EFR summary

Advanced Financial Statement Analysis

2025 - 2026

Week 1-6

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EUROSYSTEEM

Details

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Lecture 1: Introduction & Strategy Analysis

Through this course you will understand how to evaluate companies using financial information, which is essential for investors, analysts, and finance professionals.

Example: Facebook's IPO

- Facebook went public in May 2012 (IPO on NASDAQ).
- Stock prices are determined by supply and demand.
- However, investors still need to determine the true value of a share.

How is this done? → Through Financial Statement Analysis (FSA).
Financial statements help investors evaluate profitability, growth potential, risks

Example: Stock Market Bubble at the end of 1990
Main idea: Stock prices can deviate from the fundamental value of companies.

- P/B ratio: Price / Book Value of Equity
- P/V ratio: Price / Fundamental Value

If ratios **>1**, stock price is higher than fundamental value.
Conclusion: Financial Statement Analysis helps:

- identify true value drivers
- detect overvalued companies.

Accounting Refresher

Accounting Example
Scenario: Company A starts operations on **January 1, 2022**.
Initial investment: owner invests **€500,000 cash**.
Balance sheet at start:

Assets		**Equity**	
Cash	500,000	Owners' equity	500,000

Book entry:

Cash	500,000		(debit)
Equity		500,000	(credit)

Now assume that the following transactions take place during the year:
Several business transactions occur:

1. A purchases an office (other assets) for 100,000 cash;
2. A purchases a machine (other assets) for 20,000 cash;
3. A purchases inventory for 200,000, 100,000 is paid in cash, 100,000 on credit;
4. A sells 75% of the inventory for 250,000 on credit (cash has not been received at the end of the year)

Cash Accounting Result

500,000 - 100,000 (Office) - 20,000 (Machine) - 100,000 (Inventory) = 280,000

Assets		**Equity**	
Cash	280,000	Equity	280,000

Important: The credit sale (250,000) is not recorded yet because no cash has been received. Problem with cash accounting: It ignores economic activity that hasn't yet generated cash. This is why accrual accounting is used instead.

Income Statement (P&L)

Expense		**Revenue**	
COGS	150,000	Sales	250,000
Profit	100,000		

Book entry

Profit	100,000	
	Equity	100,000

Balance Sheet

Asset		**Liabilities & Equity:**	
Cash	280,000	Owners' equity	600,000
Inventory	50,000	Accounts payable	100,000
Accounts receivable	250,000		
Other assets	120,000		
	700,000		700,000

Accrual Accounting

- Accrual accounting records economic activity, not just cash.
- This produces a more accurate measure of performance.

Change in non-cash assets: 420,000 (Inventory 50,000 + Accounts receivable 250,000 + Other assets 120,000)
Change in liabilities: - 100,000 (Accounts payable)
Total accruals: 320,000

These total accruals exactly explain the difference between the net income on a cash accounting basis (i.e., the total cash flow) and the net income on anaccrual accounting basis ("earnings")

Key formula: Net income = Cash flows + Accruals
100 = - 220 + 320

Financial Statement Analysis

- Capital markets connect: Investors (savers) → Companies needing capital
- But there is a major issue: Separation between *ownership* and *control*
  → Shareholders = owners, Managers = decision makers
  → Managers have more information than investors.
- Therefore: Financial statement analysis helps outsiders: Understand company performance and Estimate future prospects.
- Example users: Financial analysts, Investors, Credit analysts.

Households (investors) provide: Savings / capital. Businesses receive: Investment funds. Between them are two types of intermediaries.

1. *Financial intermediaries*. Examples: Banks, Venture capital, Pension funds, Investment funds. They allocate capital.
2. *Information intermediaries*. Examples: Auditors, Financial analysts, Rating agencies, Financial press. They analyze and verify information.

Two problems exist:

Adverse Selection: Before investment. Managers know more about company quality than investors. Investors cannot easily distinguish: good companies/bad companies.

Moral Hazard: After investment. Managers may use resources for personal benefit and make decisions that do not maximize shareholder value.

These problems lead to: **The "Lemons Problem" (Akerlof 1970)**
Investors cannot identify good investments. Result:

- Investors value good and bad investments at average prices
- Good companies leave the market
- Bad companies remain

Eventually: Markets may break down.
Financial statement analysis helps reduce this problem.

