends  $\rightarrow$  *retroactively adjust prior years to ensure comparability*.
- Diluted EPS provides more conservative measure of per-share profitability.
- Frequent issuance of dilutive securities = red flag for shareholders (dilution of ownership).

## Module 30.5: Ratios and Common-Size Income Statements

### LOS 30.e: Evaluate Performance Using Common-Size Income Statements and Ratios

#### 1. Common-Size Income Statements

- **Definition:** Expresses each line item as a percentage of revenue.
- **Purpose:**
  - Eliminates firm size effect  $\Rightarrow$  allows **time-series** and **cross-sectional** analysis.
  - Facilitates comparison across peers and over time.
- **Key points:**
  - Reveals structural differences in costs and profitability.
  - Highlights strategic focus (e.g., high R&D vs low R&D firms).
  - Exception: Income tax is more meaningful as **percentage of pretax income** = effective tax rate.

## 2. Example: North vs South Company

### Absolute Results (in \$):

- North: Revenue = 75,000,000; Gross Profit = 22,500,000; Operating Profit = 7,500,000.
- South: Revenue = 3,500,000; Gross Profit = 2,800,000; Operating Profit = 1,575,000.
- North larger and higher absolute profit.

Metric	North (% of Revenue)	South (% of Revenue)
Gross Profit Margin	30%	80%
Operating Profit Margin	10%	45%
R&D Expense	Lower proportion	Higher proportion

Table 6: Common-Size Income Statement Comparison: North vs South

### Common-Size Results (relative % of revenue):

#### Insights:

- South is **more profitable relatively**, despite smaller size.
- High gross margin suggests **technological differentiation or pricing power**.
- Higher R&D share indicates innovation-driven strategy.

## 3. Margin Ratios (Profitability Metrics)

### Formulas:

- **Gross Profit Margin:**

$$\text{GPM} = \frac{\text{Gross Profit}}{\text{Revenue}} = \frac{\text{Revenue} - \text{COGS}}{\text{Revenue}}$$

- **Operating Profit Margin:**

$$\text{OPM} = \frac{\text{Operating Profit}}{\text{Revenue}}$$

- **Pretax Margin:**

$$\text{Pretax Margin} = \frac{\text{Pretax Accounting Profit}}{\text{Revenue}}$$

- **Net Profit Margin:**

$$\text{NPM} = \frac{\text{Net Income}}{\text{Revenue}}$$

- **Effective Tax Rate:**

$$\text{ETR} = \frac{\text{Income Tax Expense}}{\text{Pretax Income}}$$

**Interpretation:**

- **Gross Profit Margin (GPM):**

- Indicates ability to cover production costs.
- Improved via: raising prices, reducing production costs.
- Higher GPM often reflects product differentiation (brand, technology, patents).

- **Operating Profit Margin (OPM):**

- Accounts for operating expenses (R&D, SG&A).
- Measures efficiency of operations and cost control.

- **Net Profit Margin (NPM):**

- Includes all expenses (interest, tax).
- Best measure of bottom-line profitability.

- **Pretax Margin:**

- Useful for comparing firms across different tax jurisdictions.

#### 4. Example: Ratio Analysis of North vs South

Ratio	Formula	North	South
Gross Profit Margin	GP / Revenue	30%	80%
Operating Profit Margin	OP / Revenue	10%	45%
Net Profit Margin	NI / Revenue	Lower	Higher
R&D as % of Revenue	R&D / Revenue	Low	High
Effective Tax Rate	Tax Expense / Pretax Income	Apply separately	Apply separately

Table 7: Comparison of Profitability Ratios: North vs South

**Insights:**

- North: Economies of scale, but low margins. Strategy: volume-driven.
- South: Differentiated products, high pricing power, innovation-focused.
- Indicates South may sustain higher profitability despite smaller size.

## 5. Key Analyst Considerations

- Common-size analysis reveals **underlying strategy and structure**, not visible in absolute figures.
- Margin ratios should be tracked **over time** (trend analysis) and **against peers** (cross-sectional).
- Tax effects should be separated using effective tax rate.
- High margins may indicate differentiation but may also suggest risk if not sustainable.
- Low margins may suggest commoditization, reliance on cost leadership.

## Module 31.1: Intangible Assets and Marketable Securities

### LOS 31.a: Intangible Assets

- **Definition:** Non-monetary assets lacking physical substance.
- **Types:**
  - **Identifiable:** Can be acquired separately (patents, trademarks, copyrights).
  - **Unidentifiable:** Cannot be separated, often indefinite life (e.g., goodwill).
- **IFRS Treatment:**
  - Purchased intangibles: cost model or revaluation model (if active market exists).
  - Internally created intangibles:
    - \* Research costs  $\Rightarrow$  expensed.
    - \* Development costs  $\Rightarrow$  capitalized if criteria met (e.g., feasibility, intent to use/sell).
- **U.S. GAAP Treatment:**
  - Only cost model allowed.
  - Internally created intangibles (R&D) generally expensed (except certain legal costs).
- **Subsequent Treatment:**
  - Finite-lived  $\Rightarrow$  amortized + impairment testing.
  - Indefinite-lived  $\Rightarrow$  no amortization, annual impairment test.
- **Costs Always Expensed (IFRS & GAAP):** start-up, training, admin, advertising, relocation, termination.

### Example: Lowe S.A. R&D Projects (IFRS)

- Project 1: Hydrogen fuel cells (research stage)  $\Rightarrow$  costs expensed.
- Project 2: Catalytic converter (development stage, prototype exists, resources and market available)  $\Rightarrow$  costs capitalized.

$$\text{Capitalized Costs} = 120 + 60 + 30 = \text{€}210 \text{ million}$$

- Admin costs  $\Rightarrow$  expensed.

### LOS 31.b: Goodwill

- **Definition:** Excess purchase price over fair value of net assets in an acquisition.

$$\text{Goodwill} = \text{Purchase Price} - \text{Fair Value of Net Assets}$$

- **Key Points:**

- Created only in acquisitions (not internally generated).
- Indefinite life  $\Rightarrow$  not amortized, but tested annually for impairment.
- Impairment recognized as loss (no cash flow impact).

- **Special Case:** If purchase price  $<$  fair value  $\Rightarrow$  gain recognized in income statement.

- **Analyst Considerations:**

- Some analysts exclude goodwill from balance sheets (improves comparability).
- Goodwill impairments can signal poor acquisitions.
- Firms may allocate more cost to goodwill (not amortized) vs assets (which depreciate), inflating net income.

### Types of Goodwill:

- **Accounting Goodwill:** Arises from past acquisitions.
- **Economic Goodwill:** PV of expected future excess returns.

## LOS 31.c: Financial Instruments

- **Definition:** Contracts that create both a financial asset (for one party) and a liability/equity instrument (for the other).
- **Examples (Assets):** investment securities, derivatives, loans, receivables.
- **Measurement Bases:**
  - **Historical Cost:** e.g., unquoted equity investments, loans.
  - **Amortized Cost:** held-to-maturity (GAAP), debt securities with intent to hold to maturity.
  - **Fair Value:** trading securities, available-for-sale (GAAP), derivatives.

Category	Measurement	Income Statement Impact
Held-to-Maturity	Amortized cost	Interest income only
Trading Securities	Fair value	Unrealized gains/losses + income
Available-for-Sale	Fair value	Realized gains/losses + income; Unrealized gains/losses → OCI

Table 8: Financial Assets under U.S. GAAP

### U.S. GAAP Classification:

#### Example: Triple D Bond (\$1M, 6%, decline by \$20k)

- **Held-to-Maturity:** Report \$1,000,000, interest income \$60,000.
- **Trading:** Report \$980,000, interest \$60,000 + unrealized loss \$20,000.
- **Available-for-Sale:** Report \$980,000, interest \$60,000 in IS, \$20,000 unrealized loss in OCI.

### IFRS Classification:

- Amortized Cost (hold to collect).
- Fair Value through OCI (collect + sell).
- Fair Value through P&L (trading/default).
- Key Differences: Equity can be FVOCI under IFRS (choice at purchase), not under U.S. GAAP.



## LOS 31.d: Non-Current Liabilities

- **Examples:** Bank loans, notes payable, bonds payable, some derivatives.
- **Measurement:**

- Usually reported at amortized cost:

$$\text{Amortized Cost} = \text{Issue Price}$$

- Principal Payments
- + Amortized Discount
- Amortized Premium
- Premium/discount amortized into interest expense.
- Liability approaches face value at maturity.
- Some liabilities (e.g., trading, derivatives, hedged) measured at fair value.

- **Deferred Tax Liabilities (DTL):**

- Taxes payable in future due to timing differences between financial vs tax reporting.
- Created when:
  - \* Tax deductions occur before expense recognition (e.g., accelerated tax depreciation).
  - \* Revenues recognized before taxable (e.g., subsidiary earnings).
- Eventually reverse when taxes are paid.

## Module 32.1: Cash Flow Introduction and Direct Method CFO

### LOS 32.a: How the Cash Flow Statement Links to Income Statement and Balance Sheet

- The **Cash Flow Statement (CFS)** provides insights not visible in the Income Statement (IS) and Balance Sheet (BS):
  - Cash receipts and cash payments during the period.
  - Classification into: Operating (CFO), Investing (CFI), Financing (CFF).
  - Quality of earnings: accrual vs. cash-backed profits.
- **Uses of CFS by analysts:**
  - Liquidity → ability to sustain business with operating cash.
  - Solvency → ability to meet long-term obligations.

- Financial flexibility → ability to fund growth or meet surprises.

- **Link to Financial Statements:**

- IS = performance between two BS dates (flow statement).
- CFS reconciles change in cash between beginning and end of BS period.
- Operating Activities ↔ Current Assets & Liabilities.  
Investing Activities ↔ Noncurrent Assets.  
Financing Activities ↔ Noncurrent Liabilities & Equity.

**Example: Accounts Receivable (AR)**

$$\text{Ending AR} = \text{Beginning AR} + \text{Sales} - \text{Cash Collections}$$

$$\text{Cash Collections} = \text{Sales} - (\text{Ending AR} - \text{Beginning AR})$$

**Numerical Example:**

Beginning AR = €10,000, Ending AR = €15,000, Sales = €68,000

$$\text{Cash Collections} = 68,000 - (15,000 - 10,000) = 63,000$$

- An **increase in AR** → use of cash. - An **increase in Unearned Revenue** → source of cash.

**General Rules (Sources vs Uses of Cash):**

- Increase in an Asset → Use of Cash (–).
- Decrease in an Asset → Source of Cash (+).
- Increase in a Liability → Source of Cash (+).
- Decrease in a Liability → Use of Cash (–).

**LOS 32.b: Direct vs. Indirect CFO Presentation**

- CFO can be presented using:
  1. **Direct Method:** Lists actual cash inflows/outflows.
  2. **Indirect Method:** Adjusts net income for non-cash items and accruals.
- CFI and CFF are presented the same under both methods.

## Direct Method for CFO: Step-by-Step

1. Start with Revenue (top of IS).
2. Adjust for changes in related BS accounts:
  - Subtract increase in asset (use of cash).
  - Add decrease in asset (source of cash).
  - Add increase in liability (source of cash).
  - Subtract decrease in liability (use of cash).
3. Treat expenses as negative values before adjustments.
4. Ignore non-cash items (e.g., depreciation, unrealized gains/losses).
5. Sum adjusted inflows/outflows = CFO.

## Components of Direct Method CFO:

- Cash collected from customers.
- Cash paid to suppliers (COGS adjusted for Inventory & AP).
- Cash operating expenses (e.g., wages, rent).
- Cash interest paid.
- Cash taxes paid.

## Example: Direct Method CFO Calculation

### Income Statement (20X7)

Sales Revenue	500,000
COGS	(300,000)
Depreciation	(20,000)
Operating Expenses	(100,000)
Interest Expense	(10,000)
Tax Expense	(20,000)
Net Income	50,000

### Balance Sheet Changes (20X6 → 20X7)

Accounts Receivable	+15,000
Inventory	+5,000
Accounts Payable	+8,000
Taxes Payable	+3,000

### Step-by-Step CFO:

- Cash Collected from Customers:

$$500,000 - 15,000 = 485,000$$

- Cash Paid to Suppliers (COGS adj.):

$$300,000 + 5,000 - 8,000 = 297,000$$

- Cash Operating Expenses:

$$100,000 \quad (\text{no adjustment assumed})$$

- Cash Interest Paid:

$$10,000 \quad (\text{no adjustment assumed})$$

- Cash Taxes Paid:

$$20,000 - 3,000 = 17,000$$

$$\text{CFO} = 485,000 - 297,000 - 100,000 - 10,000 - 17,000 = 61,000$$

### Interpretation:

- $\text{CFO} = 61,000$  (positive cash flow from operations).
- Quality of earnings is high if  $\text{CFO} \geq \text{Net Income}$  (50,000).
- Indicates earnings are backed by real cash collections.

## Module 32.2: Indirect Method CFO

### LOS 32.b: Prepare and interpret CFO using the indirect method

#### Core idea

- Start from **Net Income (NI)** and reconcile to **Cash Flow from Operations (CFO)** by:
  1. **Adding back** noncash charges and **removing** non-operating gains/losses that flowed through NI.
  2. **Adjusting for working capital** changes (operating current assets and operating current liabilities).

## Bridge formula

$$\text{CFO} = \text{NI} + \text{NCC} - \text{WCINV}$$

- **NCC (Noncash Charges):** Items in NI with no current-period cash effect (e.g., depreciation). Gains reduce NI without cash classification in CFO; losses increase NI similarly. Under the indirect method: *add back charges, subtract gains, add losses*.
- **WCINV (Working Capital Investment):** Net increase in *noncash* operating current assets minus the net increase in *operating* current liabilities.

## What counts as operating for WCINV

- **Include (typical):** Accounts receivable, inventory, prepaid expenses, other operating CAs; Accounts payable, accrued expenses, taxes payable, unearned (deferred) revenue.
- **Exclude:** Cash and cash equivalents; short-term *interest-bearing* debt and dividends payable (CFF); short-term investments (except trading securities which are CFO under U.S. GAAP).

Account change	CFO effect	Logic
↑ Operating current asset (e.g., AR, Inventory)	–	Cash not yet received or tied up in inventory
↓ Operating current asset	+	Release of cash (collection or inventory run-down)
↑ Operating current liability (e.g., AP, Accrued, Taxes Payable)	+	Paying later preserves cash
↓ Operating current liability	–	Paying earlier uses cash

Table 9: Working capital adjustments under the indirect method

## Sign rules for working capital adjustments

Income statement item	Indirect CFO adjustment
Depreciation and amortization	Add back
Impairment losses, write-downs	Add back
Stock-based compensation expense	Add back
Bad-debt expense (allowance build)	Add back
Deferred tax expense (net)	Add back (if noncash)
Unrealized FX losses (noncash)	Add back
Gains on sale of PPE/investments (CFI item)	Subtract
Losses on sale of PPE/investments (CFI item)	Add back

Table 10: Common noncash and non-operating items in the NI-to-CFO bridge

## Typical noncash charges, gains, and losses (NCC bucket)

### Step-by-step algorithm (indirect method)

1. Begin with **Net Income**.
2. **Add back** noncash charges and **remove** non-operating gains/losses: + Depreciation/Amortization + Impairments, − Gains on asset sales, + Losses on asset sales, + Deferred tax expense, etc.
3. Adjust for **working capital**:
  - Subtract increases / add decreases in operating current *assets*.
  - Add increases / subtract decreases in operating current *liabilities*.
4. Resulting total is **CFO**.

### Worked example (reconciling to the 32.1 direct-method numbers)

#### Given (from 32.1):

- Income Statement (20X7): NI = \$50,000; Depreciation = \$20,000; no gains/losses assumed.
- Balance sheet changes (20X6 → 20X7): AR = +15,000; Inventory = +5,000; AP = +8,000; Taxes Payable = +3,000.

#### Indirect method CFO:

$$\begin{aligned}\text{CFO} &= \text{NI} + \text{NCC} + (\Delta\text{AP}) + (\Delta\text{Taxes Payable}) - (\Delta\text{AR}) - (\Delta\text{Inventory}) \\ &= 50,000 + 20,000 + 8,000 + 3,000 - 15,000 - 5,000 \\ &= \boxed{61,000}\end{aligned}$$

This matches the **direct method CFO** computed in Module 32.1, as required.

### Aggregate working capital formulation

$$\begin{aligned}\text{WCINV} &= \Delta(\text{AR} + \text{Inventory} + \text{Prepays} + \text{Other Op. CAs}) - \Delta(\text{AP} + \text{Accrued} + \text{Taxes Pay.} + \text{Unearned}) \\ \text{CFO} &= \text{NI} + \text{NCC} - \text{WCINV}\end{aligned}$$

### Standards notes and exam tips

- Both IFRS and U.S. GAAP *encourage* the direct format, but most issuers present **indirect** CFO. Under U.S. GAAP, if direct is shown, an indirect reconciliation is required in the notes.

- Remember classification options: under IFRS, interest and dividends received/paid may be classified as CFO or CFI/CFF (policy choice), while U.S. GAAP generally classifies interest paid/received and dividends received as **CFO**, and dividends paid as **CFF**.
- Quality of earnings: persistent gap where  $NI > CFO$  can indicate aggressive accruals or working-capital build.

## Module 32.3: Investing and Financing Cash Flows and IFRS/U.S. GAAP Differences

### Cash Flow From Investing (CFI) and From Financing (CFF)

#### Definitions

- **CFI:** Cash inflows/outflows from acquiring or disposing of *long-term assets* and certain investments.
- **CFF:** Cash inflows/outflows from transactions affecting *capital structure* (debt and equity).

Bucket	Inflows	Outflows
<b>CFI</b>	Proceeds from sale of PP&E, intangibles, long-term investments	Purchase of PP&E and intangibles; purchase of debt/equity investments (other than trading); loans made to others
<b>CFF</b>	Proceeds from issuing debt (bonds/notes) or equity (shares); proceeds from new borrowings	Repayment of principal on debt; share repurchases (treasury stock); cash dividends paid
<b>CFO (relevant contrasts)</b>	Interest received; dividends received	Interest paid; income taxes paid (all taxes under U.S. GAAP)

Table 11: Cash flow classifications under U.S. GAAP (selected items)

### U.S. GAAP classification (typical)

#### Professor's note

- Do not confuse *dividends received* (CFO under U.S. GAAP) with *dividends paid* (CFF).

## Worked example: Computing CFI

### Given:

- Footnote: PP&E purchases during the year = \$25,000.
- Gross PP&E: beginning = \$60,000; ending = \$69,000.
- Depreciation expense = \$7,000.
- Accumulated depreciation increased only \$3,000 (implies disposal removed accumulated depreciation).
- Loss on sale of PP&E in the income statement (therefore proceeds < carrying value).
- Land: beginning carrying value = \$40,000; ending = \$35,000; no land purchases disclosed.

### 1) Identify PP&E disposals (gross and accumulated depreciation)

$$\begin{aligned}\text{Disposed gross cost} &= \text{Beg. gross PP\&E} + \text{Additions} - \text{End. gross PP\&E} \\ &= 60,000 + 25,000 - 69,000 = 16,000\end{aligned}$$

Accumulated depreciation removed with the disposal:

$$\text{AD removed} = \text{Beg. AD} + \text{Depreciation} - \text{End. AD} = 7,000 - 3,000 = 4,000$$

*(We only need the net change; exact beg/end AD levels are not required.)*

### 2) Carrying value and proceeds on PP&E sale

$$\text{Carrying value disposed} = \text{Disposed gross cost} - \text{AD removed} = 16,000 - 4,000 = 12,000$$

Given a *loss* on disposal and that only *proceeds* are cash:

$$\text{Proceeds on PP\&E sale} = 10,000 \quad (\text{implied by loss of } \$2,000)$$

### 3) Land disposal

$$\text{Carrying value disposed (land)} = 40,000 - 35,000 = 5,000 \quad (\text{no depreciation on land})$$

$$\text{Proceeds on land sale} = 15,000$$



#### 4) Compute CFI

$$\begin{aligned}\text{CFI} &= -\text{Cash paid for PP\&E additions} + \text{Proceeds on PP\&E sale} + \text{Proceeds on land sale} \\ &= -25,000 + 10,000 + 15,000 \\ &= \boxed{0}\end{aligned}$$

*In this case, new asset purchases were exactly offset by disposal proceeds.*

#### One-line shortcut for carrying value of PP&E disposed

$$\text{Carrying value disposed} = \text{Beg. net PP\&E} - \text{Depreciation} + \text{Additions} - \text{End. net PP\&E}$$

*Then use: Proceeds = Carrying value + Gain (or - Loss).*

#### Worked example: Computing CFF

**Given:**

- Bonds outstanding issued at par. Bonds payable: beginning = \$10,000; ending = \$15,000.
- Contributed capital (Common stock + APIC): beginning = \$40,000; ending = \$50,000.
- Retained earnings: beginning = \$30,500; ending = \$61,000. Net income = \$39,000.
- Dividends payable change as applicable (not shown below; include if provided).

#### 1) Net principal cash flow from debt (issued at par)

$$\Delta \text{Bonds payable} = 15,000 - 10,000 = \boxed{+5,000 \text{ (CFF inflow)}}$$

#### 2) Net equity cash flow

$$\Delta \text{Contributed capital} = 50,000 - 40,000 = \boxed{+10,000 \text{ (CFF inflow)}}$$

*If contributed capital decreased, it would be an outflow (share repurchase).*

#### 3) Cash dividends paid

$$\text{Dividends declared} = \text{Beg. RE} + \text{Net income} - \text{End. RE} = 30,500 + 39,000 - 61,000 = 8,500$$

Adjust for change in dividends payable (DP):

$$\text{Dividends paid} = \text{Dividends declared} + \text{Beg. DP} - \text{End. DP}$$

*Use provided DP figures; if none, assume declared = paid.*

Thus,  $\boxed{\text{Dividends paid} = 8,500 \text{ (CFF outflow)}}$ .