Role of Intermediaries

To prevent financial markets from breaking down due to information problems, *intermediaries* help reduce information asymmetry. Example: A mechanic certifying a used car's quality. Two main types of intermediaries:

1. Financial intermediaries

Organizations that focus on aggregating funds from individual investors and analyzing different investment alternatives to make investment decision.
→ Examples: Venture capital firms, Banks, Pension funds, Insurance companies, Investment funds

2. Information intermediaries

Organizations that focus on providing information to investors on the quality of investment opportunities. Their role is to reduce information asymmetry between managers and investors.
→ Examples: Auditors, Financial analysts, Credit rating agencies, Financial press

The Accounting System

Financial statements summarize the economic consequences of business activities.
The **accounting system**:

- Measures business transactions
- Reports them in financial statements.

Because of this, financial statement analysis must consider how accounting rules influence the numbers.

Four institutional features

of accounting systems that affect financial statements.

Feature 1: Accrual Accounting

Accrual accounting separates: Economic activity from Cash payments and receipts

- This means: Revenue and expenses are recorded when they occur, not when cash is received or paid.
- Example: A company sells goods on credit today. Revenue is recorded today. Cash may arrive later.
- Accrual accounting provides a better representation of company performance than cash accounting.

Feature 2: Accounting Conventions & Standards

Managers must make estimates and judgments when preparing financial statements. Examples: Asset valuations, Depreciation, Inventory valuation

- **Benefits**: Managers can include inside information about the business in financial reports.
- **Costs** : Managers may manipulate earnings to achieve goals (earnings management).

Because of this accounting standards are created to limit misuse of accounting discretion. However, strict rules can also reduce managers' ability to reflect real economic conditions. Therefore, analysts must evaluate how accounting choices affect reported numbers.

Feature 3: Managers' Reporting Strategy

Managers decide how much information to disclose.
Key questions:

- Do they provide additional voluntary disclosure?
- Do they hide poor performance?

Possible strategies e.g. Full disclosure, Manipulating investor perceptions
Example: Managers might delay bad news or emphasize positive results.

Feature 4: Auditing, Legal Liability and Enforcement

External mechanisms that improve financial reporting quality. Auditing verifies the integrity of reported financial statements. Threat of lawsuits and resulting penalties have the beneficial effect of improving the quality of disclosure. Public enforcement bodies further enhance the pressure for high quality financial statements.
Examples of regulators: SEC (USA), AFM (Netherlands)

Four Steps of Financial Statement Analysis

Financial statement data contains both:

- Real economic information
- Possible distortions or noise

Therefore analysts must carefully interpret accounting numbers.
These four steps aim to extract true economic information from financial statements.

1. Strategy Analysis (lecture 1)
Generate performance expectations through industry analysis and competitive strategy analysis

2. Accounting Analysis (lecture 2, 3)
Evaluate accounting quality by assessing accounting policies and estimates

3. Financial Analysis (lecture 4)
Evaluate performance using ratios and cash flow analysis

4. Prospective Analysis (lecture 5)
Make forecasts and value business

Strategy Analysis

Strategy analysis is important because it helps analysts understand the economics of the business. It allows analysts to:

- Understand **how the company makes money**
- Identify **key profit drivers**
- Identify **major risks**
- Evaluate whether current performance is **sustainable**

Analysts should understand: The company's industry, Competitive forces and Diversification and synergies. Without understanding the business model, financial numbers are difficult to interpret.

Porter's Five Forces model of industry structure and profitability.

Competition within the industry

1. Rivalry among existing firms
2. Threat of new entrants
3. Threat of substitute products

Bargaining power in markets

4. Bargaining power of buyers
5. Bargaining power of suppliers

Competitive Force 1: Rivalry Among Existing Firms

When rivalry is **high**, competition pushes prices down.
Consequences:

- Prices approach **marginal cost**
- Profit margins decrease
- Companies compete on **non-price factors** (quality, branding, innovation).

Factors determining rivalry:

- Industry growth rate
- Number and balance of competitors
- Economies of scale
- Ratio of fixed to variable costs

Competitive Force 2: Threat of New Entrants

If new firms can **easily enter an industry**, profits decline.
Reasons: More competitors → Increased supply → Price competition.
Barriers to entry determine the threat.
Important barriers include:

- Economies of scale
- First-mover advantage
- Customer and supplier relationships
- Legal barriers (e.g., patents or regulation).

Example: Pharmaceutical companies have strong patent protection, reducing entry.

Competitive Force 3: Threat of Substitutes

Substitutes are **alternative products that satisfy the same need**.
Examples: Train vs airplane, Streaming vs cinema
When substitutes exist:

- Customers can switch easily
- Companies cannot raise prices easily.