#### 4) Total CFF (sign convention: inflows positive)

$$\text{CFF} = (+5,000) + (+10,000) - (8,500) = \boxed{+6,500}$$

#### Completing the cash flow statement

- Compute **CFO** (from 32.1/32.2), **CFI**, and **CFF**.
- Net change in cash = CFO + CFI + CFF.
- Check: End cash – Beg cash = Net change in cash.

#### Converting Indirect CFO to Direct CFO (LOS 32.c)

##### Three-step method

1. **Aggregate** all revenues & gains and all expenses & losses.
2. **Remove** all noncash items and **disaggregate** the remainder into natural cash categories.
3. **Convert accruals to cash** by adjusting each category for related working-capital changes.

#### Useful direct-method building blocks

Cash collected from customers = Sales –  $\Delta$ Accounts receivable

Cash paid to suppliers = COGS +  $\Delta$ Inventory –  $\Delta$ Accounts payable

Cash operating expenses  $\approx$  SG&A –  $\Delta$ Accrued expenses –  $\Delta$ Prepays

Cash interest paid = Interest expense –  $\Delta$ Interest payable

Cash taxes paid = Tax expense –  $\Delta$ Taxes payable –  $\Delta$ Deferred taxes

Sum the adjusted cash inflows/outflows to get  $\text{CFO}_{\text{direct}}$  (it must equal indirect CFO).

#### IFRS vs U.S. GAAP classification differences (LOS 32.d)

Item	U.S. GAAP	IFRS
Interest received	CFO	CFO or CFI
Interest paid	CFO	CFO or CFF
Dividends received	CFO	CFO or CFI
Dividends paid	CFF	CFO or CFF
Income taxes paid	CFO (all)	CFO unless specifically attributable to CFI or CFF

Table 12: Key classification differences: IFRS vs U.S. GAAP

**Illustration: tax on investing transaction** Sell land for \$1,000,000; income tax on sale = \$160,000.

- **U.S. GAAP:** CFI inflow \$1,000,000; CFO outflow \$160,000.
- **IFRS:** May present net CFI inflow \$840,000 if taxes are directly attributable to the investing transaction.

### Exam tips and analyst notes

- When bonds are issued at par (Level I simplification),  $\Delta$  Bonds payable equals *cash* from debt issuance/repayment.
- Premium/discount amortization affects interest expense and carrying value but not cash; focus on principal cash flows in CFF.
- For equity,  $\Delta$  (Common stock + APIC) approximates net share issuance (inflow) or repurchase (outflow); differences from issue price affect retained earnings in practice.
- Always reconcile totals to the change in cash as a validation step.

## Module 33.1: Introduction to Financial Ratios

**LOS 39.a:** Describe tools and techniques used in financial analysis, including their uses and limitations.

### 1. Overview of Analytical Tools

- Financial analysis converts accounting data into decision-useful information.
- Techniques help identify trends, relationships, and anomalies — but must be interpreted contextually.
- Core analytical methods:
  - **Ratio Analysis**
  - **Common-Size Analysis** (vertical and horizontal)
  - **Graphical Analysis**
  - **Regression Analysis**
- These tools correspond to **Step 3** of the financial analysis framework:

“Adjust financial statements, compute ratios, and prepare exhibits.”

## 2. Ratio Analysis

### Purpose and Usefulness:

- Expresses relationships among financial variables.
- Provides quick insight into performance, efficiency, liquidity, solvency, and profitability.
- Useful for:
  - Projecting future earnings and cash flows.
  - Assessing flexibility (ability to meet obligations under stress).
  - Evaluating management performance.
  - Comparing firm and industry trends.
  - Benchmarking against peers and historical results.

### Analyst Objective:

- Ratios raise questions rather than provide final answers.
- Must be interpreted together — no single ratio suffices.

Analytical Goal	Related Ratio Type	Interpretation Focus
Profitability	Net margin, ROA, ROE	Earnings generation vs. resources used
Liquidity	Current, Quick, Cash ratios	Short-term solvency
Leverage	Debt-to-assets, Debt-to-equity	Long-term solvency and capital structure
Efficiency	Inventory turnover, Receivable turnover	Asset utilization effectiveness
Valuation	P/E, EV/EBITDA, P/B	Market perception and expectations

### Limitations:

- Ratios are meaningless in isolation — require benchmarking.
- Accounting methods differ (e.g., IFRS vs. U.S. GAAP → *inconsistent comparability*).
- Conglomerates complicate peer comparison (multi-industry operations).
- Ratios vary across industries — what’s “strong” in one sector may be “weak” in another.

- Definitions differ across analysts (e.g., “debt” may or may not include leases).
- Requires contextual analysis:
  - Prior-period trends.
  - Business cycle stage.
  - Company strategy and expectations.

#### Analytical Tip:

- Consistency of calculation method is crucial.
- Always specify formula and inputs (e.g., average vs. ending balances).

### 3. Common-Size Analysis

#### Purpose:

- Standardizes financial statements for comparison across time or peers.
- Removes size effect — ideal for multi-period and cross-sectional analysis.

#### Types:

- **Vertical Common-Size Statements:**

- Express each item as a % of a key total.
- **Balance Sheet:** Each item  $\div$  Total Assets.

$$\text{Common-size BS ratio} = \frac{\text{Balance Sheet Item}}{\text{Total Assets}}$$

- **Income Statement:** Each item  $\div$  Sales.

$$\text{Common-size IS ratio} = \frac{\text{Income Statement Item}}{\text{Sales}}$$

- **Horizontal Common-Size Statements:**

- Express each item relative to a base-year value (set = 1.0).
- Useful for trend and growth analysis over multiple periods.

Type	Divisor / Base	Analytical Use
Vertical BS	Total Assets	Capital structure, liquidity mix
Vertical IS	Sales (Revenue)	Margin structure, cost efficiency
Horizontal BS/IS	First-year values (index = 1.0)	Trend growth and volatility

### Advantages:

- Facilitates identification of cost drivers and margin trends.
- Enables structural comparison (e.g., asset mix, leverage composition).
- Reveals operating leverage through relative expense movement.

### Example Interpretation:

- Suppose net profit margin rises from 7%  $\rightarrow$  12%.  $\rightarrow$  *Analyst investigates whether this stems from*
  - Lower amortization (noncash  $\rightarrow$  *temporary effect*).
  - Lower interest expense (improved capital efficiency).
  - Permanent operational gains vs. one-time savings.

Common-size analysis identifies areas to **investigate further** — not final conclusions.

### Analyst Caution:

- Presentation format can differ — some show latest year leftmost (as in CFA examples).
- Always check which year is the “base” for horizontal statements.

## 4. Graphical Analysis

### Purpose:

- Visualizes relationships and time trends for easier pattern recognition.
- Useful for presentations and quick diagnostics.

### Common Formats:

- **Stacked Column (Bar) Graph:** – Shows composition (e.g., asset categories) over multiple years. – Reveals shifts in structure (e.g., rise in payables, fall in cash).
- **Line Graph:** – Tracks item trends (e.g., revenue, margins, leverage ratios). – Highlights anomalies (e.g., diverging growth between assets and sales).

### Example Interpretation:

- Rising trade payables and declining cash  $\rightarrow$  *possible liquidity issues*.
- Rapid growth in receivables vs. flat sales  $\rightarrow$  *possible aggressive revenue recognition*.

Graph Type	Best For	Analyst Insight
Stacked Bar	Composition over time	Balance sheet structure shifts
Line Graph	Trend analysis	Growth, seasonality, or volatility patterns
Pie Chart	Cross-sectional composition	Segment contribution to total

## 5. Regression Analysis

### Purpose:

- Quantitative tool linking dependent (e.g., sales) and independent variables (e.g., GDP, advertising).
- Used for **forecasting and scenario analysis**.

$$\text{Sales}_t = \alpha + \beta \times \text{GDP}_t + \varepsilon_t$$

### Analytical Application:

- Identify drivers of performance (macroeconomic sensitivity).
- Forecast future metrics (e.g., revenues, margins, default probabilities).
- Evaluate consistency of management forecasts.

### Limitations:

- Correlation  $\neq$  causation.
- Historical relationships may not persist.
- Sensitive to outliers and structural breaks (e.g., pandemic, crisis).

## 6. Comparative Overview of Analytical Tools

Tool	Primary Use	Limitation / Risk
Ratio Analysis	Quick diagnostics, cross-firm comparison	Accounting differences, context dependency
Common-Size Analysis	Normalized structure, cost trend detection	No insight into absolute scale or cash flows
Graphical Analysis	Visualization of trends	Potential for oversimplification
Regression Analysis	Forecasting relationships	Model risk, multicollinearity, data sensitivity

## 7. Analytical Insights for Interpretation

- Always interpret ratios and common-size trends together:

E.g., Rising ROE but falling CFO/Ni  $\rightarrow$  *possible accrual-based boost*. E.g., Rising ROE but falling

- Combine horizontal trends (growth) with vertical proportions (structure).
- Investigate anomalies:
  - Decline in gross margin with stable sales  $\rightarrow$  *cost inflation or product mix change*.
  - Decrease in total asset turnover  $\rightarrow$  *inefficient asset use or overinvestment*.
- Verify if improvements are operational (sustainable) or accounting-based (temporary).

## 8. Key Takeaways

- **Ratio analysis** provides relationships but requires context.
- **Common-size analysis** standardizes data for comparability.
- **Graphical tools** reveal trends intuitively.
- **Regression analysis** quantifies predictive relationships.
- Always evaluate results within:
  - Historical trend.
  - Peer and industry context.
  - Business cycle phase.
- No single ratio or exhibit explains performance — use a holistic analytical framework.



## Module 34.1: Inventory Measurement — Lower of Cost & NRV/Market

### LOS 34.a — Rules, mechanics, examples, and ratio implications

#### Core definitions and tests

- **IFRS (IAS 2):** Carry inventory at the **lower of** *cost* or *net realisable value (NRV)*.

$$\boxed{\text{NRV} = \text{Expected selling price} - \text{Costs to complete} - \text{Selling costs}}$$

- **U.S. GAAP:**

- All methods except LIFO/retail: **lower of cost or NRV** (same as IFRS).
- LIFO or retail method: **lower of cost or market (LCM)** where

$$\text{Ceiling} = \text{NRV}, \quad \text{Floor} = \text{NRV} - \text{Normal profit margin}, \quad \text{Market} = \min\{\text{Ceiling}, \max(\text{Replacement cost}, \text{Floor})\}$$

- **Recognition:** If test value < cost  $\Rightarrow$  *write-down* (IS: separate loss line or added to COGS). Test value becomes new carrying amount.
- **Reversals:**
  - **IFRS:** *Write-up* permitted later, limited to original cost.
  - **U.S. GAAP:** *No write-up* permitted (even if NRV rises).
- **Mechanics:** Use a *valuation allowance* (contra-inventory) to preserve historical cost ledger and show reduced carrying value.

#### Computation flow (exam ready)

1. Compute NRV and (if GAAP—LIFO/retail) Ceiling/Floor/RC.
2. Determine test value:

$$\text{IFRS or GAAP(non-LIFO)} : \min(\text{Cost}, \text{NRV}) \quad \text{GAAP(LIFO/retail)} : \min(\text{Cost}, \text{Market}).$$

3. Loss = New carrying value – Cost (negative if write-down).

<b>Original cost</b>	\$210
<b>Expected selling price</b>	\$225
<b>Costs to sell/complete</b>	\$22
<b>NRV = 225 – 22</b>	\$203
<b>Replacement cost (RC)</b>	\$197
<b>Normal profit margin</b>	\$12

Table 13: Inputs for lower-of tests

**Worked example (per unit) IFRS / GAAP (non-LIFO/retail):**

$$\text{Carrying value} = \min(210, 203) = \boxed{\$203}, \quad \text{IS loss} = 203 - 210 = \boxed{-\$7}.$$

**GAAP (LIFO/retail; LCM):**

$$\text{Ceiling} = 203, \text{ Floor} = 203 - 12 = 191, \text{ RC} = 197 \in [191, 203] \Rightarrow \text{Market} = 197.$$

$$\text{Carrying value} = \min(210, 197) = \boxed{\$197}, \quad \text{IS loss} = 197 - 210 = \boxed{-\$13}.$$

**Recovery scenario (next year: NRV ↑ \$10 to 213; RC ↑ \$10 to 207)**

- **IFRS:** Write up to  $\min(\text{NRV}, \text{original cost}) = \min(213, 210) = \boxed{210} \Rightarrow \boxed{+\$7}$  gain (limited to prior write-down).
- **U.S. GAAP:** *No reversal* permitted (even if NRV rises).

**Special fair-value/NRV exception (both frameworks)**

- For certain commodities (agriculture, forest products, mineral ores, precious metals) held by producers/dealers: inventory may be carried at **NRV/fair value**; *unrealized* gains/losses flow through earnings if an active market/observable prices exist.

**Financial statement and ratio implications**

**Immediate period (write-down runs through COGS or separate line)**

- **Balance sheet:** ↓ Inventory (CA)  $\Rightarrow$  ↓ Current assets & Total assets; ↓ Equity via NI.
- **Liquidity:** ↓ Current ratio (CA/CL); **Quick ratio** unchanged (inventory excluded).
- **Activity:** ↑ Inventory turnover  $\left( \frac{\text{COGS}}{\text{Avg Inv}} \right) \Rightarrow$  ↓ Days' inventory on hand, ↓ Cash conversion cycle; ↑ Total asset turnover.
- **Leverage:** ↑ Debt-to-assets and ↑ Debt-to-equity (assets/equity ↓).
- **Profitability:** ↑ COGS  $\Rightarrow$  ↓ Gross/Operating/Net margins; NI typically falls by a *larger %* than assets or equity  $\Rightarrow$  ↓ ROA, ↓ ROE.

### Subsequent periods (post write-down base is lower)

- Lower carrying cost flowing into COGS may  $\downarrow$  COGS  $\Rightarrow$   $\uparrow$  margins/NI mechanically.
- With reduced asset/equity bases,  $\uparrow$  ROA and ROE can result *even without operational improvement*  $\Rightarrow$  **comparability caution**.

### Comparative summary (IFRS vs U.S. GAAP)

Topic	IFRS	U.S. GAAP
Measurement basis	Lower of <i>cost or NRV</i> (all methods)	Lower of <i>cost or NRV</i> (non-LIFO/retail); <i>LCM</i> (LIFO/retail) with Ceiling/Floor
Write-up on recovery	Allowed up to original cost (gain in IS)	Prohibited (no reversal)
Valuation mechanism	Valuation allowance (contra-asset)	Valuation allowance (contra-asset)
Commodity exception	NRV/fair value permitted; unrealized P&L	Same concept for qualifying producers/dealers
LIFO effect on impairments	N/A (IFRS prohibits LIFO)	LIFO less likely to impair in inflation (older, lower costs)

Table 14: IFRS vs U.S. GAAP — inventory measurement at lower-of tests

### Analyst checklist

- Identify framework and method (IFRS vs GAAP; LIFO/retail or not)  $\Rightarrow$  choose NRV vs LCM.
- For LCM: compute Ceiling = NRV, Floor = NRV – normal profit, clamp RC to range.
- Track valuation allowance changes (footnotes) to quantify recurring vs one-off charges.
- Adjust time-series ratios for the mechanical post-impairment boost to margins/ROA/ROE.
- Remember: IFRS allows reversals (limit = prior write-down); U.S. GAAP does not.

### Compact formulas

$$\text{IFRS \& GAAP (non-LIFO)} : \quad \boxed{CV = \min\{\text{Cost}, \text{NRV}\}}$$

$$\text{U.S. GAAP (LIFO/retail)} : \quad \text{Market} = \begin{cases} \text{NRV}, & \text{RC} > \text{NRV}, \\ \text{RC}, & \text{NRV} - \text{NP} \leq \text{RC} \leq \text{NRV}, \\ \text{NRV} - \text{NP}, & \text{RC} < \text{NRV} - \text{NP}. \end{cases}$$

$$\boxed{CV = \min\{\text{Cost}, \text{Market}\}}$$

## Module 34.2: Inflation Impact on FIFO and LIFO

**LOS 34.b:** Calculate and explain how inflation and deflation of inventory costs affect the financial statements and ratios of companies that use different inventory valuation methods.

### 1. Overview and Core Logic

- **Assumption:** Stable or increasing inventory quantities unless otherwise stated.
- **Key idea:** Cost flow assumptions (FIFO vs LIFO) determine which purchase costs are assigned to COGS and to ending inventory, but *not* which physical units are sold.
- **Inflationary Periods ( $\uparrow$  prices):**
  - LIFO COGS  $>$  FIFO COGS (because latest, higher-cost items are assumed sold first)
  - LIFO Ending Inventory  $<$  FIFO Ending Inventory (older, lower-cost items remain)
  - $\Rightarrow$  LIFO  $\rightarrow$  lower gross profit and lower net income
- **Deflationary Periods ( $\downarrow$  prices):** Reverse effects of inflation.

### 2. Comparative Table: Inflation vs Deflation Effects

Item	Inflation (Rising Prices)	Deflation (Falling Prices)
COGS (LIFO vs FIFO)	LIFO $>$ FIFO	LIFO $<$ FIFO
Ending Inventory	LIFO $<$ FIFO	LIFO $>$ FIFO
Gross Profit / Net Income	LIFO $<$ FIFO	LIFO $>$ FIFO
Tax Expense	LIFO $<$ FIFO	LIFO $>$ FIFO
Cash Flow (from lower taxes)	LIFO $>$ FIFO	LIFO $<$ FIFO
Inventory Turnover	LIFO $>$ FIFO	LIFO $<$ FIFO
Current Ratio	LIFO $<$ FIFO	LIFO $>$ FIFO
Debt / Equity Ratio	LIFO $>$ FIFO	LIFO $<$ FIFO

### 3. Conceptual Visualization

#### Figure 34.1: LIFO vs FIFO under Rising Prices

FIFO: COGS uses older (low) prices; Inventory uses newer (high) prices.

LIFO: COGS uses newer (high) prices; Inventory uses older (low) prices.

#### 4. Economic Interpretation

- **FIFO inventory** reflects *current replacement cost*, a closer proxy to *economic value*.
- **LIFO COGS** reflects *current cost of sales*, a better measure of current period profitability.
- **Average Cost Method:** Produces values between FIFO and LIFO for both COGS and inventory.

#### 5. Ratio Analysis Effects (Assuming Rising Prices)

- **Profitability Ratios**
  - LIFO → Higher COGS → Lower gross, operating, and net margins.
  - FIFO → Lower COGS → Higher profitability.
- **Liquidity Ratios**
  - FIFO inventory higher ⇒ Higher current ratio and working capital.
  - LIFO inventory lower ⇒ Lower liquidity.
- **Activity Ratios**
  - Inventory Turnover =  $\frac{\text{COGS}}{\text{Average Inventory}}$
  - LIFO: numerator ↑, denominator ↓ ⇒ higher turnover.
  - FIFO: opposite effect ⇒ lower turnover, higher days inventory on hand.
- **Solvency Ratios**
  - FIFO ⇒ Higher total assets and equity ⇒ Lower debt ratio and debt-to-equity ratio.
  - LIFO ⇒ Lower total assets ⇒ Higher leverage measures.

#### 6. LIFO Reserve and Adjustments

$$\text{LIFO Reserve} = \text{FIFO Inventory Value} - \text{LIFO Inventory Value}$$

- Used to reconcile LIFO to FIFO financial statements.
- Analysts can adjust reported LIFO financials to FIFO basis:

$$\text{FIFO Inventory} = \text{LIFO Inventory} + \text{LIFO Reserve}$$

$$\text{FIFO COGS} = \text{LIFO COGS} - \Delta(\text{LIFO Reserve})$$

## 7. LIFO Liquidation

- Occurs when inventory quantities **decline** under LIFO.
- Older, cheaper layers of inventory are recognized in COGS  $\Rightarrow$  artificially **lower COGS, higher income**.
- **Effect:** Non-sustainable increase in profit margins (temporary).
- May occur intentionally (earnings management) or due to external events (strike, shortage, demand drop).
- **Analyst Action:** Inspect LIFO reserve disclosure:
  - Decrease in LIFO reserve  $\Rightarrow$  possible LIFO liquidation.

## 8. Example: Willock Corporation

### Assumptions:

- Purchase prices and sales prices inflating at 5% per year.
- Purchases made at start of each year.

Year	Event	Effect (FIFO)	Effect (LIFO)
1	No beginning inventory; constant price	Same GP, same margin	Same GP, same margin
2	Rising prices & inventory quantities	Higher ending inventory (at \$84) $\Rightarrow$ higher GP	Lower ending inventory (mix of \$80–\$84) $\Rightarrow$ lower GP
3	Prices still rising but inventory <b>declines</b> (LIFO liquidation)	Normal higher COGS (new purchases)	Older cheap inventory released $\Rightarrow$ artificially higher GP

### Interpretation:

- Year 2: Normal inflation pattern  $\Rightarrow$  FIFO reports higher gross margin.
- Year 3: LIFO liquidation  $\Rightarrow$  lower COGS, higher reported profit, despite inflation.
- The increase in margins in Year 3 is temporary and unsustainable.