Factors affecting substitutes:

- Relative price
- Performance of alternatives
- Customer willingness to switch.

More substitutes → lower industry profitability.

Competitive Force 4: Bargaining Power of Buyers

Buyers can push **prices downward** if they have strong bargaining power.
Factors influencing buyer power:

- Price sensitivity
- Availability of alternatives
- Size and importance of buyers.

Example: Large retailers negotiating with suppliers.

Competitive Force 5: Bargaining Power of Suppliers

Suppliers can push **input prices upward** if they have strong bargaining power.
Suppliers gain power when:

- Few suppliers exist
- Products are specialized
- Switching suppliers is difficult.

Strategy Analysis and the Rest of FSA

Insights from strategy analysis help the other steps of financial statement analysis.

- Accounting Analysis : Evaluate whether accounting reflects business reality.
- Financial Analysis: Use financial data to evaluate past performance and current financial position.
- Prospective Analysis: Forecast future earnings and future growth.

Lecture 2 – Accounting Analysis

Lecture 1: Recap

Porter's Five Forces model

Rivalry among existing firms
Decreases when there is an high industry growth, few strong competitors, high entry costs. Increases when there is an stagnant industry, many similar competitors

Threat of new entrants
Decreases when tere are large capital needs. Increases when easy online entry

Threat of substitutes
Decreases when there is few realistic alternatives for customers and high switching costs. Increases when there are many cheap or convenient alternatives.

Bargaining power of suppliers
Decreases when there are many alternative suppliers, easy to switch.
Increases when there are few key suppliers, specialized inputs, high switching costs.

Bargaining power of buyers
Decreases when fragmented customers, products differentiated.
Increases when large buyers, high price transparency.

Accounting Analysis

The purpose of accounting analysis is to **evaluate how well financial statements reflect the true economic reality of a business**.

- Identify areas where accounting flexibility exists
- Evaluate accounting policies and estimates used by the company

Main objectives:

1. Assess the degree of distortion in financial statements
2. Undo distortions if they exist

Accounting analysis is important for several reasons:

1. **Better Ratio Analysis**

We want ratios to be based on the most informative and reliable numbers.

2. **Forecasting**

Analysts must determine whether current revenues and earnings are sustainable.
→ Example: If managers inflate earnings this year, earnings next year will likely be lower. This is known as: The "Iron Law of Accrual Reversal".
Meaning: Accrual accounting adjustments tend to reverse over time.

3. **Firm Valuation**

Valuation models rely on forecasts, so they must reflect economic reality rather than distorted accounting numbers.

Financial statements can become distorted due to three main sources:

1. Noise in Accounting Rules
It is often difficult for standard setters to restrict management discretion without losing valuable information (e.g., R&D)

2. Forecast Errors
Managers cannot perfectly predict the future (e.g., probability of collecting payments)

3. Managers' Accounting Choices

Managers may intentionally choose accounting methods to achieve reporting objectives. Possible motives include: meeting earnings targets, influencing stock prices, meeting debt covenants

6 Steps in Accounting Analysis

1. Identify key accounting policies
2. Assess accounting flexibility
3. Evaluate accounting strategy
4. Evaluate quality of disclosure
5. Identify potential red flags
6. Recast financial statements and remove distortions

Step 1: Identify Key Accounting Policies

Key accounting policies depend on industry characteristics and competitive strategy
These determine the critical success factors and risks of a firm.
Analysts should evaluate how companies measure these factors.

For Example, Banking Industry: Main risks are interest rate risk and credit risk
→ Accounting impact: loan loss reserves

For Example, Manufacturing Industry: Important factors are R&D and product quality
→ Accounting impact: warranty expenses and warranty reserves

Step 2: Assess Accounting Flexibility

Analysts must evaluate how much flexibilty managers have in reporting numbers.

- Accounting flexibility differs by industry because of accounting rules.
- Areas that usually involve flexibility: depreciation methods, inventory valuation, amortization of intangibles, pension benefit estimation

For Example,
High flexibility: Banks estimating expected loan defaults. Low flexibility: Marketing expenses in consumer products must usually be expensed immediately.

Step 3: Evaluate Accounting Strategy

If managers have accounting flexibility, they can use it in two ways:

- Informative reporting: Communicate the firm's real economic performance.
- Opportunistic reporting: Hide poor performance or manipulate earnings.

Analysts should evaluate: managers' reporting incentives, deviations from industry norms, history of accounting errors, complex transactions or structures

Step 4: Evaluate Quality of Disclosure

Analysts must assess whether disclosures help or hinder understanding.
Good disclosure makes financial statements easier to interpret.
Key aspects to examine: accounting choices, explanations of financial performance, non-financial information, segment reporting, discussion of bad news, quality of investor relations

Step 5: Identify Red Flags

Red flags are warning signals that accounting quality may be questionable.
They indicate areas where analysts should investigate more closely and gather additional information.

Examples of possible red flags: unexplained accounting changes, unusual revenue growth, unexplained transactions, unexpected large asset write-offs

Step 6: Recast Financial Statements

If accounting distortions are identified, analysts should adjust the financial statements, this is called recasting.

- Restate the numbers if the analysis suggests the reported numbers are misleading
- Cash flow statement provides an alternative benchmark and shows how individual line items in the income statement diverge from underlying cash flows
- Notes to the financial statements provide additional information about accounting changes and estimates made

Pitfalls in Accounting Analysis

1. Common standards ≠ common practices

Even if countries adopt the same accounting standards (e.g., IFRS), reporting quality can still differ.Reason:

- Differences in **l**egal systems
- Differences in regulation and enforcement
- Differences in institutional quality

So adoption of IFRS does not automatically guarantee high-quality financial reporting.

2. Not all unusual accounting is questionable

Unusual accounting choices do not necessarily mean manipulation.
Explanations: unusual business models or changes in business circumstances.
Analysts must investigate the economic reason behind accounting choices.

3. Conservative accounting is not always good accounting
Conservatism means systematically understating assets or earnings.
Potential problems:

- Understatement of assets
- Important information missing from financial statements

Example: R&D investments often create value but may not appear as assets.

4. Conservatism can lead to earnings smoothing
Managers may:

- Report **lower earnings in good times**
- Save reserves to **increase earnings in bad times**

This leads to **earnings smoothing**, which can distort real performance.

Question: If management reports truthfully, what economic events might explain the following accounting change?

Decrease in allowance for doubtful accounts (% of receivables)
→ Change in the customer base
→ Larger sale from reliable customers.

Capitalization of a higher proportion of development expenditures
→ Cost incurred on product development are to be capitalized
→ If the company completes the product design earlier than it initially expected, it can capitalize a higher promotion of development costs during that period

Accounting adjustments

Accounting Equation Elements

- **Assets**

Definition: Economic resources controlled by the firm that produce **future benefits**.
Examples: machinery, buildings, patents, receivables

- **Liabilities**

Definition: Present obligations that will result in **future outflows of resources**.
Examples: loans, accounts payable, pension obligations

- **Equity**

Represents the residual claim of shareholders. Formula: Equity = Assets – Liabilities

- **Income**

Increase in economic benefits during the accounting period.
Examples: sales revenu, investment income

- **Expenses**

Decrease in economic benefits during the accounting period.
Examples: wages, depreciation, raw materials

An asset is: A **resource controlled by the entity,** Resulting from **past events,** From which **future economic benefits are expected**

A liability is: A **present obligation,** Arising from **past events,** Expected to cause an **outflow of economic benefits**

Example: Assets?

Example 1: Machine
A company buys a machine for €1.5 million on January 1, 2022.
By December 31: The machine is ready for use. But it has not been used yet.

1. Controlled by the entity? Yes. The company owns and controls the machine.
2. Result of past events? Yes. The machine was purchased earlier in the year.
3. Expected future economic benefits? Yes. The machine will be used to produce goods in the future.

Conclusion: The machine qualifies as an asset, even though it has not yet been used.

Example 2: Trademark
A smartphone company's **registered trademark** is estimated to be worth **€30 billion**. Question: Should this value appear as an asset on the balance sheet?

1. Controlled by the entity? Yes. The firm owns the trademark.
2. Result of past events? Yes. The trademark was created and registered.
3. Expected future benefits? Yes. The brand generates future sales.

However, accounting standards create a restriction:
Internally generated trademarks usually cannot be recognized as assets.
Reason: Their value cannot be measured reliably.
This creates a balance sheet distortion because the brand may be extremely valuable but not reported.

Example: Liability?

Example 1 – Short-term loan
In mid-2022, the company borrowed €10 million from its bank. Reason: Lack of liquidity. Question: Is this a liability at December 31, 2022?

1. Present obligation? Yes. The company must repay the bank.
2. Result of past events? Yes. The loan agreement already occurred.
3. Expected outflow of resources? Yes. Repayment will require cash outflow.

Conclusion: The loan clearly qualifies as a liability.