## 9. Summary Table: FIFO vs LIFO Comparison (Rising Prices)

Metric	FIFO	LIFO
COGS	Lower	Higher
Ending Inventory	Higher	Lower
Gross Profit / Net Income	Higher	Lower
Taxes	Higher	Lower
Cash Flow (after tax)	Lower	Higher
Inventory Turnover	Lower	Higher
Current Ratio	Higher	Lower
Debt Ratio	Lower	Higher
Book Value of Equity	Higher	Lower

## 10. Key Takeaways

- During **inflation**, LIFO → higher COGS, lower income, lower taxes, higher cash flows.
- During **deflation**, FIFO → higher COGS, lower income.
- **Average Cost** method results fall between FIFO and LIFO.
- **LIFO Liquidation** inflates profits temporarily; analysts must adjust for it.
- FIFO inventory approximates current value; LIFO COGS approximates current cost.

## Module 34.3: Presentation and Disclosure of Inventories

**LOS 34.c:** Describe the presentation and disclosures relating to inventories and explain issues that analysts should consider when examining a company's inventory disclosures and other sources of information.

### 1. Required Inventory Disclosures (U.S. GAAP & IFRS)

- Cost flow method used (e.g., LIFO, FIFO, weighted-average).
- Total carrying value of inventory.
- Breakdown by classification (raw materials, work in progress, finished goods), if relevant.
- Carrying value of any inventories reported at fair value less costs to sell.
- Cost of inventory recognized as expense (COGS) during the period.

- Amount of inventory write-downs (valuation allowances).
- Reversals of write-downs and related circumstances (IFRS only; U.S. GAAP prohibits reversals).
- Carrying value of inventories pledged as collateral for borrowings.

## 2. Analytical Uses of Inventory Disclosures

- Evaluate inventory management quality and efficiency.
- Adjust financial statements for comparability (e.g., converting LIFO to FIFO).
- Infer **demand expectations**:
  - $\uparrow$  Raw materials / WIP  $\Rightarrow$  Firm expects higher future demand.
  - $\uparrow$  Finished goods, but  $\downarrow$  WIP / Raw materials  $\Rightarrow$  Potential **falling demand** or risk of **write-downs**.
- Detect potential obsolescence:
  - Finished goods increasing faster than sales  $\Rightarrow$  declining demand, possible write-offs.
  - Excess inventory also increases costs (storage, insurance, taxes) and ties up cash.
  - All categories declined proportionally; no sign of finished-goods buildup.
  - Hence, not indicative of lower demand or obsolescence.

### (c) Valuation Allowance (Obsolescence Reserve)

Year	Allowance / Cost of FG	Ratio (%)
20X6	76,000 / 706,000	10.7%
20X7	17,000 / 221,000	7.7%

#### Interpretation:

- Allowance decreased (10.7%  $\rightarrow$  7.7%), *indicating no increase in expected obsolescence*.



#### (d) Sales Growth and Gross Profit Margin

$$\text{Sales Growth} = \frac{S_t}{S_{t-1}} - 1 \quad \text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

Year	Sales (\$)	Growth (%)	Gross Margin (%)
20X6	5,500,000	+3.8	52.7
20X7	7,500,000	+36.4	45.3

#### Interpretation:

- Strong sales growth (+36%) with falling margin (52.7 → 45.3%) ⇒ higher production or input costs.
- Declining inventory + rising costs ⇒ possible **supply-side constraints**, not demand weakness.

#### (e) Liquidity Ratios

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}, \quad \text{Quick Ratio} = \frac{\text{Cash} + \text{Market Securities} + \text{Receivables}}{\text{Current Liabilities}}$$

Year	Current Assets (\$)	Current Liabilities (\$)	Current Ratio	Quick Ratio
20X6	3,670,000	866,000	4.14	3.13
20X7	5,995,000	1,505,000	3.98	3.78

#### Interpretation:

- **Current ratio** slightly decreased (inventory dropped from current assets).
- **Quick ratio** improved → *liquidity strengthened when excluding inventory*.
- Inventory is illiquid; combining days inventory on hand + DSO approximates cash conversion time.

### 5. Analyst Interpretation and Sources of Further Evidence

- Declining inventories amid rising sales → *not due to demand weakness, but possibly due to cost increases*.
- Gross margin compression confirms higher input costs.
- Analysts should verify via:
  - Management Discussion & Analysis (MD&A).
  - Footnote details on inventory valuation.
  - Industry reports and competitor disclosures.
  - Media or conference commentary.

## 6. Key Takeaways

- Inventory disclosures reveal both **valuation policy** and **business trends**.
- Analysts must interpret changes in composition, turnover, and allowances carefully:
  - Rising inventory → *potential overproduction or falling demand*.
  - Falling inventory → *possible supply constraints or strong sales*.
- Ratio trends must be cross-checked with sales growth and gross margins.
- Always combine quantitative ratios with qualitative sources (MD&A, industry context) for accurate insight.

## Module 35.1: Intangible Long-Lived Assets

### 1. Overview and Key Concepts

- **Definition:** Intangible assets are identifiable non-monetary assets without physical substance that provide future economic benefits (e.g., patents, brands, copyrights, franchises, software, goodwill).
- **Classification by Useful Life:**
  - **Finite-lived** ⇒ amortized over useful life.
    - \* **Finite-lived** ⇒ amortized over useful life.
    - \* **Indefinite-lived** ⇒ not amortized; tested annually for impairment.
  - **Identifiability under IFRS:** An intangible asset is identifiable if it is:
    1. Separately transferable or arises from legal/contractual rights.
    2. Controlled by the firm (ability to obtain future benefits).
    3. Expected to generate probable future economic benefits.
    4. Has a cost that can be measured reliably.
  - **Unidentifiable assets:** Cannot be separated from the business (e.g., goodwill).

## 2. Classification by Source of Creation

Type	Description and Accounting Treatment	Examples
<b>Internally Developed</b>	Most costs expensed as incurred. Under IFRS, <b>development costs</b> (after research stage) may be capitalized if specific criteria are met. Under U.S. GAAP, <b>R&amp;D costs</b> are expensed, except certain <b>software development</b> costs.	R&D, internally developed software, internally generated brand names, customer lists.
<b>Purchased Separately</b>	Recorded on balance sheet at cost (usually fair value at purchase). If purchased as part of a group, allocate total price by fair value of individual assets.	Purchased patents, licenses, franchises, trademarks.
<b>Acquired in Business Combination</b>	Acquisition method: allocate purchase price to identifiable tangible and intangible assets at fair value. Unidentifiable residual = <b>Goodwill</b> . Only goodwill created in acquisitions is capitalized.	Acquired brands, customer relationships, patents, goodwill.

## 3. Internally Developed Intangibles

### Under IFRS:

- **Research phase:** Expensed as incurred.
- **Development phase:** Capitalized if:
  - \* Technically feasible to complete.
  - \* Firm intends and can use or sell the asset.
  - \* Future economic benefits are probable.
  - \* Adequate resources are available to complete the project.
  - \* Costs can be reliably measured.
- Example: development of a new drug after discovery stage.

### Under U.S. GAAP:

- **Research and Development:** Expensed as incurred.

- **Software development:**
  - \* For sale to others:
    - Expensed until **technological feasibility** is proven.
    - Capitalized thereafter.
  - \* For internal use:
    - Expensed until **probable completion** and intended use; then capitalized.

#### 4. Purchased Intangibles

- Initially recorded at **cost (fair value)**.
- Cost allocation for grouped purchases based on fair value of each asset.
- Capitalization impacts:
  - \* Higher initial net income (vs. expensing) due to deferral of costs.
  - \* Lower future net income due to amortization.
  - \* Higher assets, equity, and operating cash flow in early periods.
- Analytical implication:
  - \* Firms with internally generated intangibles show lower total assets and equity than firms that purchase them.
  - \* Thus, ratios (e.g., ROA, ROE) may not be directly comparable.

#### 5. Intangibles Acquired in a Business Combination

- Accounted for using the **Acquisition Method**.
- Steps:
  1. Determine purchase price (consideration paid).
  2. Identify and value all **identifiable** tangible and intangible assets at fair value.
  3. Record liabilities assumed at fair value.
  4. Recognize **Goodwill** as:

$$\text{Goodwill} = \text{Purchase Price} - (\text{Fair Value of Identifiable Net Assets})$$

- **Goodwill:**
  - \* Represents synergies, reputation, or assembled workforce value.
  - \* Not amortized; tested annually for impairment.
  - \* Only goodwill from business combinations is capitalized; internally generated goodwill is expensed.

Concept	Treatment under Acquisition Method
Purchase price allocation	To identifiable assets & liabilities at fair value
Previously unrecorded intangibles	Capitalized if identifiable
Goodwill	Residual = Purchase price – Fair value of identifiable net assets
Internally generated goodwill	<b>Not recognized</b> (expensed)

## 6. Financial Statement Effects of Capitalization vs. Expensing

Item	Capitalizing (Purchased or Development Phase)	Expensing (Research or Internal)
Income (initial periods)	Higher (cost deferred)	Lower (cost expensed immediately)
Income (later periods)	Lower (due to amortization)	Higher (no future amortization)
Assets / Equity	Higher (asset recognized)	Lower (no asset recorded)
Operating Cash Flow	Higher (capitalized costs not deducted in CFO)	Lower (expenses reduce CFO)
Total Cash Flow	Unchanged (classification difference only)	Unchanged
Analyst adjustment	Improves comparability across firms with different capitalization policies.	—

## 7. Example: Goodwill Calculation (Business Combination)

### Example:

Purchase Price = \$1,000,000, Fair Value of Identifiable Net Assets = \$850,000

$$\Rightarrow \text{Goodwill} = \$1,000,000 - \$850,000 = \boxed{\$150,000}$$

- This \$150,000 goodwill represents the premium paid for expected synergies, customer relationships, or brand reputation.
- Appears as an asset on the acquirer's balance sheet.
- Subject to annual impairment testing.

## 8. Summary Table: Comparison Across Intangible Asset Types

Aspect	Internally Developed	Purchased Separately	Acquired in Business Combination
Initial Recognition	Mostly expensed (except IFRS development phase)	Capitalized at cost (fair value)	Capitalized at fair value
Amortization	If finite-lived	If finite-lived	If finite-lived
Impairment Test	If indefinite-lived or indicators exist	Same	Same
Goodwill Recognition	Not recognized	N/A	Residual value from acquisition
Impact on Ratios	Low assets, high turnover ratios	Higher assets & equity	May include goodwill distortion
Reporting Difference	Lower net income in early years	Higher initial income, later amortization	Requires goodwill impairment testing

## 9. Key Takeaways

- **Finite-lived** intangibles: amortized; **indefinite-lived**: impairment-tested only.
- **IFRS vs. U.S. GAAP:**
  - \* IFRS allows capitalization of **development** costs; GAAP generally does not.
  - \* Both require **research** costs to be expensed.
- Purchased intangibles and goodwill recognized at **fair value**.
- Internally generated goodwill is never capitalized.
- Analysts must adjust for capitalization policy differences when comparing firms.

## Module 35.2: Impairment and Derecognition

**LOS 35.b:** Explain and evaluate how impairment and derecognition of property, plant, and equipment and intangible assets affect the financial statements and ratios.

## 1. Key Concepts

- **Depreciation / Amortization:** Allocation of an asset's cost over its useful life (expected decline).
- **Impairment:** Unanticipated decline in an asset's recoverable value below carrying amount.
- **Derecognition:** Removal of a long-lived asset from the balance sheet upon sale, exchange, or abandonment.

## 2. Impairments Overview

- Both **IFRS** and **U.S. GAAP** require recognition of impairment losses through the income statement.
- If material, impairment losses are presented as **unusual or infrequent items**.
- Applies to both tangible (PP&E) and intangible assets (finite-lived).

## 3. Impairment Testing Under IFRS

- **Assessment:** At least annually, determine whether indicators of impairment exist (e.g., decline in market value, damage, obsolescence).
- **Impairment condition:**

$$\text{Carrying Value} > \text{Recoverable Amount}$$

- **Recoverable Amount:**

$$\text{Recoverable Amount} = \max(\text{Fair Value} - \text{Selling Costs}, \text{Value in Use})$$

- **Value in Use:** Present value (PV) of future cash flows from continued use and disposal.
- **Loss Recognition:**

$$\text{Impairment Loss} = \text{Carrying Value} - \text{Recoverable Amount}$$

- **Reversals:** Allowed (up to original impairment loss), except for goodwill.

## 4. Impairment Testing Under U.S. GAAP

- **Trigger:** Only when indicators suggest potential non-recoverability.
- **Two-Step Process:**

### 1. Recoverability Test (Step 1):

If Carrying Value > Undiscounted Future Cash Flows  $\Rightarrow$  Impaired

### 2. Measurement (Step 2):

$$\text{Impairment Loss} = \text{Carrying Value} - \text{Fair Value}$$

(Fair value  $\approx$  discounted expected cash flows if market value not known.)

– **Reversals:** *Not permitted* (except for held-for-sale assets).

## 5. Example: Brownfield Equipment Impairment

### Data:

$$\text{Original Cost} = \$900,000$$

$$\text{Accumulated Depreciation} = \$100,000$$

$$\Rightarrow \text{Carrying Value} = \$800,000$$

### Under IFRS:

$$\text{Recoverable Amount} = \max(785,000 \text{ (Value in Use)}, 760,000 \text{ (Fair Value - Costs)})$$

$$\text{Impairment Loss} = 800,000 - 785,000 = \boxed{15,000}$$

**Action:** Write down asset to \$785,000; recognize \$15,000 loss in income statement.

### Under U.S. GAAP:

$$\text{Future Undiscounted Cash Flows} = 795,000 < 800,000 \Rightarrow \text{Impaired}$$

$$\text{Fair Value} = 790,000 \Rightarrow \text{Impairment Loss} = 800,000 - 790,000 = \boxed{10,000}$$

**Action:** Write down asset to \$790,000; recognize \$10,000 loss.

Method	Test Basis	Reversal Allowed?
IFRS	PV of future cash flows or fair value less costs	Yes (except goodwill)
U.S. GAAP	Undiscounted cash flows test, loss = FV–CV	No

## 6. Financial Statement and Ratio Effects

### – Immediate Effects (Year of Impairment):

- \* Assets  $\downarrow$ , Equity  $\downarrow$ , Net Income  $\downarrow$ .
- \* ROA, ROE  $\downarrow$  due to reduced earnings.
- \* Asset turnover  $\uparrow$  (lower denominator).



- \* No cash flow impact (non-cash charge, not tax-deductible).
- **Subsequent Periods:**
  - \* Lower depreciation/amortization  $\rightarrow$  *Net income*  $\uparrow$ .
  - \* ROA, ROE  $\uparrow$  in future periods.
  - \* Total asset base remains smaller.

## 7. Analytical Implications

- Impairments suggest prior overstatement of asset values or understated depreciation.
- Judgment involved  $\rightarrow$  *management discretion and potential earnings management*.
- Common motives:
  - \* Delay recognition during strong years to smooth earnings.
  - \* Take “big bath” impairments in weak years to reset future profitability.
  - \* New management often records larger impairments for clean slate.

## 8. Intangible Assets with Indefinite Lives

- Not amortized.
- Tested at least annually for impairment.
- Impairment loss = Carrying amount – Fair value (if carrying amount  $>$  fair value).

## 9. Long-Lived Assets Held for Sale

- Must be reclassified from **held for use**  $\rightarrow$  **held for sale** *if* :
  - Sale is probable and asset is available for immediate sale.
- No further depreciation or amortization.
- Impairment if:
 
$$\text{Carrying Value} > \text{Fair Value} - \text{Selling Costs}$$
- Loss recognized in income statement.
- **Loss reversal:** Allowed under both IFRS and U.S. GAAP (limited to original impairment).

## 10. Derecognition of Long-Lived Assets

- Occurs when an asset is sold, exchanged, or abandoned.
- **Gain/Loss on Sale:**

$$\text{Gain or Loss} = \text{Proceeds} - (\text{Cost} - \text{Accumulated Depreciation} - \text{Impairment})$$

- **Cash Flow Classification:**
  - Proceeds = Investing inflow.
  - Gain/loss removed from CFO (indirect method adjustment).

Transaction Type	Accounting Treatment
Sale	Remove asset; recognize gain/loss = sale proceeds – carrying value
Abandonment	Remove asset; recognize full carrying value as loss (no proceeds)
Exchange	Gain/loss = FV(old) - CV(old); new asset recorded at FV(new)
Spinoff	Transfer division assets to new entity; shareholders receive new shares; no g

## 11. Example: Derecognition Scenarios

- **Sale:** Cost \$500k, Accum. Dep. \$300k, Sale proceeds \$250k  $\rightarrow$  *Carrying value* = \$200k  $\rightarrow$  *Gain* = \$50k.
- **Abandonment:** Cost \$400k, Accum. Dep. \$250k  $\rightarrow$  *CV* \$150k  $\rightarrow$  *Recognize* \$150k loss.
- **Exchange:** CV(old) \$100k, FV(old) = \$120k, FV(new) = \$120k  $\rightarrow$  *Gain* \$20k; *record new asset*

## 12. Summary Comparison: IFRS vs U.S. GAAP Impairment

Feature	IFRS	U.S. GAAP
Trigger for test	Annual or when indicators appear	Only when indicators appear
Test basis	Compare CV with recoverable amount (max of FV—costs or PV of CFs)	Compare CV with undiscounted CFs
Measurement of loss	CV – Recoverable amount (discounted basis)	CV – Fair value (discounted basis)
Reversal	Allowed (except goodwill)	Not allowed (except held-for-sale)
Subjectivity	Requires PV estimation (discount rate choice)	Relies on undiscounted CF estimates
Impact on ratios	Assets↓, ROA↓ (in year), future ROA↑, turnover↑	Same pattern

## 13. Spinoff Transactions

- **Definition:** Transfer of a division/subsidiary (spinnee) into a new entity; parent (spinnor) shareholders receive shares in the new company.
- **Accounting:**
  - Once probable, assets/liabilities of spinnee → *reclassified as held for sale* / **distribution**
  - No gain/loss recognized on disposal.
  - Post-spinoff: parent shareholders hold shares in both entities.

## 14. Key Takeaways

- Impairments signal that prior depreciation/amortization may have been insufficient.
- IFRS allows reversal of impairment (except goodwill); GAAP generally prohibits.
- Impairment reduces asset values and net income but improves future profitability metrics.
- Held-for-sale assets are not depreciated; impairment reversals are allowed up to prior losses.
- Derecognition removes assets upon sale, abandonment, exchange, or spinoff, affecting income and investing cash flows.
- Analysts should assess impairment timing and motivation to detect earnings management.

## Module 35.3: Long-Term Asset Disclosures

**LOS 35.c:** Analyze and interpret financial statement disclosures regarding property, plant, and equipment (PP&E) and intangible assets.

### 1. Overview

- Financial statement disclosures on PP&E and intangibles help analysts:
  - Evaluate asset management efficiency.
  - Estimate average asset age, life, and replacement needs.
  - Compare depreciation/amortization policies across firms.
- Standards differ slightly between **IFRS** and **U.S. GAAP**, particularly in revaluation and future amortization disclosures.

### 2. IFRS Disclosure Requirements

**For each class of PP&E:**

- Basis of measurement (historical cost or revaluation).
- Depreciation method.
- Depreciation expense for the period.
- Useful lives or depreciation rates.
- Gross carrying amount and accumulated depreciation:

$$\text{Carrying Value} = \text{Gross PP\&E} - \text{Accumulated Depreciation}$$

- Reconciliation of carrying amounts (opening to closing balance).

**Additional IFRS PP&E disclosures:**

- Title restrictions or collateralized assets.
- Future purchase commitments.

**If using the Revaluation Model:**

- Revaluation date.
- Method of determining fair value.
- Carrying amount under cost model (for comparison).
- Revaluation surplus recognized in Other Comprehensive Income (OCI).

**For Intangible Assets:**

- Same disclosures as PP&E.

- Must specify whether useful lives are **finite** or **indefinite**.

**For Impaired Assets:**

- Amounts of impairment losses and reversals by asset class.
- Income statement location of losses/reversals.
- Circumstances causing impairments or recoveries.

### 3. U.S. GAAP Disclosure Requirements

**For PP&E:**

- Depreciation expense by period.
- Balances of major asset classes (e.g., land, buildings, machinery).
- Accumulated depreciation (by class or total).
- General description of depreciation methods.

**For Intangible Assets:**

- Similar to PP&E.
- Must disclose estimated **amortization expense for the next five years**.

**For Impaired Assets:**

- Description of impaired asset.
- Circumstances causing impairment.
- Method of determining fair value.
- Amount and income statement location of loss.

### 4. Presentation of Depreciation and Amortization

- **IFRS:**
  - If *nature-of-expense method* used → *shown explicitly on income statement*.
  - If *function-of-expense method* used → *included in COGS or SG&A*.
- **Cash Flow Presentation:**
  - Indirect method: shown as non-cash add-back to net income in CFO.
  - Direct method: excluded from CFO; disclosed in reconciliation (U.S. GAAP requires reconciliation in notes).
- **Investing Activities:**
  - Asset purchases = cash outflows.
  - Asset sales = cash inflows.

## 5. Analytical Ratios from Disclosures

### (a) Fixed Asset Turnover

$$\text{Fixed Asset Turnover} = \frac{\text{Revenue}}{\text{Average Net PP\&E}}$$

- Measures sales generated per dollar of PP&E.
- High ratio = efficient utilization of fixed assets.
- Declining ratio = potential overinvestment or aging assets.