Example 2 – Product recall
A defect is discovered in smartphones sold three years earlier. Problem: They require constant recharging. The company announces a product recall. Question:
Does this create a liability?

1. Present obligation? Yes. The firm publicly announced it and must fix the problem.
2. Result of past events? Yes. The defect originated from **past production errors**.
3. Expected outflow of resources? Yes. Costs will include: repair or replacement, logistics, customer compensation

Conclusion: A **provision for product recall** should be recognized as a liability

Lecture 3 – Accounting Adjustments & Cash Flow

Recap: Financial Statement Analysis Framework

Analysts use analysis tools:

- Business strategy analysis
- Accounting analysis (this lecture)
- Financial analysis
- Prospective analysis

The textbook describes 7 examples of asset distortions, but the lecture covers only **3**:
Example 1: Overstated depreciation of non-current assets
Example 2: Key intangible assets missing from the balance sheet
Example 3: Accelerated recognition of revenues

Topics not discussed in this lecture:

- **Liability distortions** (e.g., misestimation of provisions)
- **Equity distortions**

Important note:

- Asset distortions also affect equity, because of double-entry accounting.

Accounting Distortions & Adjustments

When identifying distortions, analysts should focus on accounting estimates and methods related to key business risks and success factors.
Balance Sheet Approach: Analysts examine distortions in assets, liabilities, equity

Why not focus only on the income statement?
Managers often manipulate earnings, but because of double-entry bookkeeping:

- Manipulating income statement items also affects the balance sheet

Therefore: Adjusting the balance sheet automatically adjusts the income statement.

Example 1: Overstated depreciation of non-current assets

Asset Distortion: Depreciation Example Lufthansa

- Lufthansa uses a **4.75% depreciation rate** for aircraft (20-year life).
- Industry peers use **3.8% depreciation** (25-year life).

Assumption: No operational differences justify the different rates.
Goal: Adjust Lufthansa's financial statements to improve comparability.

Items affected by depreciation adjustments

Balance Sheet

- Non-current tangible assets
- Deferred tax liability
- Equity / retained earnings

Income Statement

- Cost of sales / depreciation expense
- Profit before tax
- Income tax expense
- Net profit

Reason:
Changes in depreciation affect pretax profit, which changes taxes and net income.

IFRS vs Tax Accounting

Financial statements and tax reports serve different purposes:

- IFRS Financial Statements: Information for investors
- Tax Statements: Contracting and taxation

Because of different rules: The same transaction can be treated differently.
This leads to temporary differences, which are handled through:

- **Deferred Tax Liabilities (DTL)**
- **Deferred Tax Assets (DTA)**

These balance differences between accounting profit and taxable income.

Step 1: Adjust Opening Book Value

Goal: Adjust the book value of aircraft at the start of 2023.
We estimate what the value would have been with the correct depreciation rate.

Given data:

Residual value	5%
Useful life	20 years
Aircraft cost (Jan 1, 2023)	€32,791
Accumulated depreciation	€19,712

Depreciable cost	31,151 = 32,791 × (1 - 0.05)
Proportion depreciated so far	19,712/31,151 =63.3%
Average age of aircraft	12.66 years = 63.3% × 20

So the fleet is approximately 12.7 years old on average.

Actual Depreciation Schedule

Parameters:

- Aircraft value: €32,791
- Residual value: 5%
- Useful life: 20 years
- Depreciation rate: **4.75%** (= (1-0.05)/20)

	Beg. Value	Deprec.	End Value
Year 1	€ 32,791.00	€ 1,557.57	€ 31,233.43
Year 2	€ 31,233.43	€ 1,557.57	€ 29,675.86
Year 3	€ 29,675.86	€ 1,557.57	€ 28,118.28
Year 4	€ 28,118.28	€ 1,557.57	€ 26,560.71
Year 5	€ 26,560.71	€ 1,557.57	€ 25,003.14
Year 6	€ 25,003.14	€ 1,557.57	€ 23,445.57
Year 7	€ 23,445.57	€ 1,557.57	€ 21,887.99
Year 8	€ 21,887.99	€ 1,557.57	€ 20,330.42
Year 9	€ 20,330.42	€ 1,557.57	€ 18,772.85
Year 10	€ 18,772.85	€ 1,557.57	€ 17,215.28