**(b) Average Age, Total Useful Life, and Remaining Useful Life** Assuming straight-line depreciation and zero salvage value:

Metric	Formula
Average Age	$\frac{\text{Accumulated Depreciation}}{\text{Depreciation Expense}}$
Total Useful Life	$\frac{\text{Gross PP\&E}}{\text{Depreciation Expense}}$
Remaining Useful Life	$\frac{\text{Net PP\&E}}{\text{Depreciation Expense}}$

### Relationships:

$$\text{Remaining Life} = \text{Total Useful Life} - \text{Average Age}$$

## 6. Example: Estimating Asset Age and Life

Given:

$$\begin{aligned}\text{Gross PP\&E} &= \$3,000,000 \\ \text{Accumulated Depreciation} &= \$1,000,000 \\ \text{Depreciation Expense} &= \$500,000\end{aligned}$$

Metric	Formula	Result (Years)
Average Age	$1,000,000/500,000$	= 2
Total Useful Life	$3,000,000/500,000$	= 6
Remaining Life	2 subtracted from 6	= 4

### Interpretation:

- Assets are, on average, 2 years old.
- Expected useful life = 6 years  $\Rightarrow$  roughly one-third expired.
- Remaining useful life = 4 years.

## 7. Capital Expenditure vs. Depreciation Ratio

$$\text{CapEx-to-Depreciation Ratio} = \frac{\text{Capital Expenditures}}{\text{Depreciation Expense}}$$

- Indicates whether the firm is maintaining, expanding, or shrinking productive capacity.
- Ratio  $> 1 \rightarrow$  *Growth or replacement of capacity.*
- Ratio  $< 1 \rightarrow$  *Possible aging of assets, underinvestment.*

## 8. Comparative Summary: IFRS vs U.S. GAAP Disclosures

Aspect	IFRS	U.S. GAAP
PP&E Disclosure Details	Basis, methods, rates, gross/accumulated values, reconciliation	Expense by period, major classes, accumulated dep., methods
Revaluation Model	Allowed; requires date, method, fair value basis, surplus in OCI	Not allowed (cost model only)
Intangibles	Same as PP&E; specify finite vs indefinite life	Same as PP&E; include 5-year amortization forecast
Impairment Disclosure	Amounts, reversals, causes, locations in IS	Description, cause, fair value method, loss amount/location
Future Amortization Disclosure	Not required	Required (next 5 years)
Depreciation on Income Statement	Explicit (if nature method used)	Generally in COGS or SG&A
Cash Flow Reporting	Indirect: add-back noncash charges	Indirect: required reconciliation (footnote if direct method used)

## 9. Analytical Uses of Disclosure Data

- Assess efficiency (fixed asset turnover).
- Estimate average and remaining asset life to gauge reinvestment needs.
- Compare CapEx trends to depreciation for expansion signals.
- Identify potential impairment or obsolescence risks.
- Detect conservative vs aggressive accounting (e.g., high/low depreciation rates).

## 10. Key Takeaways

- IFRS provides more detailed reconciliation and revaluation disclosures.
- GAAP emphasizes future amortization and categorical asset breakdowns.
- Average age, useful life, and CapEx/depreciation ratios are key tools for analysts to:
  - Detect aging assets or expansion strategies.
  - Predict future capital needs and financing requirements.
- Both frameworks require impairment disclosures detailing causes, methods, and impacts.
- Footnote details often reveal hidden information about competitiveness, efficiency, and risk.

## Module 36.1: Leases

**LOS 36.a:** Explain the financial reporting of leases from the perspectives of lessors and lessees.

### 1. Overview

- A **lease** is a contractual agreement granting the right to use an asset for a specified period in exchange for periodic payments.
- **Lessee:** The party that uses the asset. **Lessor:** The party that owns the asset and receives payments.
- Leases are an alternative to purchasing an asset; they affect both the balance sheet and income statement depending on classification.

### 2. Requirements for a Contract to Be a Lease

A contract must:

1. Refer to a specific identifiable asset.
2. Convey substantially all economic benefits of use to the lessee.
3. Grant the lessee the right to control the use of the asset during the lease term.

### 3. Advantages of Leasing

- Lower initial cash outflow (vs. asset purchase).
- Potentially lower financing cost (asset acts as collateral).
- Reduced risk of obsolescence (lessor retains ownership risk).
- Flexibility in financing structure.



#### 4. Lease Classification Criteria (IFRS & U.S. GAAP)

A lease is classified as a **Finance Lease** (otherwise Operating Lease) if any of the following conditions apply:

1. Ownership transfers to lessee at lease end.
2. Lessee has a purchase option and is expected to exercise it.
3. Lease term covers most of the asset's useful life.
4. PV of lease payments  $\geq$  substantially all of the asset's fair value.
5. Asset is specialized, usable only by lessee.

#### 5. Lessee Accounting (IFRS & U.S. GAAP)

##### Recognition:

- At lease inception, record both:

$$\text{Right-of-Use (ROU) Asset} = \text{Lease Liability} = \text{PV of Lease Payments}$$

- Exceptions: short-term leases ( $\leq 12$  months) or low-value assets ( $\leq USD5,000$ ).

##### Balance Sheet Effects:

- ROU Asset (intangible) amortized over lease term.
- Lease Liability reduced by principal portion of payments.

##### Income Statement Effects:

- **Finance Lease:** Amortization expense + Interest expense (separate).
- **Operating Lease:** Combined lease expense = total lease payment (interest + amortization not shown separately).

##### Cash Flow Effects:

- Principal portion  $\rightarrow$  *Financing outflow*.
- Interest portion  $\rightarrow$  *IFRS : either Operating or Financing; GAAP : Operating*.

#### 6. Example: Lessee – Finance Lease (IFRS)

##### Data:

Lease Term = 4 years, Payment = 10,000 per year,  $i = 5\%$ .

##### PV of Lease Payments:

$$PV = 10,000 \times \frac{1 - (1 + 0.05)^{-4}}{0.05} = 35,460$$

##### Accounting:

- Record ROU Asset = Lease Liability = \$35,460.
- Amortization (straight-line):  $\$35,460 / 4 = \$8,865$  per year.

**Year 1 Lease Liability Amortization Schedule:**

Year	Opening Liability	Interest (5%)	Payment	Closing Liability
1	35,460	1,773	10,000	27,233
2	27,233	1,362	10,000	18,595
3	18,595	930	10,000	9,525
4	9,525	476	10,000	0

**Effects:**

- IS: Interest + Amortization =  $1,773 + 8,865 = 10,638$  (Year 1).
- BS: ROU Asset  $\downarrow$  \$8,865 per year; Liability  $\downarrow$  by principal paid.
- CF: \$8,227 financing outflow (principal); \$1,773 operating (interest under GAAP).

**7. Example: Lessee – Operating Lease (U.S. GAAP)**

Same data as above.

- Lease liability amortized as for finance lease.
- ROU Asset amortized to equal liability each year.
- Total lease expense = fixed \$10,000 per year (straight-line).
- CF: Entire \$10,000 as operating outflow.

**Comparison of Lessee Accounting:**

Aspect	Finance Lease	Operating Lease
Balance Sheet	ROU Asset + Lease Liability	Same, but ROU = Liability each period
Income Statement	Interest + Amortization (separate)	Combined single lease expense
Expense Pattern	Front-loaded (higher early years)	Even (straight-line)
Cash Flow	Principal $\rightarrow$ <i>Financing, Interest</i> $\rightarrow$ <i>CFO/Financing</i>	Entire payment $\rightarrow$ <i>CFO</i>
Impact on Ratios	Higher leverage, lower early NI, higher CFO	Lower leverage, higher early NI, lower CFO

## 8. Lessor Accounting (IFRS & GAAP)

**Two Types: Finance Lease and Operating Lease.**

**Finance Lease (Sales-Type / Direct Financing):**

- **At inception:**

- Remove leased asset from balance sheet.
- Record **Lease Receivable (Net Investment in Lease)**:

$$\text{PV of Lease Payments} + \text{PV of Residual Value}$$

- If manufacturer/dealer: recognize sales revenue and COGS (like a sale).
  - If finance company: defer any initial gain; recognize interest income over lease term.
- **During lease:** Recognize interest income via the effective interest method.
  - **Cash Flow:** Entire inflow as operating activity.

**Operating Lease:**

- Retain leased asset (PP&E); continue depreciation.
- Record lease payments as **rental income** on straight-line basis.
- CF: Entire payment classified as CFO inflow.

## 9. Example: Lessor – Finance Lease (Sales-Type)

**Data:**

Payments = 10,000 for 4 years,  $i = 5\%$ , Residual Value = 2,000, Carrying Value = 30,000.

$PV(\text{Lease Payments}) = 35,460$ ,  $PV(\text{Residual}) = 1,645$ , Net Investment = 37,105.

**Step 1 – Derecognition:**

- Revenue (Net Investment) =  $35,460 + 1,645 = \$37,105$ .
- Cost of Sales (Carrying Value) =  $\$30,000$ .
- Initial Profit =  $37,105 - 30,000 = \$7,105$ .

**Step 2 – Balance Sheet:**

$$\text{Lease Receivable} = 37,105 \text{ (PV of payments + residual)}$$

**Step 3 – Over Time:**

- Interest income recognized using effective interest method.
- Lease receivable reduced by cash collections.

## 10. Example: Lessor – Operating Lease

- Asset remains on balance sheet (PP&E).
- Depreciation expense recorded each year.
- Lease payments recognized as **rental income**.
- Cash inflows classified as CFO.

### Depreciation:

$$\text{Depreciation Expense} = \frac{(30,000 - 2,000)}{4} = 7,000$$

### Income Statement:

- Lease revenue = \$10,000 per year.
- Depreciation expense = \$7,000.
- Operating profit = \$3,000 per year.

## 11. Lessor Comparison Summary

Aspect	Finance Lease (Sales-Type / Direct Financing)	Operating Lease
Asset on Balance Sheet	Removed; replaced with lease receivable	Retained; depreciated normally
Revenue Recognition	Upfront (if dealer); interest income over term	Rental income recognized evenly
COGS	Recognized at inception (dealer)	None
Cash Flow Classification	All lease receipts $\rightarrow$ CFO	All lease receipts $\rightarrow$ CFO
Impact on Income	Front-loaded (sales profit + interest)	Straight-line income pattern

## 12. Short-Term and Low-Value Leases

- **IFRS:** Exemption for leases  $\leq$  12 months or asset value  $\leq$  \$5,000.
- **GAAP:** Exemption for leases  $\leq$  12 months.
- No ROU asset or liability recorded.
- Lease expense recognized straight-line over term.

### 13. Ratio and Analytical Implications

- **Finance Lease:**
  - Higher assets and liabilities  $\Rightarrow$  higher leverage ratios.
  - Lower net income early, higher later.
  - CFO higher (interest/principal split); total CF unchanged.
- **Operating Lease:**
  - Lower leverage and total assets.
  - Smoother expense pattern.
  - Lower CFO (entire payment in operations).
- Analysts should adjust for lease capitalization to improve comparability.

### 14. Key Takeaways

- Both IFRS and U.S. GAAP classify leases as **finance or operating**.
- Lessees recognize **ROU Asset + Lease Liability** for nearly all leases.
- Finance leases separate interest and amortization; operating leases combine them.
- Lessors classify leases as:
  - **Finance Lease:** Asset removed, lease receivable created.
  - **Operating Lease:** Asset retained and depreciated.
- Both methods yield the same total income over lease life; only timing differs.
- Both operating and finance leases increase leverage and should be included in debt analysis.

## Module 36.2: Deferred Compensation and Disclosures

**LOS 36.b:** Explain the financial reporting of defined contribution, defined benefit, and stock-based compensation plans.

**LOS 36.c:** Describe the financial statement presentation of and disclosures relating to long-term liabilities and share-based compensation.

### 1. Overview: Deferred Compensation

- Deferred compensation includes benefits earned in the current period but paid in the future.
- Common forms:
  - **Pensions** (defined contribution / defined benefit).
  - **Stock-based compensation** (grants, options, SARs).
- Accounting involves estimates of future variables: discount rate, turnover, mortality, compensation growth, etc.

## 2. Pension Plans Overview

Type	Defined Contribution (DC)	Defined Benefit (DB)
Definition	Employer contributes fixed amounts to employee account.	Employer promises periodic benefits after retirement.
Investment Risk	Employee bears risk.	Employer bears risk.
Employer Obligation	Limited to contributions.	Based on actuarial estimate of future payments.
Expense Recognition	Employer's contribution in period.	Service cost + Interest cost $\pm$ Remeasurements.
Balance Sheet Impact	No future liability after payment.	Net pension asset/liability = Plan assets – PV of obligation.

## 3. Defined Contribution Plan Accounting

- Expense = Employer contribution (recorded in income statement).
- Once paid, no further liability.
- Example: Employer contributes 5% of salaries; contribution recorded as:

$$\text{Pension Expense (IS)} = \text{Cash Outflow (CFO)}$$

## 4. Defined Benefit Plan Accounting

### Key Concept: Funded Status

$$\text{Funded Status} = \text{Fair Value of Plan Assets} - \text{Present Value of Pension Obligation}$$

- Overfunded  $\Rightarrow$  Net pension **asset**.
- Underfunded  $\Rightarrow$  Net pension **liability**.

### Components of Change in Funded Status (IFRS vs U.S. GAAP)

Component	IFRS Treatment	U.S. GAAP Treatment
1. Service Cost	Included in IS (current + past service).	Current service cost in IS; past service cost → OCI, amortized.
2. Interest Expense / Income	Net pension liability × discount rate.	Same.
3. Expected Return on Assets	Included implicitly via net interest rate.	Reported separately in IS (expected, not actual).
4. Actuarial Gains / Losses	OCI (remeasurements).	OCI (may be amortized over service life).
5. Past Service Cost	IS (immediate).	OCI (amortized).

### Under IFRS: Three Elements

1. **Service Cost** (current + past).
2. **Net Interest Expense/Income** = Discount rate × Net Pension Asset/Liability.
3. **Remeasurements** (actuarial gains/losses + asset return variance) → *OCI*.

### Under U.S. GAAP: Five Elements

1. Service cost.
2. Interest expense/income.
3. Expected return on plan assets.
4. Past service cost.
5. Actuarial gains and losses.

### Analytical Notes

- Pension liability behaves like **debt** (interest-bearing).
- Pension expense affects multiple accounts (COGS, SG&A, OCI).
- Analysts should assess pension plan funded status to gauge long-term solvency risk.

### 5. Example: Pension Funded Status Calculation

Fair Value of Assets = \$950,000

PV of Obligation = \$1,000,000

⇒ Funded Status = −\$50,000 (Underfunded)

Balance Sheet: Net Pension Liability \$50,000. Income Statement: Includes service cost and net interest expense. OCI: Includes remeasurement losses.

## 6. Share-Based Compensation

### Objectives:

- Align management's interests with shareholders.
- Motivate long-term performance.
- No immediate cash outflow but causes share dilution.

### Types:

- **Stock Grants** – Shares awarded directly, sometimes restricted.
- **Performance Shares** – Vesting conditional on achieving targets (e.g., ROE).
- **Employee Stock Options (ESOs)** – Rights to buy shares at preset price.
- **Stock Appreciation Rights (SARs)** – Cash equivalent of stock appreciation.

## 7. Accounting for Stock-Based Compensation

### At Grant Date:

- Measure **fair value**:
  - Stock grants: market price on grant date.
  - Options: option-pricing model (e.g., Black-Scholes, binomial).

### Over Vesting (Service) Period:

- Expense recognized in IS on a straight-line basis:

$$\text{Annual Expense} = \frac{\text{Fair Value at Grant}}{\text{Vesting Period}}$$

- Corresponding increase in equity (APIC / Share-Based Compensation Reserve).

### On Vesting or Exercise:

- Stock Grants: reclassify reserve to Common Stock and APIC.
- Stock Options: cash inflow (exercise price) + recycle equity reserve.
- SARs: cash outflow recognized when exercised (no dilution).



### Financial Statement Effects:

Effect	Stock Grants / Options	SARs / Phantom Stock
Income Statement	Expense over vesting period	Liability revalued, expense each period
Balance Sheet	Equity (APIC or reserve) ↑	Liability ↑ (fair value basis)
Cash Flow	None until exercise	Cash outflow at exercise
EPS Impact	Dilution due to new shares	None (no new shares issued)

### Analyst Note:

- IFRS and GAAP both require grant-date fair value measurement.
- Differences arise only in equity account naming and option valuation assumptions (e.g., volatility).

## 8. Lease Disclosures (IFRS 16)

### Lessee Disclosures:

- Carrying amount of ROU assets by class.
- Total cash outflows for leases.
- Interest expense on lease liabilities.
- Depreciation expense by asset class.
- Variable lease payments expensed during the period.
- Additions to ROU assets.
- Maturity analysis of lease liabilities (current vs long-term).
- Expenses for low-value or short-term leases.
- Qualitative disclosures:
  - Nature of leasing activities.
  - Future cash outflows (e.g., guarantees, covenants, sale-and-leaseback).

### Lessor Disclosures:

- **Finance Leases:**
  - Selling profit/loss on derecognition.
  - Finance income (interest) recognized.
  - Variable lease income.
  - Reconciliation of undiscounted payments to net investment.
  - Maturity analysis of lease receivables.

- **Operating Leases:**
  - Lease income (fixed + variable).
  - Maturity schedule of undiscounted future receipts.
  - Compliance with IAS 16 (PP&E) and IAS 36 (Impairment) disclosures.

## 9. Pension Disclosures (IAS 19)

### Defined Contribution Plans:

- Disclose employer contribution expense separately.

### Defined Benefit Plans:

- Describe plan nature, governance, regulation, and risk exposures.
- Reconcile opening and closing funded status:

$$\text{Funded Status}_t = \text{Plan Assets}_t - \text{PBO}_t$$

- Reconcile plan assets and defined benefit obligation (PBO).
- Provide sensitivity analysis for key actuarial assumptions (discount rate, mortality, salary growth).
- Disclose plan asset composition by type.
- Expected future contributions and maturity profile of obligations.

## 10. Share-Based Compensation Disclosures

- Describe nature of plan (grant date, vesting date, service period, settlement method).
- Explain valuation method (Black-Scholes, binomial, etc.) and assumptions (volatility, dividend yield, expected term).
- Disclose total expense impact on IS and balance sheet (APIC, reserves).
- Quantify outstanding and exercisable awards.
- Present dilution effect on EPS (basic and diluted).

## 11. Key Analytical Insights

- **Defined Benefit:** High actuarial sensitivity  $\rightarrow$  *equity volatility; treat under funded plans as debt*.
- **Stock-Based Compensation:** Non-cash expense but dilutive; analysts may adjust EV or EPS accordingly.

- **Disclosures:** Crucial for assessing off-balance obligations and employee-alignment incentives.
- **Analyst Adjustment:**
  - Add pension liabilities to debt in leverage ratios.
  - Include share-based compensation in adjusted operating expense or in total cost of equity capital.

## 12. Summary Table: Deferred Compensation Overview

Type	Expense Recognition	Balance Sheet Effect	Cash Flow Effect
Defined Contribution	Expense = Contribution	None (after payment)	CFO outflow in period
Defined Benefit	Service cost + interest $\pm$ OCI items	Net Pension Asset/Liability	CFO = contributions; no full match to expense
Stock Grants	Fair value expensed over vesting	APIC / Reserve $\uparrow$	No cash; equity dilution
Stock Options	Fair value expensed; APIC $\uparrow$	Equity $\uparrow$ ; reserve $\rightarrow$ <i>APIC on exercise</i>	Cash inflow = Exercise price
SARs / Phantom	FV-based liability remeasured each period	Liability $\uparrow$ (fair value)	Cash outflow at exercise

## 13. Key Takeaways

- Defined contribution = simple expense; defined benefit = actuarial complexity.
- Pension funded status (asset/liability) must be analyzed as quasi-debt.
- Stock-based compensation expensed over service period using grant-date fair value.
- Lease, pension, and share-based disclosures are essential for assessing future obligations and shareholder dilution.
- Analysts should adjust financial ratios to reflect off-balance obligations and fair-value equity costs.

## Module 37.1: Differences Between Accounting Profit and Taxable Income

**LOS 37.a:** Contrast accounting profit, taxable income, taxes payable, and income tax expense, and distinguish between temporary and permanent differences.

## 1. Overview

- Financial accounting (IFRS/US GAAP) and tax accounting often differ due to distinct objectives and timing.
- These differences cause income tax expense (in IS) to differ from taxes payable (in tax return).
- Key outcome: creation of **Deferred Tax Liabilities (DTL)** and **Deferred Tax Assets (DTA)**.

## 2. Key Terminology

Term	Definition (Accounting View)	Definition (Tax View)
Accounting Profit	Pretax financial income reported in financial statements.	–
Taxable Income	–	Income reported on the tax return; basis for tax computation.
Taxes Payable	–	Tax liability based on taxable income (current tax expense).
Income Tax Expense	Expense in income statement = current tax payable $\pm$ change in deferred tax.	–
Deferred Tax Liability (DTL)	Future tax payment expected when temporary differences reverse.	Caused by taxable temporary differences.
Deferred Tax Asset (DTA)	Future tax benefit expected from deductible temporary differences or loss carryforwards.	Results from taxes paid early or deductible expenses recognized later.
Valuation Allowance	Contra-account reducing DTA if not probable to be realized.	–
Tax Base	Net value of an asset or liability for tax purposes.	May differ from carrying value.
Carrying Value	Net book value on balance sheet (after depreciation/amortization).	–

## 3. Relationships Between Measures

$$\text{Tax Expense} = \text{Taxes Payable} + \Delta \text{DTL} - \Delta \text{DTA}$$

- Increase in DTL  $\Rightarrow$  increases tax expense (future outflow).
- Increase in DTA  $\Rightarrow$  decreases tax expense (future benefit).

#### 4. Temporary vs Permanent Differences

Type	Definition	Effect
Temporary Difference	Timing difference between accounting and tax recognition of income or expenses.	Reverses in future $\Rightarrow$ creates DTA or DTL.
Permanent Difference	Items recognized in accounting but never for tax (or vice versa).	Do not reverse $\Rightarrow$ no DTA/DTL; affects effective tax rate.