	Beg. Value	Deprec.	End Value
Year 11	€ 17,215.28	€ 1,557.57	€ 15,657.70
Year 12	€ 15,657.70	€ 1,557.57	€ 14,100.13
Year 13	€ 14,100.13	€ 1,557.57	€ 12,542.56
Year 14	€ 12,542.56	€ 1,557.57	€ 10,984.99
Year 15	€ 10,984.99	€ 1,557.57	€ 9,427.41
Year 16	€ 9,427.41	€ 1,557.57	€ 7,869.84
Year 17	€ 7,869.84	€ 1,557.57	€ 6,312.27
Year 18	€ 6,312.27	€ 1,557.57	€ 4,754.70
Year 19	€ 4,754.70	€ 1,557.57	€ 3,197.12
Year 20	€ 3,197.12	€ 1,557.57	€ 1,639.55

Example:

- Year 1 depreciation: **€1,557.57**
- Ending value after 20 years: **€1,639.55 (residual value)**.

Reduced Depreciation Scenario

New parameters:

- Useful life: **25 years**
- Depreciation rate: **3.8%** (= (1-0.05)/25)

Example:

- Annual depreciation becomes **€1,246.06**

Result:

- Assets depreciate **more slowly**, meaning the book value remains **higher** over time.

Step 2: Adjust Accumulated Depreciation

Using the average age of **12.7 years**:

- Estimated accumulated depreciation: 12.7 years × 3.8% × 32,791 = 15,825
- Reported accumulated depreciation: 19,712
- Difference: 19,712 - 15,825 = 3,887
- Meaning: Non-current assets are **understated by €3,887**

Adjust balance sheet

Tax rate = **25%**

Deferred tax liability: 0.25 × 3,887 = 972

Equity increase: 0.75 × 3,887 = 2,915

Item	Adjustment
Non-current assets	+3,887
Deferred tax liability	+972
Equity	+2,915

	Adjustments Dec 31, 2022		Adjustments Dec 31, 2023	
	Assets	Liabilities	Assets	Liabilities
Balance sheet				
Non-current tangible assets	+ 3,887		+ 3,887	
Deferred tax liability		+ 972		+ 972
Equity		+ 2,915		+ 2,915
Income statement				
Cost of sales / depreciation expense				
Tax expense				
Net profit				

Step 3: Adjust 2023 Depreciation

Now adjust current year depreciation (2023).

Fleet cost at start of 2023: 32,791

Difference in depreciation rates: 0.0475 - 0.038

Adjustment: (0.0475 - 0.038) × 32,791 = 311.5

New aircraft purchased:

- Cost = €1,634, Used for half a year

Adjustment: (0.0475 - 0.038) × (1,634/2) = 7.7

Total reduction in depreciation: 311.5 + 7.7 = 319.2

Meaning: Depreciation expense should be **€319 lower**.

Updated Balance sheet

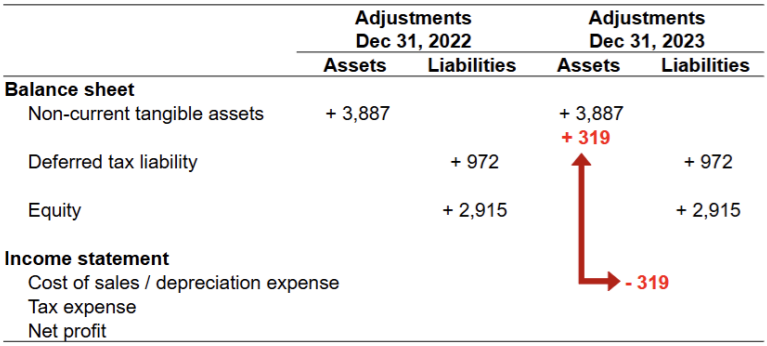
Non-current assets increase by:

- +3,887 (past correction)
- +319 (current year)

Updated Income statement

Depreciation expense decreases:

- -319



Step 4: Tax and Profit Effects

Lower depreciation → higher pretax income.

Asset increase: +319

Tax effect

Tax rate = 25%

0.25 × 319 = 80

Deferred tax liability increases by **80**.

Net income increase

0.75 × 319 = 239

Equity increases by **239**.

Important note:

- IFRS **does not allow retrospective changes** in depreciation estimates.
- The exercise is done **only for analytical comparison**.