- **Examples of permanent differences:**

- Tax-exempt interest (e.g., municipal bond income)  $\rightarrow$  lower effective tax rate.
- Non-deductible expenses (e.g., fines, life-insurance premiums)  $\rightarrow$  higher effective tax rate.
- Tax credits  $\rightarrow$  directly reduce taxes payable.

#### 5. Deferred Tax Liabilities (DTLs)

- Created when:
  - Revenues are recognized earlier in accounting income than for tax.
  - Expenses are deductible earlier for tax than for accounting.
- Represent future **taxable temporary differences**.
- Expected to reverse  $\rightarrow$  *future cash outflows*.
- Common example: Accelerated tax depreciation vs. straight-line book depreciation.

**Example 1: Accelerated Depreciation Facts:** Asset cost \$30,000; useful life 6 yrs; straight-line (accounting), double-declining (tax).

$$\text{SL depreciation} = 30,000/6 = 5,000 \text{ per year.}$$

$$\text{DDB depreciation (Year 1)} = 30,000 \times 2/6 = 10,000.$$

**Result:**

- Tax depreciation  $\downarrow$  book depreciation in early years  $\Rightarrow$  taxable income lower  $\Rightarrow$  DTL created.
- In later years, reverses as book depreciation  $\downarrow$  tax depreciation.
- Total depreciation over life equal; only timing differs.

**Journal Logic:**

Year 1: Tax expense (IS)  $>$  Taxes payable (return)  $\Rightarrow$  DTL created.

Later: Taxes payable  $>$  Tax expense  $\Rightarrow$  DTL reversed.

## 6. Deferred Tax Assets (DTAs)

- Created when:
  - Revenue is taxed before it is recognized in accounting.
  - Expense is recognized in accounting before being deductible for tax.
  - Tax loss carryforwards exist.
- Represent future **deductible temporary differences**.
- Provide future tax savings (future reductions in tax payable).
- Typical causes:
  - Warranty or bad debt expense (recognized earlier in accounting).
  - Unearned revenue (taxed now, recognized later).
  - Post-employment benefits.
  - Tax loss carryforwards.

### Example 2: Warranty Expense

- Accounting recognizes estimated warranty expense now.
- Tax deduction allowed only when paid.
- $\Rightarrow$  Accounting expense earlier  $\rightarrow$  *taxes payable higher*  $\rightarrow$  *DTA created*.

## 7. Summary: Taxable vs Deductible Temporary Differences

Scenario	Timing Effect	Result
Tax dep. > Book dep.	Taxable income lower initially	DTL
Book dep. > Tax dep.	Taxable income higher initially	DTA
Revenue in IS before tax	Future taxable revenue	DTL
Revenue taxed before IS	Future deduction benefit	DTA
Expense deductible early	Future taxable income	DTL
Expense in IS before tax	Future deductible amount	DTA

## 8. Tax Expense vs Taxes Payable Relationship

$$\text{Tax Expense} = \text{Taxes Payable} + \Delta \text{DTL} - \Delta \text{DTA}$$

### Interpretation:

- If DTL increases  $\rightarrow$  *add to tax expense*.
- If DTA increases  $\rightarrow$  *subtract from tax expense*.

**Example 3:**

$$\begin{aligned}\text{Taxes Payable} &= \$10,000 \\ \Delta\text{DTL} &= +\$2,000 \\ \Delta\text{DTA} &= +\$500 \\ \Rightarrow \text{Tax Expense} &= 10,000 + 2,000 - 500 = 11,500\end{aligned}$$

## 9. Tax Loss Carryforwards and Valuation Allowances

- **Tax Loss Carryforward:** Past losses offset future taxable income; creates DTA.
- **Valuation Allowance:** If realization of DTA is unlikely, reduce DTA:

$$\text{Net DTA} = \text{Gross DTA} - \text{Valuation Allowance}$$

- Reduces both assets and equity; does not affect cash.

## 10. Changes in Enacted Tax Rate

- DTLs and DTAs must reflect the tax rate expected at reversal.
- When statutory rate changes:
  - Increase in tax rate  $\Rightarrow$  both DTA and DTL increase.
  - Decrease in tax rate  $\Rightarrow$  both decrease.
- Adjustment recognized through tax expense in current period.

**Example 4:**

$$\begin{aligned}\text{Existing DTL} &= \$4,000 \text{ at } 20\% \\ \text{New rate} &= 25\% \\ \Rightarrow \text{Revised DTL} &= 4,000 \times \frac{25}{20} = 5,000 \\ \text{Increase of } \$1,000 &\text{ recorded as tax expense.}\end{aligned}$$

## 11. Analytical Insights

- DTLs and DTAs stem from temporary timing differences; permanent differences affect only tax rate.
- DTLs represent expected future tax **outflows** (liabilities); DTAs represent expected **inflows/savings**.
- Analysts often treat DTLs as debt-like if reversal is probable and recurring.
- Deferred tax accounts are sensitive to changes in tax rates and assumptions.

## 12. Summary Table: Deferred Tax Overview

Aspect	Deferred Tax Liability (DTL)	Deferred Tax Asset (DTA)
Cause	Income tax expense > taxes payable	Taxes payable > income tax expense
Typical Case	Accelerated tax depreciation; revenue recognized earlier in IS	Warranty expense; bad debt allowance; unearned revenue; tax loss carryforward
Future Effect	Taxable temporary difference $\Rightarrow$ future outflow	Deductible temporary difference $\Rightarrow$ future benefit
Reversal Timing	In later years when taxable income rises	In later years when taxable income falls
Impact on IS	Increases tax expense in creation period	Reduces tax expense in creation period

## 13. Key Takeaways

- **Taxable Income**  $\rightarrow$  Basis for current tax payable.
- **Accounting Profit**  $\rightarrow$  Basis for financial reporting.
- Temporary differences create deferred taxes; permanent differences do not.
- Formula:

$$\text{Tax Expense} = \text{Taxes Payable} + \Delta \text{DTL} - \Delta \text{DTA}$$

- DTLs = future tax payments; DTAs = future tax savings.
- Changes in statutory tax rates revalue all deferred tax balances.
- Permanent differences affect effective tax rate but never reverse.

## Module 37.2: Deferred Tax Assets and Liabilities

**LOS 37.b:** Explain how deferred tax liabilities and assets are created and the factors that determine how a company's deferred tax liabilities and assets should be treated for financial analysis.

### 1. Overview

- Deferred tax assets (DTAs) and deferred tax liabilities (DTLs) arise from **temporary timing differences** between taxable income and accounting profit.
- For a difference to be temporary, the total amount recognized over the asset or liability's life must be the same in both the income statement and tax return—only the **timing** differs.
- These temporary differences cause future taxable or deductible amounts, leading to DTLs or DTAs respectively.



## 2. Example: Firebird Corporation (Depreciation and Warranties)

### Facts:

- Statutory tax rate: 30%.
- PP&E cost: \$40 million.
- Accounting depreciation: Straight-line over 5 years.
- Tax depreciation: Straight-line over 4 years.
- Warranty expense: 5 % of gross revenues.

### Observation:

- Depreciation  $\rightarrow$  *timing difference in asset*.
- Warranty provision  $\rightarrow$  *timing difference in liability*.
- No permanent differences.

## 3. Timing Difference 1: Depreciation (Tax Base vs Carrying Value)

- Accounting total depreciation: \$8 million per year for 5 years.
- Tax total depreciation: \$10 million per year for 4 years.
- Total depreciation (\$40 million) is the same—only timing differs.
- Early years: Tax depreciation  $\downarrow$  book  $\rightarrow$  *taxable income < accounting profit*  $\rightarrow$  *DTL created*.
- Later years: Timing reverses  $\rightarrow$  *DTL reverses*.

### Carrying vs Tax Base:

DTL arises when: Carrying Value of Asset > Tax Base of Asset.

$$\text{DTL} = (\text{Carrying Value} - \text{Tax Base}) \times \text{Tax Rate}$$

### Example: Year 1

$$\text{Carrying Value} = 40 - 8 = 32$$

$$\text{Tax Base} = 40 - 10 = 30$$

$$\text{Temporary Difference} = 2$$

$$\Rightarrow \text{DTL} = 2 \times 30\% = 0.6$$

### Interpretation:

- Firm paid less tax now (\$0.6 m less).
- Future tax payment expected  $\rightarrow$  *liability*.

#### 4. Timing Difference 2: Warranty Provision (Liability Side)

- Warranty expense estimated at 5 % of sales each year.
- Accounting: Expense recognized at sale  $\rightarrow$  *creates warranty liability*.
- Tax: Expense deductible only when actually incurred  $\rightarrow$  *tax return shows lower expense initially*.
- Therefore: Taxes payable  $\neq$  tax expense  $\rightarrow$  *DTA created*.

#### Tax Base of Liability:

Tax Base of Liability = Carrying Value – Amounts deductible in future.

- Since all future warranty costs will be deductible, tax base = 0.
- DTA arises because the entire liability will reduce taxable income later.

$$\text{DTA} = (\text{Carrying Value of Liability} - \text{Tax Base}) \times \text{Tax Rate}$$

#### Example:

$$\text{Warranty Liability} = 2.0 \Rightarrow \text{DTA} = 2.0 \times 30\% = 0.6$$

#### 5. Combined Tax Expense Computation

$$\text{Tax Expense} = \text{Taxes Payable} + \Delta \text{DTL} - \Delta \text{DTA}$$

- Depreciation difference  $\rightarrow$  *DTL increases  $\rightarrow$  add to tax expense*.
- Warranty difference  $\rightarrow$  *DTA increases  $\rightarrow$  subtract from tax expense*.

#### Example Summary Table:

Source	Treatment	Result
Depreciation (asset)	Higher tax dep. early years	DTL (future out-flow)
Warranty (liability)	Expense earlier for book	DTA (future benefit)

#### 6. Realizability of Deferred Tax Assets

- DTAs represent expected future tax savings—but realization depends on **future taxable income**.
- Neither DTLs nor DTAs are discounted to PV; they are recorded at statutory rates.
- Each reporting date: management must assess if DTAs are recoverable.

### IFRS Treatment:

- Reduce DTA directly if realization unlikely  $\rightarrow$  *increasetaxexpense*.

### U.S. GAAP Treatment:

- Maintain gross DTA but record a **valuation allowance** (contra account) for unrecoverable portion.
- **Creating or increasing valuation allowance**  $\Rightarrow$   $\uparrow$  tax expense,  $\downarrow$  net income.

$$\text{Net DTA} = \text{Gross DTA} - \text{Valuation Allowance}$$

### Analyst Notes:

- Persistent losses  $\rightarrow$  *likelyvaluationallowanceneeded*.
- Subjectivity in assessing future profitability  $\rightarrow$  *possibleearningsmanagement*.

## 7. Analytical Treatment of Deferred Taxes

- **If DTLs expected to reverse:** Treat as liabilities (future tax payments).
- **If DTLs not expected to reverse soon:** Treat as equity (adjust  $\downarrow$ DTL,  $\uparrow$ Equity).
- **Decision Rule:** Ask “When will the temporary difference reverse?”
- In high-growth firms with ongoing capex and accelerated tax depreciation, DTLs may never fully reverse.

### Analyst Adjustment:

$$\text{Adjusted Equity} = \text{Reported Equity} + \text{Non-Reversing Portion of DTL}$$

## 8. Analytical Examples

Scenario	Treatment	Reasoning
DTL from depreciation in mature firm	Treat as liability	Future tax payments
DTL in growing firm with continuous capex	Treat as equity	Perpetually renewed
DTA with low profitability history	Reduce DTA value	Realization uncertain
Large valuation allowance reversal	Earnings mgmt signal	Boosts income

## 9. Key Formulas

$$\text{DTL} = (\text{Carrying Value of Asset} - \text{Tax Base}) \times \text{Tax Rate}$$

$$\text{DTA} = (\text{Carrying Value of Liability} - \text{Tax Base}) \times \text{Tax Rate}$$

$$\text{Tax Expense} = \text{Taxes Payable} + \Delta\text{DTL} - \Delta\text{DTA}$$

## 10. Key Takeaways

- Temporary differences  $\rightarrow$  *DTLs(future tax outflows) or DTAs(future tax savings)*.
- Depreciation differences usually create DTLs; warranty and bad debt estimates create DTAs.
- DTAs require “more-likely-than-not” realizability test.
- IFRS reduces DTAs directly; GAAP uses valuation allowance.
- For analysis:
  - Reversing DTLs  $\rightarrow$  *treat as liabilities*.
  - Non-reversing DTLs  $\rightarrow$  *treat as equity*.
- Analysts must evaluate tax assumptions, profitability forecasts, and valuation allowances for earnings quality.

## Module 37.3: Tax Rates and Disclosures

**LOS 37.c:** Calculate, interpret, and contrast an issuer’s effective tax rate, statutory tax rate, and cash tax rate.

**LOS 37.d:** Analyze disclosures relating to deferred tax items and the effective tax rate reconciliation and explain their effects on a company’s financial statements and ratios.

### 1. Overview

- The **statutory tax rate** is the legally imposed corporate rate in the firm’s jurisdiction.
- The **effective tax rate (ETR)** is the rate implied by the income statement.
- The **cash tax rate (CTR)** shows the actual cash outflow for taxes relative to pretax income.
- Differences between these rates stem primarily from **permanent differences**, tax credits, foreign income rates, or tax holidays—not from temporary timing differences.

## 2. Key Tax Rate Formulas

$$\text{Effective Tax Rate (ETR)} = \frac{\text{Income Tax Expense}}{\text{Earnings Before Tax}}$$

$$\text{Cash Tax Rate (CTR)} = \frac{\text{Cash Taxes Paid}}{\text{Earnings Before Tax}}$$

$$\text{Statutory Tax Rate (STR)} = \text{Legal corporate rate of domicile}$$

- **ETR**  $\neq$  **STR** if permanent differences or multi-jurisdictional operations exist.
- **CTR**  $\neq$  **ETR** due to timing of cash flows (deferred taxes).

## 3. Causes of Differences Between Statutory and Effective Rates

Cause	Explanation	Effect on ETR
Different foreign tax rates	Subsidiaries under higher/lower rates	Raises or lowers ETR
Permanent differences	Tax-exempt income, non-deductible expenses, credits	Divergence from STR
Tax holidays / incentives	Exemption or reduction in certain jurisdictions	Temporarily lowers ETR
Changes in tax laws	Adjustments to rates or deductions	One-time ETR changes
Capital vs. operating income	Different treatment of gains or dividends	Distorts ETR comparison

## 4. Example: NDC – Effective Tax Rate Reconciliation

### Facts:

- NDC operates in U.S. and abroad.
- Reconciliation between statutory and effective tax rates is disclosed for 3 years.

### Analysis:

- ETR trended **upward** due to:
  - Higher state income tax component.
  - Reduced benefit from foreign income tax advantages.
  - Offset by one-off losses and special items.
- Volatility of “special items” and “other” categories reduces comparability and forecast reliability.

- Continuous items (foreign rates, permanent differences) are relevant for forward projections; sporadic ones (asset sales, holidays) should be excluded from normalized ETR estimates.

## 5. Analytical Use of Tax Rate Disclosures

- Footnote reconciliations help analysts:
  - Identify recurring vs. non-recurring drivers of tax expense.
  - Forecast sustainable after-tax earnings.
  - Adjust valuation models (e.g., DCF) with realistic effective rates.
- Persistent low ETR may signal tax optimization or structural advantages; temporary low ETR may indicate tax holidays.

## 6. Deferred Tax Item Disclosures (LOS 37.d)

**Purpose:** Explain sources of temporary differences generating DTAs and DTLs and show how changes affect income tax expense.

### Common Sources:

Item	Timing Difference	Result
Accelerated tax dep. vs. SL book	Tax dep. higher early	DTL (future out-flow)
Asset impairments	Deductible upon sale/disposal	DTA (future deduction)
Restructuring provisions	Expensed now, deductible when paid	DTA (future benefit)
Post-employment benefits	Recognized when earned, paid later	DTA
Unrealized gains on AFS securities	Taxed upon realization	DTL via OCI
Inventory (LIFO vs. FIFO)	Depends on jurisdiction	Possible DTL

### Disclosure Requirements:

- Components of **income tax expense**: – Current tax expense (taxes payable) – Deferred tax expense (change in DTL – change in DTA)
- **Detailed schedule** of DTAs, DTLs, valuation allowance, and changes during the year.

- **Tax loss carryforwards** and expiry dates.
- **Unrecognized DTLs** for undistributed earnings of subsidiaries/JVs.
- **Effective vs. statutory rate reconciliation.**

## 7. Example: WCCO Inc. – Deferred Tax Disclosure Analysis

### Facts:

- Income tax expense > taxes payable for last 3 years.
- DTA from international tax-loss carryforwards and employee benefits.
- DTL from PP&E (accelerated depreciation) and unrealized gains on AFS securities.
- Valuation allowance decreased by \$33 million in 20X5.

### Analysis:

- **Why expense > payable:** DTLs increased faster than DTAs  $\rightarrow$  *positive deferred tax expense.*
- **Valuation allowance reduction:**  $\rightarrow$  *Decreases deferred tax expense, increases net income.  $\rightarrow$  Signals improved outlook for future taxable income.*
- Analysts should verify whether management's optimism is justified; reversal of valuation allowances can be used for earnings management.

## 8. Income Tax Expense Relationship

$$\text{Income Tax Expense} = \text{Taxes Payable} + \Delta \text{DTL} - \Delta \text{DTA}$$

- When DTL  $\uparrow \rightarrow$  *tax expense*  $\uparrow$ .
- When DTA  $\uparrow \rightarrow$  *tax expense*  $\downarrow$ .
- Links income statement tax provision with cash flow and balance-sheet items.

## 9. Analytical Implications

- Persistent DTL growth  $\Rightarrow$  aggressive tax depreciation or capital expansion.
- Large DTAs  $\Rightarrow$  potential underutilized tax benefits; check valuation allowance.
- Declining ETR with stable operations  $\Rightarrow$  structural tax advantage.
- Large swings in ETR  $\Rightarrow$  one-offs or policy changes; normalize for forecasting.
- Deferred tax balances affect leverage and ROE: – Increasing DTLs boost equity if treated as quasi-equity. – Large valuation allowances depress net assets.

## 10. Key Takeaways

- **Statutory Rate (STR):** Legal corporate tax rate.
- **Effective Rate (ETR):** Income statement rate = Tax Expense / EBT.
- **Cash Rate (CTR):** Actual cash taxes / EBT (CFO perspective).
- Differences stem mainly from permanent differences, foreign rate variations, and tax holidays.
- Deferred tax disclosures explain future tax obligations and potential earnings adjustments.
- Analysts should:
  - Separate recurring vs. non-recurring tax items.
  - Evaluate valuation-allowance changes as signals of earnings quality.
  - Assess whether DTLs are reversing (liability) or perpetual (equity-like).

## Module 38.1: Reporting Quality

**LOS 38.a–f:** Compare financial reporting quality with the quality of reported results; describe the spectrum of reporting quality, conservative vs. aggressive accounting, managerial motivations, disciplining mechanisms, and presentation choices (including non-GAAP measures).

### 1. Financial Reporting Quality vs. Quality of Reported Results (LOS 38.a)

- **Financial Reporting Quality (FRQ):** Refers to the characteristics of financial statements themselves—primarily their compliance with GAAP, relevance, and faithful representation.
- **Quality of Reported Results (QRR):** Refers to the *sustainability, accuracy, and adequacy* of reported earnings, cash flows, and balance sheet items.
- **Key Point:** A firm can have high-quality reporting (GAAP-compliant, unbiased) but still low-quality results (unsustainable or inadequate earnings).

#### Decision Usefulness:

- **Relevance:** Information affects users' decisions and is material.
- **Faithful Representation:** Information is complete, neutral, and free from error.

#### Quality of Earnings:

- Depends on **sustainability** (recurrence) and **level** (adequacy).
- One-time or volatile sources (e.g., FX gains, asset sales) → low sustainability.



- Operational improvements → high sustainability.

Dimension	High Quality	Low Quality
Reporting	GAAP-compliant, relevant, neutral, error-free	Biased estimates, poor disclosure, misleading presentation
Earnings	Sustainable, sufficient, reflect ongoing operations	One-off, unsustainable, or inadequate to cover costs/investor return
Cash Flows	Stable, supported by earnings	Volatile, inconsistent with accruals
Balance Sheet	Realistic asset values, adequate provisions	Overstated assets, understated liabilities

## 2. Spectrum of Financial Reporting Quality (LOS 38.b)

Quality Spectrum:	Level	Characteristics	Implication
	1. Highest	GAAP-compliant, sustainable, adequate ROIC	Transparent, reliable
	2. Low earnings quality	Unsustainable or inadequate earnings	Watch for temporary performance
	3. Biased estimates	Distorted neutrality (aggressive accruals)	Requires adjustments
	4. Earnings management	Smoothing within GAAP	Volatility artificially reduced
	5. Non-GAAP activity	Reflects operations but breaks rules	Restatement risk
	6. Fraudulent	Misrepresentation or fabrication	No analytical value

**Key Insight:** Quality exists on a continuum — from **faithful representation and sustainability** → to **bias, manipulation, or fraud**.

## 3. Conservative vs. Aggressive Accounting (LOS 38.c)

- **Conservative Accounting:** Choices that reduce current-period earnings or asset values. → Future earnings likely to rise as prior deferrals reverse.
- **Aggressive Accounting:** Choices that boost current earnings or assets. → Future earnings will decline when overstatements correct.
- **Neutral Accounting:** Best quality — unbiased, faithfully represents economic activity.

### Earnings Smoothing:

- Managers alternate between conservative and aggressive choices to reduce volatility.
- **“Cookie jar reserves”**: Conservative estimates in good periods (higher liabilities) used later to boost earnings in weak periods.

### Examples (Figure 38.1):

Area	Aggressive Accounting	Conservative Accounting
Revenue Recognition	Early recognition; optimistic completion estimates	Delay until greater certainty
Expense Recognition	Capitalize expenses; reduce allowances	Immediate expensing; larger provisions
Inventory Valuation	Overstate future value; delay write-downs	Write down early when impaired
Estimates	Understate liabilities (warranties, pensions)	Overstate liabilities or reserve accounts
Presentation	Highlight positive metrics; obscure risks	Transparent, balanced disclosure

### GAAP-Induced Conservatism:

- Higher verification threshold for revenues than for expenses.
- Research costs expensed immediately (uncertain future benefit).
- Legal liabilities accrued when “probable,” but asset gains recognized only when realized.

### Analytical Implication:

- Conservatism  $\neq$  always “good” - can understate performance.
- Aggressiveness increases risk of restatements and volatility.

## 4. Motivations for Low-Quality Reporting (LOS 38.d)

### Primary Motivations:

- Meet or exceed benchmarks:
  - Prior guidance from management.
  - Analyst consensus expectations.
  - Prior-year earnings.

- Career incentives - enhance reputation, promotion prospects.
- Stock-based compensation - link to EPS or price performance.
- Avoid covenant violations (leverage, coverage ratios).
- Maintain credibility with investors, suppliers, and lenders.

### Behavioral Drivers of Misreporting (Fraud Triangle):

- **Motivation:** Pressure to achieve targets.
- **Opportunity:** Weak controls, poor oversight, flexible standards.
- **Rationalization:** Self-justification (e.g., “I’ll fix it next quarter.”)

### Conditions Conducive to Misreporting:

- Weak internal controls or ineffective board oversight.
- Wide discretion in accounting treatment under GAAP.
- Low enforcement penalties or lax auditing.

## 5. Mechanisms That Discipline Reporting Quality (LOS 38.e)

External Mechanisms:	Mechanism	Description	Limitations
	Regulatory oversight	SEC, FCA, ESMA, IOSCO	Limited resources; reactive
	Disclosure	Periodic reporting, management commentary	Can be biased; needs audit
	Independent audit	“reasonable assurance” of fair presentation	Client hires auditor; conflict risk
	Internal controls	Management assessment (e.g., SOX 404)	May fail under weak governance
	Legal enforcement	Fines, suspensions, criminal penalties	May not fully deter
	Private contracts	Covenants in lending/supplier agreements	Only protect specific parties

### Audit Opinion Types:

- **Unqualified (“Clean”):** Fairly presented under GAAP.
- **Qualified:** Material exceptions exist.

- **Adverse:** Misstatements pervasive.
- **Disclaimer:** Auditor cannot form an opinion.

**Key Note:** An unqualified opinion  $\neq$  guarantee of accuracy; provides only **reasonable assurance** based on tests.

## 6. Presentation Choices and Non-GAAP Measures (LOS 38.f)

### Purpose of Non-GAAP (or Non-IFRS) Measures:

- Firms adjust earnings to exclude “non-recurring” or “non-operating” items.
- Aim to show “core performance,” but often improve apparent profitability.

### Common Adjustments:

- Exclude restructuring costs, impairment losses, or non-cash items.
- Modify depreciation or stock-based compensation treatment.
- Remove FX effects or mark-to-market adjustments.

### Regulatory Requirements (U.S. SEC):

- Present the most comparable GAAP measure with equal prominence.
- Explain management’s rationale for the non-GAAP measure.
- Reconcile differences with GAAP.
- Disclose whether excluded items are likely to recur.

### IFRS Requirements:

- Define and explain relevance of non-IFRS measures.
- Provide reconciliation to IFRS-compliant measures.

### Analyst Cautions:

- Non-GAAP measures can obscure recurring costs or exaggerate profitability.
- Evaluate adjustments critically - are they truly non-recurring?
- Compare reconciliations year-over-year for consistency.

## 7. Analytical Summary Table

Dimension	High-Quality Reporting	Low-Quality Reporting
Compliance	Fully GAAP/IFRS-compliant	Non-compliant or partially compliant
Decision Usefulness	Relevant, faithfully represented, neutral	Misleading, incomplete, biased
Earnings Quality	Sustainable, adequate level, recurring sources	One-time, unsustainable, or overstated
Accounting Bias	Neutral	Aggressive or conservative bias distorting neutrality
Motivation	Transparent reporting for investor understanding	Meet targets, conceal weakness, avoid covenants
Discipline	Strong regulatory, audit, internal control environment	Weak governance, limited oversight
Presentation	Clear, GAAP-comparable, reconciled	Non-GAAP emphasis, selective disclosure

## 8. Key Takeaways

- **High-Quality Reporting:** GAAP-compliant, relevant, neutral, decision-useful.
- **High-Quality Earnings:** Sustainable, adequate, supported by cash flows.
- **Aggressive vs. Conservative:** Bias affects timing of recognition; neutrality preferred.
- **Low-Quality Reporting Drivers:** Incentives, weak controls, rationalization.
- **Enforcement:** Auditors, regulators, and private contracts impose discipline but not perfection.
- **Non-GAAP Measures:** Require reconciliation and transparency; analysts must adjust for bias.

## Module 38.2: Accounting Choices and Estimates

**LOS 38.g:** Describe accounting methods (choices and estimates) that could be used to manage earnings, cash flow, and balance sheet items.

### 1. Overview

- Management has discretion within GAAP/IFRS to choose among accounting methods and estimates.
- These choices affect the **timing, magnitude, and classification** of reported earnings, cash flows, and assets/liabilities.

- Earnings management often exploits flexibility in:
  - Revenue recognition timing.
  - Expense recognition (allowances, depreciation, amortization).
  - Classification between operating/investing cash flows.
- Such actions may be GAAP-compliant yet reduce financial reporting quality.

## 2. Revenue Recognition Choices

### Key Mechanisms:

- **FOB Shipping Point vs. Destination:** – Revenue recognized when goods leave seller (FOB shipping) → earlier recognition. – Revenue recognized upon customer receipt (FOB destination) → later recognition.
- **Channel Stuffing:** Ship excess goods to distributors to inflate current-period revenue. → Future revenues fall as pipeline is cleared.
- **Bill-and-Hold:** Customer billed but goods not yet delivered. – Used legitimately when customer requests delayed delivery. – Fictitious bill-and-hold = premature revenue recognition.
- **Discounts/Financing:** Temporary incentives accelerate orders to meet earnings targets.

### Analyst Warning:

- Examine revenue growth vs. receivables and inventory.
- Sharp increase in receivables with stable sales may signal premature recognition.

Method	Effect on Earnings	Effect on Future Periods
FOB Shipping Point	Recognize earlier → higher current revenue	Lower next-period revenue
FOB Destination	Recognize later → deferred revenue	Higher next-period revenue
Channel Stuffing	Inflates current sales artificially	Future sales fall; potential returns increase
Bill-and-Hold	Records sales before delivery	Lowers later revenue when goods finally shipped

## 3. Estimates of Credit Losses and Warranty Reserves

### Bad-Debt Allowance:

- **Lower allowance** → ↓ expenses, ↑ income, ↑ net receivables.
- **Higher allowance** → ↑ expenses, ↓ income, ↓ receivables.
- Used to smooth earnings (“cookie jar” reserves). – High-earnings years: increase reserve. – Low-earnings years: decrease reserve to boost profit.

### Warranty Reserve:

- Similar mechanics to bad-debt estimates.
- $\downarrow$  Estimated warranty expense  $\rightarrow \uparrow$  earnings now, but risk of future losses.
- $\uparrow$  Estimate  $\rightarrow \downarrow$  current income, more conservative.

**Analytical Signal:** Check trend of allowances vs. sales or receivables; abrupt changes indicate potential manipulation.

### 4. Valuation Allowance (Deferred Tax Assets)

- A **valuation allowance** reduces DTAs to reflect likelihood of realization.
- **Increase allowance**  $\rightarrow \downarrow$  DTA,  $\downarrow$  net income (conservative).
- **Decrease allowance**  $\rightarrow \uparrow$  DTA,  $\uparrow$  net income (aggressive).
- Can be used to smooth income across periods.

$$\text{Net DTA} = \text{Gross DTA} - \text{Valuation Allowance}$$

### Example:

- 2024: Increase allowance  $\rightarrow$  recognize tax expense  $\rightarrow \downarrow$  income.
- 2025: Decrease allowance  $\rightarrow$  recognize tax benefit  $\rightarrow \uparrow$  income.

### 5. Depreciation Methods and Estimates

#### Depreciation Choice:

- **Accelerated methods** (DDB, SYD)  $\rightarrow$  higher early-year expense, lower income initially.
- **Straight-line**  $\rightarrow$  stable expense, smoother earnings.

#### Key Estimates:

- **Useful life:** Longer life  $\rightarrow \downarrow$  depreciation,  $\uparrow$  income early.
- **Salvage value:** Higher salvage  $\rightarrow \downarrow$  expense,  $\uparrow$  asset value.
- Misestimated salvage  $\rightarrow$  gain/loss on sale at disposal.

### Analytical Effect:

Choice	Short-Term Effect	Long-Term Effect
Accelerated depreciation	↓ earnings, ↓ assets	↑ future earnings as expense declines
Longer useful life	↑ earnings now	↓ later as remaining life shortened
Higher salvage value	↑ current earnings	↓ future gains when asset sold below value

## 6. Amortization and Impairment

- Amortization of intangibles parallels depreciation mechanics.
- Goodwill **not amortized** — tested for impairment annually.
- **Ignoring or delaying impairment** → ↑ current earnings, overstated assets.
- **Timely recognition** → ↓ income now, but more faithful reporting.

**Analytical Tip:** Watch for firms with goodwill  $\downarrow$  30

## 7. Inventory Cost Flow Assumptions

### Choice Impact (Rising Prices):

Method	Income Statement Effects	Balance Sheet Effects
FIFO	Lower COGS → ↑ gross profit, ↑ NI	Ending inventory closer to current cost (↑ value)
Weighted-Average	Higher COGS → ↓ profit	Lower inventory valuation

**Choice Impact (Falling Prices):** Effects reverse — FIFO produces lower income and inventory.

### Information Quality:

- FIFO → more relevant balance sheet (current prices).
- Weighted-average → more relevant income statement (current COGS).

### Analytical Focus:

- Transparency of disclosure regarding inventory method.
- Adjust comparables to consistent method (e.g., LIFO reserve adjustment).



## 8. Related-Party Transactions

- If management controls both buyer and seller entities, transfer prices can shift earnings.
- Overpricing supplies  $\rightarrow$   $\downarrow$  public-firm earnings; underpricing  $\rightarrow$   $\uparrow$  earnings.
- Must review footnotes for related-party disclosures under IAS 24 or ASC 850.

## 9. Capitalization Choices

### General Rule:

- Capitalizing expenditures defers expense recognition, creating an asset.
- Example: Capitalize \$1.5 m marketing cost over 3 yrs  $\rightarrow$  current expense \$0.5 m (instead of \$1.5 m).
- Immediate effect:  $\uparrow$  current earnings,  $\uparrow$  assets; future periods bear amortization expense.

### Cash Flow Reclassification:

- Expense  $\rightarrow$  Operating outflow.
- Capitalization  $\rightarrow$  Investing outflow  $\rightarrow$  increases CFO.

### Analytical Implication:

- Review ratio of capitalized costs to total assets or R&D to detect earnings management.
- Over-capitalization inflates asset base and margins.

## 10. Cash Flow Classification Management

### Stretching Payables:

- Delay payments to suppliers  $\rightarrow$  temporarily boosts CFO.
- No immediate earnings impact but reverses next period.

### Capitalized Interest:

- Interest cost added to asset  $\rightarrow$  reduces current CFS from investing, raises CFO.
- Expense spread via depreciation  $\rightarrow$  defers cost.

### IFRS Flexibility:

- IFRS allows classification of interest/dividends as CFO or CFI/CFF.
- Management can choose categories to improve reported CFO.

Technique	Effect on CFO	Analyst Adjustment
Stretch payables	Increases temporarily	Normalize by adjusting for delayed out-flows
Capitalize interest	Increases CFO (shifts to investing)	Reclassify to CFO for comparability
IFRS reclassification (interest/dividends)	Choice can raise or lower CFO	Ensure consistent treatment across firms

## 11. Analytical Summary

Area	Aggressive Choice	Conservative Choice
Revenue	Early recognition, channel stuffing	Defer until delivery/collection
Receivables / Reserves	Reduce allowances ( $\uparrow$ NI)	Increase allowances ( $\downarrow$ NI)
Valuation Allowance (DTA)	Decrease allowance ( $\uparrow$ NI)	Increase allowance ( $\downarrow$ NI)
Depreciation	Straight-line, long life, high salvage	Accelerated, short life, low salvage
Intangibles	Delay impairment, minimal amortization	Timely impairment recognition
Inventory	FIFO in rising prices ( $\uparrow$ NI)	Weighted-avg or LIFO ( $\downarrow$ NI)
Capitalization	Capitalize R&D or marketing costs	Expense immediately
Cash Flow Classification	Capitalize interest / stretch payables	Consistent classification

## 12. Key Takeaways

- Accounting discretion allows timing shifts that affect reported performance without changing cash economics.
- Analysts must:
  - Compare policies to peers and historical patterns.
  - Adjust for changes in estimates (e.g., useful life, allowances).
  - Focus on sustainable cash flows, not temporary accruals.
- Warning signs: rising receivables, declining CFO/NI ratio, frequent policy changes, or large non-cash gains.

## Module 38.3: Warning Signs

**LOS 38.h:** Describe accounting warning signs and methods for detecting manipulation of information in financial reports.

### 1. Overview

- The presence of one or more warning signs does not prove manipulation or fraud, but it **requires deeper analysis**.
- Patterns inconsistent with economic reality, industry norms, or peer behavior may signal **earnings management or accounting distortion**.
- Analysts must investigate **changes in estimates, accounting policies, and cash flow mismatches**.

#### Common Manipulation Objectives:

- Inflate revenue to meet earnings targets.
- Delay expense recognition to boost profit.
- Capitalize costs to enhance asset values.
- Smooth income to reduce perceived volatility.

### 2. Revenue Recognition Warning Signs

#### Key Red Flags:

- Frequent or unexplained **changes in revenue recognition methods**.
- Use of **bill-and-hold** or **barter** transactions (nonstandard recognition practices).
- Aggressive use of **rebate programs** requiring subjective estimation of rebate impact.
- Lack of transparency in multi-element sales (bundled goods/services).
- Revenue growth significantly outpacing industry peers.
- **Receivables turnover** declining over several periods.
- Decreasing **total asset turnover**, especially after acquisitions.
- Inclusion of **nonoperating or one-time sales** in revenue.

<b>Warning Sign</b>	<b>Possible Manipulation</b>	<b>Analyst Detection</b>
Change in revenue policy	Timing shift in recognition	Compare to prior year notes and footnotes
Bill-and-hold transactions	Premature revenue recognition	Inspect delivery terms and customer acceptance clauses
Channel stuffing or rebates	Inflated current sales	Check receivables growth vs. sales
Revenue $\downarrow$ peer growth	Overstatement of revenue	Compare with industry sales and macro demand
Falling receivable turnover	Delayed collections / fake sales	Review aging schedules, DSO trends

#### **Analyst Focus:**

- Review consistency between **sales growth, receivables, and cash flow**.
- Persistent divergence between revenue and CFO  $\rightarrow$  potential manipulation.

### **3. Inventory and Cost Recognition Warning Signs**

#### **Indicators:**

- Declining **inventory turnover** (COGS / average inventory).  $\rightarrow$  May indicate obsolete inventory, overproduction, or inflated asset value.
- **LIFO liquidation** (U.S. GAAP only): Drawing down old, low-cost layers to reduce COGS and inflate profit.
- Inventory buildup without corresponding sales growth.

<b>Warning Sign</b>	<b>Effect</b>	<b>Analyst Response</b>
Falling inventory turnover	Possible overstatement of assets	Compare inventory growth vs. sales growth
LIFO liquidation	Artificial boost to earnings	Adjust for nonrecurring gain in analysis
Inventory buildup	Channel stuffing / weak demand	Check write-downs or obsolescence provisions

### **4. Capitalization Policies**

- Capitalizing costs not typically capitalized by peers inflates assets and defers expense recognition.
- Examples: advertising, startup, training, or routine maintenance costs.
- Review footnotes and compare capitalization policies with industry norms.

### Analyst Test:

- Calculate **capitalized costs / total assets** and **CFO/NI ratio**.
- A rising asset base without matching cash flows indicates possible capitalization bias.

## 5. Relationship Between Revenue and Cash Flow

- Ratio of **CFO to Net Income** persistently  $< 1$  or declining over time  $\rightarrow$  red flag. Indicates accrual-based revenue not supported by cash receipts.

$\text{CFO} / \text{Net Income} < 1 \Rightarrow \text{Possible Aggressive Accrual Accounting}$

Observation	Interpretation	Analytical Check
CFO $<$ NI over several years	Overstated accruals or early revenue	Compare CFO/NI ratio, track AR trends
CFO volatility $>$ NI volatility	Real cash cycles fluctuate more than reported income	Analyze changes in working capital

## 6. Other Common Warning Signs

### Accounting Estimates and Policies:

- Depreciation methods or useful lives differ significantly from industry norms.
- Estimated salvage values unusually high  $\rightarrow$  lower depreciation.
- Changes in estimates without clear rationale.

### Earnings Patterns:

- Unusual fourth-quarter patterns — “big bath” or “earnings smoothing.”
- Frequent one-time charges labeled “nonrecurring” but recurring annually.
- Inconsistent profit seasonality vs. revenue patterns.

### Related-Party Transactions:

- Deals with affiliates controlled by management can shift income.
- Often priced non-arm’s-length to manipulate reported results.
- Must review **IAS 24 / ASC 850 disclosures**.

### Profitability Ratios:

- Gross or operating margins significantly higher than industry averages. → Could reflect misclassification or underreported expenses.

### Disclosure Quality:

- Minimal detail in financial statements.
- Heavy reliance on non-GAAP metrics, or aggressive use of “adjusted EBITDA.”
- Overemphasis on positive trends, little discussion of risks.

Category	Warning Indicator	Analyst Action
Estimates	Changes in depreciation life or salvage value	Compare with peers, compute depreciation rate
Earnings pattern	Repeated “nonrecurring” charges	Adjust normalized earnings
Related-party	Transactions with affiliates	Evaluate economic substance and pricing
Margins	Unusually high vs. peers	Review SG&A, COGS allocation, reclassifications
Disclosure	Minimal transparency, excessive non-GAAP use	Cross-check with audited filings

## 7. Growth Through Acquisition

### Manipulation Opportunities:

- Purchase price allocation allows flexibility in valuing acquired assets and goodwill.
- Creates future leeway for amortization and impairment adjustments.
- Restructuring reserves can be used as “cookie jar” for future periods.

### Analyst Caution:

- Compare pre- and post-acquisition margins and depreciation/amortization patterns.
- Reassess goodwill and intangible asset growth relative to sales.

## 8. Restructuring and Impairment Adjustments

### Typical Pattern:

- Large one-time restructuring charges recognized in “bad” years → improve future earnings comparability.
- Analysts should restate prior periods to reflect more realistic historical expenses.

### Analytical Approach:

- Spread restructuring costs or impairments across prior years to normalize trend.
- Avoid interpreting big bath write-downs as “positive resets.”

## 9. Practical Analyst Checklist

- Compare growth in **revenue vs. receivables vs. CFO**.
- Examine inventory and asset turnover trends.
- Track recurring “special” or “one-time” items.
- Compare accounting estimates (lives, salvage, allowances) to industry norms.
- Review related-party disclosures and audit opinions.
- Adjust for large acquisitions, restructurings, or policy changes.
- Compute key ratios:

CFO/NI, Inventory Turnover, Receivable Turnover, Gross Margin vs. Peers.

## 10. Key Takeaways

- Warning signs **do not confirm fraud** but demand deeper forensic review.
- Persistent discrepancies among revenue, receivables, and cash flows are strong red flags.
- Analysts should benchmark accounting choices against peers and monitor disclosure consistency.
- Frequent “nonrecurring” adjustments and acquisitions often mask earnings volatility.
- Adjust historical earnings to reflect economic rather than reported performance for fair valuation.

## Module 39.1: Introduction to Financial Ratios

**LOS 39.a:** Describe tools and techniques used in financial analysis, including their uses and limitations.

### 1. Overview of Analytical Tools

- Financial analysis converts accounting data into decision-useful information.
- Techniques help identify trends, relationships, and anomalies — but must be interpreted contextually.

- Core analytical methods:
  - **Ratio Analysis**
  - **Common-Size Analysis** (vertical and horizontal)
  - **Graphical Analysis**
  - **Regression Analysis**
- These tools correspond to **Step 3** of the financial analysis framework:

“Adjust financial statements, compute ratios, and prepare exhibits.”

## 2. Ratio Analysis

### Purpose and Usefulness:

- Expresses relationships among financial variables.
- Provides quick insight into performance, efficiency, liquidity, solvency, and profitability.
- Useful for:
  - Projecting future earnings and cash flows.
  - Assessing flexibility (ability to meet obligations under stress).
  - Evaluating management performance.
  - Comparing firm and industry trends.
  - Benchmarking against peers and historical results.

### Analyst Objective:

- Ratios raise questions rather than provide final answers.
- Must be interpreted together — no single ratio suffices.