Final Adjustment Overview

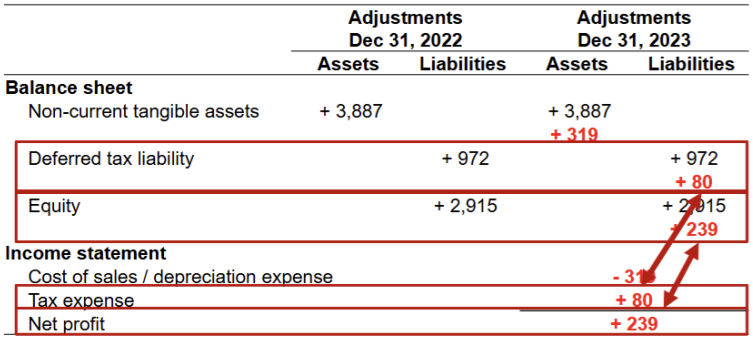
Final results after all adjustments:

Balance Sheet

Item	Adjustment
Non-current tangible assets	+3,887 + 319
Deferred tax liability	+972 + 80
Equity	+2,915 + 239

Income Statement

Item	Adjustment
Depreciation expense	-319
Tax expense	+80
Net profit	+239



Example 2: Key intangible assets off the balance sheet

Asset Distortion: R&D Intangibles

Some firms' most important assets do not appear on the balance sheet, including:

- Research & Development (R&D) investments
- Brands
- Customer membership bases
- Marketing-related intangible assets

Problem: Accounting rules often expense these costs instead of capitalizing them.

Consequences

1. Return ratios (ROA and ROE) are inflated
    - Because assets and equity are understated.
2. Harder to evaluate the business model
    - Operating performance becomes harder to judge.

Key point: **Most R&D costs are expensed instead of capitalized** in accounting.

This means:

- The investment is treated as a **cost in the income statement**
- Instead of being recorded as an asset on the balance sheet

Example Sanofi: The analyst considers:

- Capitalizing all R&D spending
- Amortizing it over its useful life

Financial statement items affected

Income Statement

- R&D expense (decreases)
- Amortization expense (increases)
- Profit before tax
- Income tax expense
- Net profit

Balance Sheet

- Non-current intangible assets
- Equity
- Deferred tax liability

The idea: convert R&D spending from an **expense** into an **asset that is amortized over time**.

R&D Capitalization Assumptions

The analyst assumes:

- Amortization method: Straight-line amortization
- Life of R&D investments: 5 years
- Timing assumption: R&D spending occurs evenly throughout the year

Therefore:

- Only half a year of amortization applies to the newest spending.

R&D spending history (Sanofi) →

Year	R&D Spending
2017	$5,472m
2016	$5,172m
2015	$5,082m
2014	$4,667m
2013	$4,605m
2012	$4,741m

Goal: Calculate how much R&D assets would appear on the balance sheet if these expenses had been capitalized.

Beginning of Adjustment Table

Operating expenses decrease by 5,172

Because the 2016 R&D expense is removed and capitalized. Explanation:

- Instead of treating R&D as a cost immediately, it becomes an intangible asset.
- However, amortization will be added later.

	Adjustments December 31, 2016		Adjustments December 31, 2017	
(€ millions)	Assets	Liabilities	Assets	Liabilities
Balance sheet				
Non-Current Intangible Assets				
Deferred Tax Liability				
Shareholders' Equity				
Income statement				
Other Operating Expenses		−5,172		−5,472
Other Operating Expenses				
Tax Expense				
Profit or Loss				

Calculating the R&D Asset (2016)

To compute the R&D asset at the end of 2016, the analyst capitalizes past R&D spending and subtracts amortization. For each year: →

Spending Year	Amortization Applied
2016	½ year
2015	1.5 years
2014	2.5 years
2013	3.5 years
2012	4.5 years

The more recent the spending, the **less amortization** it has accumulated.
This produces the remaining book value of R&D investments.

Calculated Intangible Asset Value

For each year: $Remaining\ Asset\ =\ R\&D\ spending * (1 - (\frac{1}{5} * years\ amortized)$

Results:

Year	R&D Outlay	Proportion Capitalized 31/12/16	Asset 31/12/16	Proportion Capitalized 31/12/17	Asset 31/12/17
2017	€5,472m			(1 − [1/5 × 0.5])	€4,925m
2016	5,172	(1 − [1/5 × 0.5])	€4,655m	(1 − [1/5 × 1.5])	3,620
2015	5,082	(1 − [1/5 × 1.5])	3,557	(1 − [1/5 × 2.5])	2,541
2014	4,667	(1 − [1/5 × 2.5])	2,334	(1 − [1/5 × 3.5])	1,400
2013	4,605	(1 − [1/5 × 3.5])	1,382	(1 − [1/5 × 4.5])	461
2012	4,741	(1 − [1/5 × 4.5])	474		
Total			€12,401		€12,947m

The €12,401 and €12,947, is the asset value that should appear on the balance sheet if R&D had been capitalized.