Analytical Goal	Related Ratio Type	Interpretation Focus
Profitability	Net margin, ROA, ROE	Earnings generation vs. resources used
Liquidity	Current, Quick, Cash ratios	Short-term solvency
Leverage	Debt-to-assets, Debt-to-equity	Long-term solvency and capital structure
Efficiency	Inventory turnover, Receivable turnover	Asset utilization effectiveness
Valuation	P/E, EV/EBITDA, P/B	Market perception and expectations



### Limitations:

- Ratios are meaningless in isolation — require benchmarking.
- Accounting methods differ (e.g., IFRS vs. U.S. GAAP → inconsistent comparability).
- Conglomerates complicate peer comparison (multi-industry operations).
- Ratios vary across industries — what’s “strong” in one sector may be “weak” in another.
- Definitions differ across analysts (e.g., “debt” may or may not include leases).
- Requires contextual analysis:
  - Prior-period trends.
  - Business cycle stage.
  - Company strategy and expectations.

### Analytical Tip:

- Consistency of calculation method is crucial.
- Always specify formula and inputs (e.g., average vs. ending balances).

## 3. Common-Size Analysis

### Purpose:

- Standardizes financial statements for comparison across time or peers.
- Removes size effect — ideal for multi-period and cross-sectional analysis.

### Types:

#### • Vertical Common-Size Statements:

- Express each item as a % of a key total.
- **Balance Sheet:** Each item  $\div$  Total Assets.

$$\text{Common-size BS ratio} = \frac{\text{Balance Sheet Item}}{\text{Total Assets}}$$

- **Income Statement:** Each item  $\div$  Sales.

$$\text{Common-size IS ratio} = \frac{\text{Income Statement Item}}{\text{Sales}}$$

#### • Horizontal Common-Size Statements:

- Express each item relative to a base-year value (set = 1.0).
- Useful for trend and growth analysis over multiple periods.

Type	Divisor / Base	Analytical Use
Vertical BS	Total Assets	Capital structure, liquidity mix
Vertical IS	Sales (Revenue)	Margin structure, cost efficiency
Horizontal BS/IS	First-year values (index = 1.0)	Trend growth and volatility

#### Advantages:

- Facilitates identification of cost drivers and margin trends.
- Enables structural comparison (e.g., asset mix, leverage composition).
- Reveals operating leverage through relative expense movement.

#### Example Interpretation:

- Suppose net profit margin rises from 7%  $\rightarrow$  12%.  $\rightarrow$  Analyst investigates whether this stems from:
  - Lower amortization (noncash  $\rightarrow$  temporary effect).
  - Lower interest expense (improved capital efficiency).
  - Permanent operational gains vs. one-time savings.
- Common-size analysis identifies areas to **investigate further** — not final conclusions.

#### Analyst Caution:

- Presentation format can differ — some show latest year leftmost (as in CFA examples).
- Always check which year is the “base” for horizontal statements.

## 4. Graphical Analysis

#### Purpose:

- Visualizes relationships and time trends for easier pattern recognition.
- Useful for presentations and quick diagnostics.

#### Common Formats:

- **Stacked Column (Bar) Graph:** – Shows composition (e.g., asset categories) over multiple years. – Reveals shifts in structure (e.g., rise in payables, fall in cash).
- **Line Graph:** – Tracks item trends (e.g., revenue, margins, leverage ratios). – Highlights anomalies (e.g., diverging growth between assets and sales).

### Example Interpretation:

- Rising trade payables and declining cash → possible liquidity issues.
- Rapid growth in receivables vs. flat sales → possible aggressive revenue recognition.

Graph Type	Best For	Analyst Insight
Stacked Bar	Composition over time	Balance sheet structure shifts
Line Graph	Trend analysis	Growth, seasonality, or volatility patterns
Pie Chart	Cross-sectional composition	Segment contribution to total

## 5. Regression Analysis

### Purpose:

- Quantitative tool linking dependent (e.g., sales) and independent variables (e.g., GDP, advertising).
- Used for **forecasting and scenario analysis**.

$$\text{Sales}_t = \alpha + \beta \times \text{GDP}_t + \varepsilon_t$$

### Analytical Application:

- Identify drivers of performance (macroeconomic sensitivity).
- Forecast future metrics (e.g., revenues, margins, default probabilities).
- Evaluate consistency of management forecasts.

### Limitations:

- Correlation ≠ causation.
- Historical relationships may not persist.
- Sensitive to outliers and structural breaks (e.g., pandemic, crisis).

## 6. Comparative Overview of Analytical Tools

Tool	Primary Use	Limitation / Risk
Ratio Analysis	Quick diagnostics, cross-firm comparison	Accounting differences, context dependency
Common-Size Analysis	Normalized structure, cost trend detection	No insight into absolute scale or cash flows
Graphical Analysis	Visualization of trends	Potential for oversimplification
Regression Analysis	Forecasting relationships	Model risk, multicollinearity, data sensitivity

## 7. Analytical Insights for Interpretation

- Always interpret ratios and common-size trends together:

E.g., Rising ROE but falling CFO/NII → possible accrual-based boost.

- Combine horizontal trends (growth) with vertical proportions (structure).
- Investigate anomalies:
  - Decline in gross margin with stable sales → cost inflation or product mix change.
  - Decrease in total asset turnover → inefficient asset use or overinvestment.
- Verify if improvements are operational (sustainable) or accounting-based (temporary).

## 8. Key Takeaways

- **Ratio analysis** provides relationships but requires context.
- **Common-size analysis** standardizes data for comparability.
- **Graphical tools** reveal trends intuitively.
- **Regression analysis** quantifies predictive relationships.
- Always evaluate results within:
  - Historical trend.
  - Peer and industry context.
  - Business cycle phase.
- No single ratio or exhibit explains performance — use a holistic analytical framework.

## Module 39.2: Financial Ratios, Part 1

**LOS 39.b:** Calculate and interpret activity, liquidity, solvency, and profitability ratios.

### 1. Overview

- Financial ratios are grouped by the type of insight they provide:
  - **Activity ratios (Asset utilization ratios)** – efficiency of asset management.
  - **Liquidity ratios** – ability to meet short-term obligations.
  - **Solvency ratios** – long-term leverage and financial stability.
  - **Profitability ratios** – ability to generate profits from sales and assets.

- Categories overlap: e.g., Payables turnover is both an activity and liquidity indicator.
- Always compare ratios against industry peers, historical trends, and strategic context.

## 2. Activity Ratios (Asset Utilization or Operating Efficiency)

### Purpose:

- Evaluate how efficiently a firm uses its assets to generate sales and revenue.
- High turnover ratios imply greater efficiency—but may also signal under-investment in assets.
- Use **average balances** (beginning + ending)/2 for balance sheet items to smooth seasonality.

### Key Ratios and Interpretations:

- **Receivables Turnover:**  $\frac{\text{Net Credit Sales}}{\text{Average Accounts Receivable}} \rightarrow \text{High} = \text{efficient collection or strict credit terms; Low} = \text{poor collections or loose credit.}$
- **Days Sales Outstanding (DSO):**  $\frac{365}{\text{Receivables Turnover}} \rightarrow \text{Average days to collect cash; Lower} = \text{better liquidity; Higher} = \text{potential credit risk.}$
- **Inventory Turnover:**  $\frac{\text{COGS}}{\text{Average Inventory}} \rightarrow \text{High} = \text{efficient inventory use or low stock; Low} = \text{obsolete or slow-moving inventory.}$
- **Days Inventory on Hand (DOH):**  $\frac{365}{\text{Inventory Turnover}} \rightarrow \text{Shorter} = \text{efficient management; too short} = \text{risk of stockouts.}$
- **Payables Turnover:**  $\frac{\text{Purchases}}{\text{Average Accounts Payable}}$  where  $\text{Purchases} = \text{COGS} + \text{Ending Inventory} - \text{Beginning Inventory}$ .  $\rightarrow \text{High} = \text{paying too quickly or missing credit terms; Low} = \text{taking longer to pay or cash strain.}$
- **Days Payables Outstanding (DPO):**  $\frac{365}{\text{Payables Turnover}} \rightarrow \text{Long} = \text{good supplier terms or delayed payments; Short} = \text{not using credit fully.}$
- **Total Asset Turnover:**  $\frac{\text{Revenue}}{\text{Average Total Assets}} \rightarrow \text{Overall efficiency; High} = \text{good utilization; Low} = \text{excess or idle assets.}$
- **Fixed Asset Turnover:**  $\frac{\text{Revenue}}{\text{Average Net Fixed Assets}} \rightarrow \text{Low} = \text{underused or new assets; Very high} = \text{aging or over-stressed capacity.}$

- **Working Capital Turnover:**  $\frac{\text{Revenue}}{\text{Average Working Capital}}$  where Working Capital = Current Assets – Current Liabilities. → High = efficient operations but may reflect low working capital.

### Analytical Relationships:

Operating Cycle = DSO+DOH,      Cash Conversion Cycle (CCC) = DSO+DOH–DPO

- Shorter CCC = faster cash recovery and stronger liquidity.
- Negative CCC (e.g., supermarkets) = collect cash before paying suppliers.

### Analyst Notes:

- Declining turnover ratios → inefficient operations or over-investment in assets.
- Compare all ratios against peers and over time for consistency.
- Integrate findings with liquidity ratios to evaluate working-capital management.

## 3. Liquidity Ratios

### Purpose:

- Assess short-term solvency—ability to meet obligations with current assets.
- Focus on availability, speed, and reliability of cash conversion.

### Key Ratios and Interpretations:

- **Current Ratio:**  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$  → Basic liquidity test;  $\geq 1$  = healthy;  $\leq 1$  = possible liquidity risk; too high = idle assets.
- **Quick (Acid-Test) Ratio:**  $\frac{\text{Cash} + \text{Marketable Securities} + \text{Receivables}}{\text{Current Liabilities}}$  → Excludes inventory; gauges true near-cash coverage.
- **Cash Ratio:**  $\frac{\text{Cash} + \text{Marketable Securities}}{\text{Current Liabilities}}$  → Most conservative; measures immediate liquidity capacity.
- **Defensive Interval Ratio (DIR):**  $\frac{\text{Cash} + \text{Marketable Securities} + \text{Receivables}}{\text{Daily Cash Expenditures}}$   
where Daily Cash Expenditures = (COGS + SG&A + R&D – Depreciation)/365.  
→ Indicates how many days operations can run using only liquid assets.
- **Cash Conversion Cycle (CCC):** DSO+DOH–DPO → Shorter/negative cycle = better cash efficiency; longer cycle = more working-capital financing required.

### Interpretive Highlights:

- **Current Ratio ; 1:** Possible liquidity stress or very fast turnover.
- **Large Current–Quick Gap:** Heavy reliance on inventory for liquidity.
- **High DIR + Short CCC:** Excellent short-term cash management.
- **CCC ; Industry Average:** Excess capital tied in receivables/inventory.
- Combine liquidity and activity analysis to diagnose working-capital efficiency.

### 4. Analytical Connections Between Activity and Liquidity

- Activity ratios explain why liquidity may be tight or strong:
  - Slow receivables turn  $\rightarrow$  high DSO  $\rightarrow$  lower CFO  $\rightarrow$  weaker liquidity ratios.
  - Excess inventory  $\rightarrow$  low turnover  $\rightarrow$  cash locked in working capital.
  - High payables turn  $\rightarrow$  short DPO  $\rightarrow$  reduced supplier financing.
- Trend analysis of DSO, DOH, and DPO together offers a complete view of cash flow timing.
- Combine these ratios to understand the firm's **operating cycle and working-capital efficiency**.

### 5. Illustrative Example: Cash Conversion Cycle

- **Given:** DSO = 40 days, DOH = 50 days, DPO = 30 days.
- **Compute:**

$$\text{CCC} = 40 + 50 - 30 = 60 \text{ days.}$$

- **Interpretation:** Firm recovers cash 60 days after paying suppliers. Shortening DSO or DOH improves liquidity.

### 6. Key Analyst Takeaways

- High activity ratios signal efficiency but may hide capacity risk or credit pressure.
- Liquidity ratios must be analyzed alongside cash flows and credit facilities.
- Trends matter more than levels – evaluate directional changes over time.
- Integrate activity and liquidity metrics to assess operating efficiency and financial flexibility.
- Cross-industry comparison requires adjusting for business model differences (e.g., retail vs. manufacturing).

## Module 39.3: Financial Ratios, Part 2

**LOS 39.b–c:** Calculate and interpret solvency and profitability ratios; describe relationships among ratios and evaluate a company using ratio analysis.

### 1. Overview

- **Solvency ratios** measure long-term leverage and ability to meet debt obligations.
- **Profitability ratios** assess how effectively a company generates earnings from sales, assets, and equity.
- Combined interpretation provides a holistic view of financial risk and performance.
- Consistency of formulas and cross-sectional benchmarking is essential.

### 2. Solvency Ratios

#### Purpose:

- Assess a firm's long-term financial leverage and its ability to meet debt obligations.
- Indicate the sustainability of the capital structure and the adequacy of earnings to cover fixed charges.

#### Key Ratios and Interpretations:

- **Debt-to-Equity:**  $\frac{\text{Total Debt}}{\text{Total Shareholders' Equity}}$  → Measures reliance on debt vs. equity. High = greater risk; low = conservative structure. \*Exclude leases per CFA convention (Level I).\*
- **Debt-to-Capital:**  $\frac{\text{Total Debt}}{\text{Total Debt} + \text{Preferred} + \text{Common Equity}}$  → Proportion of debt in total permanent financing; shows capital mix.
- **Debt-to-Assets:**  $\frac{\text{Total Debt}}{\text{Total Assets}}$  → Indicates percentage of assets financed by debt. Higher = more leverage and risk.
- **Financial Leverage Ratio (Leverage Multiplier):**  $\frac{\text{Average Total Assets}}{\text{Average Total Equity}}$  → Shows asset financing by equity. Ratio = 1 → all-equity firm. Higher → more leverage and higher ROE sensitivity.
- **Interest Coverage (Times Interest Earned):**  $\frac{\text{EBIT}}{\text{Interest Expense}}$  → Measures ability to meet interest payments.  $\geq 2.5\times$  = risk of default; higher = strong coverage.
- **Debt-to-EBITDA:**  $\frac{\text{Total Debt}}{\text{EBITDA}}$  → Approximate years to repay total debt from operating cash flow. Lower = stronger solvency.



- **Fixed-Charge Coverage:**  $\frac{\text{EBIT} + \text{Lease Payments}}{\text{Interest} + \text{Lease Payments}} \rightarrow$  Incorporates lease obligations; important for airlines/logistics with high lease exposure. Low ratio = potential liquidity stress.

#### Analyst Notes:

- Firms with stable cash flows can safely carry more debt.
- Focus on both **trend and level** of leverage and coverage ratios.
- Compare across peers—treatment of leases and short-term debt affects comparability.
- **Net Debt** = Total Debt – (Cash + Marketable Securities)  $\rightarrow$  better measure of true leverage.
- Combine solvency with profitability to assess value creation (ROIC vs. WACC).

### 3. Profitability Ratios

#### Purpose:

- Evaluate the firm's ability to generate profits relative to sales, assets, and equity.
- Capture management efficiency, pricing power, and cost control.
- Support valuation and performance benchmarking.

#### Key Ratios and Interpretations:

- **Gross Profit Margin:**  $\frac{\text{Sales} - \text{COGS}}{\text{Sales}}$   $\rightarrow$  Measures production efficiency and pricing power. Low margin = cost or pricing pressure.
- **Operating Profit Margin:**  $\frac{\text{EBIT}}{\text{Sales}}$   $\rightarrow$  Operating efficiency before financing costs. Analysts may also use EBITDA/Sales for cash-based view.
- **Pretax Profit Margin (EBT Margin):**  $\frac{\text{EBT}}{\text{Sales}} = \frac{\text{EBIT} - \text{Interest}}{\text{Sales}}$   $\rightarrow$  Isolates performance before taxes and highlights effect of financing structure.
- **Net Profit Margin:**  $\frac{\text{Net Income}}{\text{Sales}}$   $\rightarrow$  Overall profitability including all expenses and taxes. Focus on continuing operations for sustainability.
- **Return on Assets (ROA):**  $\frac{\text{Net Income}}{\text{Average Total Assets}}$   $\rightarrow$  Efficiency of asset use. Ignores financing mix; low ROA = poor efficiency.
- **Adjusted ROA (Before Interest):**  $\frac{\text{Net Income} + \text{Interest}(1 - \text{Tax Rate})}{\text{Average Total Assets}}$   $\rightarrow$  Removes leverage distortion; reflects returns to all capital providers.

- **Operating ROA:**  $\frac{\text{EBIT}}{\text{Average Total Assets}}$  → Measures pure operating performance, unaffected by tax or capital structure.
- **Return on Invested Capital (ROIC):**  $\frac{\text{EBIT} (1 - \text{Tax Rate})}{\text{Debt} + \text{Equity} + \text{Preferred}}$  → Return generated on long-term capital base. ROIC  $\downarrow$  WACC → value creation.
- **Return on Equity (ROE):**  $\frac{\text{Net Income}}{\text{Average Total Equity}}$  → Profitability to shareholders. High ROE may stem from leverage; assess with ROA.
- **Return on Common Equity (ROCE):**  $\frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Common Equity}}$  → Profitability available exclusively to common shareholders. Used in DuPont analysis.

### Interpretive Highlights:

- Declining margins → weaker cost control or competition pressure.
- High ROE but weak ROA → excessive leverage driving equity returns.
- Stable gross margin + falling net margin → rising non-operating or interest costs.
- Use **ROIC vs. WACC** to assess whether the firm creates or destroys value.
- Cross-check profitability trends with solvency and efficiency ratios for holistic insight.

## 4. Example: Evaluating Sedgwick Company

### Given Ratios (Current Year):

- Current ratio  $\downarrow$  but  $\downarrow$  industry average → liquidity adequate.
- Total asset turnover  $\downarrow$  → less efficient asset utilization.
- Net profit margin  $\downarrow$  and below industry → profitability weakness.
- ROE  $\downarrow$  but still  $\downarrow$  industry → leverage-driven performance.
- Debt-to-equity  $\downarrow$  but still  $\downarrow 2\times$  industry → gradual deleveraging trend.

### Analyst Conclusion:

- Sedgwick improving capital structure but still highly leveraged.
- Profitability and efficiency deteriorating → possibly due to cost control or asset growth.
- ROE outperformance stems from leverage, not operational superiority.
- Analyst should monitor debt reduction progress and margin recovery.

## 5. Relationships Among Ratios (LOS 39.c)

### Example: Interpreting Trends Together

- Current ratio  $\uparrow$  but quick ratio  $\downarrow \rightarrow$  inventory buildup.
- Days Inventory  $\uparrow \rightarrow$  supports the inventory explanation.
- DSO  $\downarrow \rightarrow$  faster cash collections.
- Combined inference  $\rightarrow$  firm offsetting poor inventory management by accelerating receivable collections.

### Cross-Ratio Insights:

- **ROE = Net Profit Margin  $\times$  Asset Turnover  $\times$  Financial Leverage** (DuPont).
- Decline in net margin or turnover may be offset by higher leverage  $\rightarrow$  risky sustainability.
- Relationship logic:

$$\text{Profitability (ROA)} \times \text{Leverage (A/E)} = \text{ROE}.$$

- Evaluate whether ROE improvements stem from operations or leverage.

### Comprehensive Evaluation Steps:

1. Compare ratios year-over-year and against industry benchmarks.
2. Analyze ratio interdependencies (e.g., liquidity  $\rightarrow$  operations  $\rightarrow$  solvency  $\rightarrow$  profitability).
3. Adjust for nonrecurring items (discontinued operations, one-time gains).
4. Review consistency of ratio definitions and accounting methods.

## 6. Key Analytical Takeaways

- Solvency ratios reveal risk exposure from leverage; coverage ratios test repayment capacity.
- Profitability ratios identify efficiency and value creation across income layers.
- Ratios must be interpreted together — single ratio analysis is insufficient.
- Consider trends, peer benchmarks, and firm-specific strategy.
- Declining efficiency + stable ROE  $\rightarrow$  leverage-driven illusion of performance.
- Analysts should adjust reported data for comparability and consistency across time.

## Module 39.4: DuPont Analysis

**LOS 39.d:** Demonstrate the application of DuPont analysis of ROE and interpret effects of changes in its components.

### 1. Concept Overview

- **Objective:** Decompose Return on Equity (ROE) into component ratios to identify drivers of profitability.
- **Purpose:** Helps analysts determine whether changes in ROE stem from:
  - Operational efficiency (profit margin),
  - Asset utilization (turnover), or
  - Financial leverage.
- **Definition:**

$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Shareholders' Equity}}$$

- **Note:** DuPont is an analytical breakdown of ROE, not a separate calculation method.

### 2. Original (3-Part) DuPont Equation

**Derivation:**

$$\text{ROE} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}} \times \frac{\text{Average Total Assets}}{\text{Average Equity}}$$
$$\text{ROE} = \text{Net Profit Margin} \times \text{Total Asset Turnover} \times \text{Financial Leverage}$$

**Interpretation:**

- **Net Profit Margin (NI / Sales):** Measures profitability of each sales dollar.
- **Total Asset Turnover (Sales / Assets):** Measures efficiency in asset utilization.
- **Financial Leverage (Assets / Equity):** Captures the effect of financing mix on ROE.

**Analyst Insights:**

- Decline in ROE must arise from one or more of:
  1. Decrease in profit margin → lower profitability.
  2. Decrease in asset turnover → inefficient use of assets.
  3. Decrease in leverage → less debt financing (reduces risk but lowers ROE).
- This 3-factor decomposition reveals the firm's profitability structure:

$$\text{ROE} = \text{Operating Performance} \times \text{Efficiency} \times \text{Leverage}.$$

### 3. Example: Original DuPont Analysis (Staret Inc.)

**Given:**

- Stable ROE 18% (over three years)
- Components (rounded):

$$20X3 : 7.0\% \times 1.33 \times 1.93 = 18.1\%$$

$$20X4 : 6.4\% \times 1.21 \times 2.34 = 18.0\%$$

$$20X5 : 5.3\% \times 1.17 \times 2.78 = 17.4\%$$

**Interpretation:**

- Net margin ↓ and asset turnover ↓ → operational deterioration.
- Leverage ↑ → compensates for declining margins to maintain ROE.
- Higher leverage increases financial risk → analyst should evaluate debt capacity and cost of capital.
- Trend: modest decline in ROE despite aggressive leveraging → potential warning signal.

### 4. Extended (5-Part) DuPont Equation

**Decomposition:**

$$\text{ROE} = \frac{\text{Net Income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}}$$

$$\text{ROE} = \text{Tax Burden} \times \text{Interest Burden} \times \text{EBIT Margin} \times \text{Asset Turnover} \times \text{Financial Leverage}$$

**Components:**

- **Tax Burden:**  $\frac{\text{Net Income}}{\text{EBT}} = (1 - \text{Tax Rate}) \rightarrow$  Lower ratio (higher taxes) ↓ ROE.
- **Interest Burden:**  $\frac{\text{EBT}}{\text{EBIT}} \rightarrow$  Measures effect of interest expense. Ratio ↓ when debt cost ↑.
- **EBIT Margin:**  $\frac{\text{EBIT}}{\text{Sales}} \rightarrow$  Operating profitability.
- **Asset Turnover:**  $\frac{\text{Sales}}{\text{Assets}} \rightarrow$  Asset utilization efficiency.
- **Financial Leverage:**  $\frac{\text{Assets}}{\text{Equity}} \rightarrow$  Magnifies both profits and losses.

### Analyst Notes:

- Each component identifies a distinct source of ROE change:
  - Lower **Tax Burden**  $\rightarrow$  higher taxes  $\rightarrow \downarrow$  ROE.
  - Lower **Interest Burden**  $\rightarrow$  higher interest cost  $\rightarrow \downarrow$  ROE.
  - Higher **Operating Margin or Turnover**  $\rightarrow \uparrow$  ROE.
- High leverage does not always increase ROE—interest burden may offset benefits.
- Extended DuPont highlights how tax and financing efficiency affect shareholder returns.

### 5. Example: Extended DuPont (Company A vs. Company B)

#### Given Data:

- Company A:
  - ROE = 13.3%, EBIT Margin = 7.0%, Asset Turnover = 2.0,
  - Interest Burden = 85.7%, Tax Burden = 66.7%, Financial Leverage = 1.67.
- Company B:
  - ROE = 24.0%, EBIT Margin = 11.1%, Asset Turnover = 3.0,
  - Interest Burden = 100%, Tax Burden = 60.0%, Financial Leverage = 1.2.

#### Step-by-Step Analysis:

- **Profitability:** Company B has stronger EBIT margin (11.1% vs. 7.0%)  $\rightarrow$  better cost control or pricing.
- **Efficiency:** Higher asset turnover (3.0 vs. 2.0)  $\rightarrow$  superior asset use or inventory management.
- **Leverage:** Company B uses less leverage (1.2 vs. 1.67) but achieves higher ROE  $\rightarrow$  operational drivers dominate.
- **Interest Burden:** Company A's 85.7% vs. 100%  $\rightarrow$  A faces more debt cost pressure.
- **Tax Burden:** Slightly lower for B (60%)  $\rightarrow$  marginal drag, but outweighed by stronger operations.

#### Interpretation:

- Company B's higher ROE (24%) arises from better margins and turnover—not leverage.
- Company A relies on leverage to offset weaker profitability—riskier structure.
- Extended DuPont shows how **ROE quality** depends on operating fundamentals rather than leverage alone.

## 6. Analytical Summary

### Core Insights:

- **3-Part DuPont:** Simplifies ROE into profitability  $\times$  efficiency  $\times$  leverage.
- **5-Part DuPont:** Expands to reveal tax, financing, and operational impacts separately.

### Interpretive Takeaways:

- **High ROE high quality.** Analysts must check whether growth stems from margin strength or excessive leverage.
- **Declining margins or turnover** offset by rising leverage  $\rightarrow$  increased financial risk.
- **Sustainable ROE** comes from stable operating margin and efficient asset management, not from borrowing.
- **Analytical Focus:**
  1. Monitor trends in component ratios year over year.
  2. Compare with industry peers.
  3. Assess risk-return balance—especially interest burden sensitivity.

### Formula Summary:

$$\begin{aligned}\text{ROE (3-part)} &= \text{Net Profit Margin} \times \text{Asset Turnover} \times \text{Financial Leverage} \\ \text{ROE (5-part)} &= \text{Tax Burden} \times \text{Interest Burden} \times \text{EBIT Margin} \\ &\quad \times \text{Asset Turnover} \times \text{Financial Leverage}\end{aligned}$$

## Module 39.5: Industry-Specific Financial Ratios and Forecasting

**LOS 39.e–f:** Describe the use of industry-specific ratios and explain how ratio analysis can support forecasting and pro forma modeling.

### 1. Industry-Specific Ratios Overview

#### Purpose:

- Different industries emphasize different performance metrics due to varying operating models, asset bases, and risk profiles.
- Analysts identify key ratios most relevant to each sector's value creation drivers (e.g., margins, efficiency, utilization).
- Comparative analysis must always be done within the same industry context.

### General Insight:

- Ratios outside industry norms → potential inefficiency, mismanagement, or distinct business strategy.
- Understanding industry-specific KPIs is critical for accurate valuation and peer comparison.

## 2. Examples of Industry-Specific Ratios

### Service and Consulting Firms:

- **Sales per Employee** = Revenue / Number of Employees → Measures productivity and human capital efficiency.
- **Net Income per Employee** = Net Income / Employees → Reflects profitability per worker; useful in labor-intensive industries.

### Retail and Restaurant Industry:

- **Same-Store Sales Growth (SSSG)**: Measures revenue growth excluding new stores → reflects customer retention and organic performance.

$$\text{SSSG} = \frac{\text{Current-Year Sales of Existing Stores} - \text{Prior-Year Sales of Same Stores}}{\text{Prior-Year Sales of Same Stores}}$$

- **Sales per Square Foot**:

$$\text{Sales per Square Foot} = \frac{\text{Total Sales}}{\text{Selling Area (sq. ft.)}}$$

→ Gauges store efficiency and space utilization.

- Decline in SSSG with store expansion may indicate *cannibalization* among locations.

### Hotel and Hospitality Industry:

- **Average Daily Rate (ADR)**:

$$\text{ADR} = \frac{\text{Room Revenue}}{\text{Rooms Sold}}$$

→ Indicates pricing power and yield management efficiency.

- **Occupancy Rate**:

$$\text{Occupancy Rate} = \frac{\text{Rooms Sold}}{\text{Rooms Available}}$$

→ Measures utilization level of hotel capacity.

- **Revenue per Available Room (RevPAR)**:

$$\text{RevPAR} = \text{ADR} \times \text{Occupancy Rate}$$

→ Integrates pricing and occupancy into one performance indicator.



### Subscription-Based Businesses (Streaming, Telecom, SaaS):

- **Average Revenue per User (ARPU):**

$$\text{ARPU} = \frac{\text{Total Revenue}}{\text{Average Number of Active Users}}$$

→ Tracks monetization efficiency and pricing trends.

- **Churn Rate:**

$$\text{Churn Rate} = \frac{\text{Customers Lost}}{\text{Total Customers at Start of Period}}$$

→ Measures customer retention and lifetime value risk.

### Banking and Financial Institutions:

- **Capital Adequacy Ratio (CAR):**

$$\text{CAR} = \frac{\text{Capital}}{\text{Risk-Weighted Assets}}$$

→ Ensures sufficient capital buffer to absorb losses (Basel III standard).

- **Liquidity Coverage Ratio (LCR):**

$$\text{LCR} = \frac{\text{High-Quality Liquid Assets}}{\text{Net Cash Outflows (30 days)}}$$

→ Indicates short-term liquidity resilience.

- **Net Interest Margin (NIM):**

$$\text{NIM} = \frac{\text{Interest Income} - \text{Interest Expense}}{\text{Average Interest-Earning Assets}}$$

→ Measures spread profitability of lending operations.

- **Loan-to-Deposit Ratio (LDR):**

$$\text{LDR} = \frac{\text{Total Loans}}{\text{Total Deposits}}$$

→ Evaluates liquidity and lending aggressiveness.

### Insurance Companies:

- **Loss Ratio:**  $\frac{\text{Claims Paid}}{\text{Premiums Earned}}$  → Measures underwriting risk.

- **Expense Ratio:**  $\frac{\text{Underwriting Expenses}}{\text{Premiums Earned}}$  → Operating efficiency.

- **Combined Ratio:** = Loss Ratio + Expense Ratio → <100% = underwriting profit; >100% = underwriting loss.

### Energy and Utilities:

- **Reserve Replacement Ratio:**  $\frac{\text{Additions to Reserves}}{\text{Production}}$  → Indicates sustainability of resource base.
- **Load Factor (Utilities):**  $\frac{\text{Average Load}}{\text{Peak Load}}$  → Measures utilization efficiency.

### Capital Adequacy and Risk Management:

- Regulators impose **minimum capital ratios** and **reserve requirements** to reduce contagion risk.
- **Value at Risk (VaR):** Statistical measure estimating potential loss over a given period at a specific confidence level. → Example: “99% one-day VaR = \$10 million” means a 1% chance of losing more than \$10M in one day.

## 3. Business Risk and Volatility Measures

### Purpose:

- Quantify variability in revenue, operating income, or net income → indicates earnings stability and risk exposure.

### Key Metric – Coefficient of Variation (CV):

$$CV = \frac{\text{Standard Deviation}}{\text{Expected Value}}$$

- Standard deviation measures volatility; CV adjusts for firm size → makes comparisons meaningful.
- Lower CV → more stable, predictable performance.
- Compare CV across time or among peers to assess relative business risk.

## 4. Ratio Analysis in Forecasting and Modeling (LOS 39.f)

### Purpose:

- Use ratios and common-size data to prepare **pro forma financial statements** for forecasting future performance.
- Link projected income statement and balance sheet values through stable ratio relationships.

### Steps for Forecasting:

1. **Estimate Sales:** Base projection on market outlook or trend growth.
2. **Apply Historical Ratios:**
  - COGS/Sales → forecast cost of goods sold.
  - Operating Margin → forecast EBIT.
  - Interest Coverage or Tax Rate → estimate net income.
3. **Forecast Balance Sheet:** Use turnover ratios (e.g., receivables, inventory) to project asset and liability levels.
4. **Prepare Pro Forma Statements:** Integrate assumptions into forward-looking financials.

### Analytical Techniques for Forecast Variability:

- **Sensitivity Analysis:** “What if” analysis — changes one input at a time to test impact on outcome. Example: What if sales growth = 3% instead of 5%?
- **Scenario Analysis:** Evaluates predefined scenarios (e.g., optimistic, base, pessimistic) for multiple variable combinations.
- **Simulation (Monte Carlo):** Generates a probability distribution of outcomes by repeatedly sampling from input distributions. → Provides full range of possible earnings forecasts.

### Interpretive Notes:

- Stable ratio assumptions simplify forecasts but may ignore structural changes.
- Ratio analysis integrates accounting data with economic expectations to create dynamic projections.
- Pro forma forecasts aid valuation models (e.g., DCF, residual income, EVA).

### 5. Key Concept Recap

- **Industry Ratios:** Tailored to the sector’s economics and operating model.
- **Financial Institutions:** Focus on capital adequacy, liquidity, and interest spreads.
- **Business Risk:** Coefficient of Variation measures volatility per unit of expected value.
- **Forecasting:** Ratio analysis underpins pro forma modeling and earnings sensitivity evaluation.
- **Analytical Integration:** Combine operational, financial, and risk metrics to evaluate performance consistency and future profitability.

### Formula Summary:

$$\begin{aligned}\text{Same-Store Sales Growth} &= \frac{\text{Sales}_t - \text{Sales}_{t-1}}{\text{Sales}_{t-1}} \\ \text{ADR} &= \frac{\text{Room Revenue}}{\text{Rooms Sold}}, \quad \text{RevPAR} = \text{ADR} \times \text{Occupancy Rate} \\ \text{ARPU} &= \frac{\text{Revenue}}{\text{Active Users}}, \quad \text{CAR} = \frac{\text{Capital}}{\text{Risk-Weighted Assets}} \\ \text{Net Interest Margin} &= \frac{\text{Interest Income} - \text{Interest Expense}}{\text{Interest-Earning Assets}} \\ \text{Coefficient of Variation} &= \frac{\sigma}{\mu}\end{aligned}$$

## Module 40.1: Financial Statement Modeling

**LOS 40.a–40.e:** Develop a sales-based pro forma model; explain behavioral forecasting biases; describe competitive forces, inflation effects on costs, and forecast horizon selection.

### 1. Sales-Based Pro Forma Company Model (LOS 40.a)

#### Purpose:

- A **pro forma model** projects future financial statements based on forecasted sales growth.
- Useful for valuation, scenario testing, and credit analysis.

#### Step-by-Step Process:

1. **Estimate Revenue Growth:** Based on market share, GDP trends, or sector growth expectations.  $\text{Future Sales} = \text{Current Sales} \times (1 + g_{\text{sales}})$
2. **Estimate COGS:** Typically as a fixed % of sales or based on input cost trends.
3. **Estimate SG&A:** Treated as fixed, semi-variable, or scaling with sales.
4. **Estimate Financing Costs:**  $\text{Interest expense} = \text{debt} \times \text{average interest rate}$ . Adjust for capital structure changes or new capex funding.
5. **Estimate Taxes:** Use historical effective rates adjusted for jurisdictional mix and deferred taxes.
6. **Model Balance Sheet:** Derive **working capital accounts** (A/R, inventory, payables) from turnover ratios:

$$\begin{aligned}\text{A/R} &= \frac{\text{Sales}}{\text{Receivables Turnover}}, \quad \text{Inventory} = \frac{\text{COGS}}{\text{Inventory Turnover}}, \\ \text{A/P} &= \frac{\text{COGS}}{\text{Payables Turnover}}\end{aligned}$$

## 7. Model Capital Expenditures & Depreciation:

$$\text{Net PP\&E}_t = \text{PP\&E}_{t-1} + \text{CapEx} - \text{Depreciation}$$

8. **Build Pro Forma Cash Flow Statement:** Derived from projected income statement and balance sheet changes. Check  $\Delta\text{Cash} = \text{CFO} + \text{CFI} + \text{CFF}$

### Analyst Insights:

- Ensure internal consistency between income statement, balance sheet, and cash flow.
- Forecast drivers (sales, margins, working capital days) rather than line items.
- Validate with historical ratios and peer benchmarks.

## 2. Behavioral Factors Affecting Analyst Forecasts (LOS 40.b)

### 1. Overconfidence Bias

- Analysts overestimate accuracy and underestimate uncertainty.
- Leads to overly narrow forecast ranges.
- **Remedy:**
  - Perform post-analysis of forecast errors.
  - Use **scenario analysis** with wide confidence intervals.
  - Seek peer feedback to challenge assumptions.

### 2. Illusion of Control Bias

- Belief that adding complexity or expert validation improves control.
- Results in overfitted, unstable models.
- **Remedy:**
  - Use only statistically significant drivers.
  - Keep models parsimonious.
  - Limit use of “expert opinions” unless empirically grounded.

### 3. Conservatism (Anchoring) Bias

- Failure to adjust forecasts sufficiently to new data.
- Often causes delayed response to negative information.
- **Remedy:**
  - Regularly test reaction speed to new inputs.
  - Use models with easily adjustable parameters.

#### 4. Representativeness Bias

- Tendency to classify situations based on surface similarity.
- Example: assuming new tech firm behaves like traditional peer.
- **Base-Rate Neglect:** Ignoring population-level probabilities (outside view).
- **Remedy:** Combine **inside view** (company data) with **outside view** (industry averages).

#### 5. Confirmation Bias

- Seeking only data that supports preexisting beliefs.
- Common when analyst favors certain companies or management views.
- **Remedy:**
  - Deliberately review opposing analyses.
  - Seek disconfirming evidence and neutral peer opinions.
  - Question management narratives critically.

### 3. Competitive Position: Porter's Five Forces (LOS 40.c)

#### Framework:

- Evaluates industry structure and determines pricing power, cost pressure, and profitability.

#### 1. Threat of Substitutes

- High substitutes → low pricing power.
- Mitigation: product differentiation and customer switching costs.

#### 2. Industry Rivalry

- High rivalry = lower margins and profits.
- Drivers: many competitors, slow growth, high fixed/exit costs, undifferentiated products.

#### 3. Supplier Power

- Few or concentrated suppliers can demand higher prices → cost pressure.
- Integration backward or diversification can mitigate this.

#### 4. Buyer Power

- Large or concentrated buyers negotiate lower prices.
- Low switching costs increase buyer leverage.

#### 5. Threat of New Entrants

- High barriers to entry (e.g., regulation, economies of scale, brand loyalty) → protect profits.
- Low barriers → competitive erosion of margins.

#### Analyst Implication:

- Favor industries with low rivalry, weak suppliers, weak buyers, few substitutes, and high barriers to entry.
- Competitive analysis directly affects long-term revenue and margin forecasts.

#### 4. Forecasting under Inflation or Deflation (LOS 40.d)

##### Analytical Context:

- Input cost changes (e.g., fuel, commodities) materially affect profitability.
- Exposure depends on hedging policies and vertical integration.

##### Analyst Considerations:

- **Hedging:** Firms can lock in prices via derivatives or fixed contracts → delay cost impact.
- **Vertical Integration:** Reduces dependency on external price fluctuations.
- **Pass-Through Capacity:** Ability to increase selling prices without losing volume.

##### Elasticity Effects:

- **Elastic Demand:** Price  $\uparrow \Rightarrow$  Quantity Sold  $\downarrow$  significantly → lower total revenue.
- **Inelastic Demand:** Price increases offset cost inflation → stable or higher revenue.

### Example – Alfredo, Inc.

- **Base Case (20X1):** Sales = \$100,000; COGS = \$40,000; Operating Profit = \$30,000.

Gross Margin = 60%,    Operating Margin = 30%.

- **Scenario A (Full Cost Pass-Through, Volume Constant):** Gross profit unchanged → margins constant, dollar profits up slightly.
- **Scenario B (Price +5%, Volume –5%):** Revenue unchanged → margins decline modestly.
- **Scenario C (Price +5%, Volume –10%):** Revenue ↓, costs ↑ → margins compress sharply.

### Analyst Guidance:

- Assess firm’s ability to hedge, substitute inputs, or absorb temporary cost shocks.
- Long-term inflation → structural price adjustment; short-term → expense reallocation (e.g., cut SG&A).
- Consider competitor pricing behavior and market share effects.

## 5. Forecast Horizon and Long-Term Projections (LOS 40.e)

### Purpose:

- Define time period over which detailed forecasts are made before moving to terminal value estimation.

### Key Considerations:

- **Portfolio Perspective:** Holding period often defines horizon (e.g., 25% turnover → 4-year horizon).
- **Cyclicity:** Must include at least one full business cycle to capture midcycle (normalized) earnings.
- **Temporary Events:** Extend horizon until effects of acquisitions or restructuring are realized.
- **Managerial Constraints:** Some institutions set forecast horizons (e.g., 3–5 years).

### Beyond Short-Term Forecasts:

- Use **trend growth rate** of revenue and margins to project future periods:

$$\text{Sales}_{t+n} = \text{Sales}_t \times (1 + g_{\text{trend}})^n$$

- Derive normalized (midcycle) margins for terminal value estimation.



### Terminal Value Methods:

- **Relative Valuation:** Apply P/E or EV/EBITDA multiples consistent with expected growth.
- **DCF Approach:**

$$\text{Terminal Value} = \frac{\text{CF}_{t+1}}{r - g}$$

where  $r$  = discount rate,  $g$  = perpetual growth rate.

### Analyst Insights:

- Use normalized earnings for terminal growth estimation.
- Small errors in  $g$  cause large valuation shifts → stress test assumptions.
- Identify **inflection points**—periods when future trends deviate from past averages (e.g., regulation, technology shifts).

## 6. Summary and Analytical Takeaways

### Key Concepts:

- **Pro Forma Modeling:** Build forward-looking income, balance sheet, and cash flow statements anchored on sales growth.
- **Behavioral Biases:** Overconfidence, illusion of control, conservatism, representativeness, confirmation → all distort forecasts.
- **Porter's Five Forces:** Framework for assessing pricing power and cost exposure.
- **Inflation Forecasting:** Assess pass-through ability, elasticity, and input substitution capacity.
- **Forecast Horizon:** Choose length to capture normalized performance and terminal value sustainability.

### Formula Recap:

$\text{Revenue}_{t+1} = \text{Revenue}_t(1 + g)$
$\text{ROE} = \frac{\text{Net Income}}{\text{Average Equity}}$
$\text{Terminal Value} = \frac{\text{CF}_{t+1}}{r - g}$
$\text{Coefficient of Variation} = \frac{\sigma}{\mu}$

**Exam Insight:**

- Expect to identify which bias affects an analyst's behavior.
- Be ready to apply inflation and elasticity reasoning in multi-step problems.
- Know how to construct and interpret each step of a sales-driven pro forma forecast.