Balance Sheet Adjustment

The calculated R&D asset is inserted into the balance sheet adjustments. →

(€ millions)	Adjustments December 31, 2016 Assets	Adjustments December 31, 2016 Liabilities	Adjustments December 31, 2017 Assets	Adjustments December 31, 2017 Liabilities
Balance sheet				
Non-Current Intangible Assets	+12,401		+12,947	
Deferred Tax Liability				
Shareholders' Equity				
Income statement				
Other Operating Expenses		−5,172		−5,472
Other Operating Expenses				
Tax Expense				
Profit or Loss				

Calculating Amortization Expense

The analyst must also calculate amortization expense for the year 2017. For 2016, amortization includes:

- ½ year amortization of *2011 and 2016 spending*
- 1 year amortization of *2012, 2013, 2014 and 2015 spending*

This ensures the asset is gradually expensed over its useful life.

Amortization Calculation Table →

This is the amortization replacing the original R&D expense.

Year	R&D Outlay	Proportion Amortized in 2016	Expense in 2016	Proportion Amortized in 2017	Expense in 2017
2017	€5,472m			1/5 × 0.5	€547m
2016	5,172	1/5 × 0.5	€517m	1/5	1,034
2015	5,082	1/5	1,016	1/5	1,016
2014	4,667	1/5	933	1/5	933
2013	4,605	1/5	921	1/5	921
2012	4,741	1/5	948	1/5 × 0.5	474
2011	4,665	1/5 × 0.5	467		
Total			€4,803m		€4,927m

Final Adjustment Results →

Explanation:

- Removing R&D expenses raises profit
- But amortization offsets much of the increase.

(€ millions)	Adjustments December 31, 2016 Assets	Adjustments December 31, 2016 Liabilities	Adjustments December 31, 2017 Assets	Adjustments December 31, 2017 Liabilities
Balance sheet				
Non-Current Intangible Assets	+12,401		+12,947	
Deferred Tax Liability (tax rate = 34.40%)		+4,266		+4,454
Shareholders' Equity		+8,135		+8,493
Income statement				
Other Operating Expenses		−5,172		−5,472
Other Operating Expenses		+4,803		+4,927
Tax Expense (tax rate = 34.40%)		+127		+187
Profit or Loss		+242		+358

Key Takeaway from R&D Adjustment

Important insight: The net profit effect is relatively small.
Why? Because: The removed R&D expense is mostly replaced by amortization.

However: The balance sheet changes significantly
Equity increases because the firm now shows valuable R&D assets.
This improves financial ratios such as: ROE and ROA
Because the **true investment base is now recognized**.

Example 3: Accelerated recognition of revenues

This occurs when firms recognize revenue earlier than it should be recognized under economic reality.

Revenue Recognition Distortion

Revenues appear in the **income statement**, but incorrect recognition also affects the **balance sheet**. If revenues are **overstated**, the corresponding balance sheet distortion appears in: **accounts receivable**

Example company: **Healthcare Locums plc (UK)**
Business is recruiting medical specialists, placing them with healthcare providers
Problem: Revenue is recognized **when a job offer is accepted**, even though:

- The job may start years later, delays can reach up to 4 years due to visa issues.

Thus revenue is recorded **before it is actually earned**.

Revenue Data Example

(£ millions)	**2008**	**2007**	**2006**	**2005**
Revenues	5.3	4.0	3.2	1.0
Cost of Sales	0.8	0.4	0.4	0.1

Assumption: Candidates who accept a job in **2005** will start in: 2005, 2006, 2007 or 2008. Each with **25% probability**.
Therefore: Part of revenues recorded in later years are actually **unearned**.

Items Affected by Revenue Adjustment

If revenue recognition is corrected, the following items change:

- **Income Statement:** Sales revenue, Cost of sales, Profit before tax, Income tax expense, Net profit
- **Balance Sheet:** Accounts receivable, Prepaid expenses / other assets, Deferred tax liabilities, Equity

Revenue Adjustment Framework

1. Identify the portion of reported revenue that is actually earned in each year.
2. Identify the unearned portion that must be deferred.
3. Adjust: Revenue, Costs, Receivables, Deferred tax items, Equity

Resulting earned revenue percentages

Year	Earned	Unearned
2005	100%	0%
2006	75%	25%
2007	50%	50%
2008	25%	75%

Unearned Revenue Identification

Year	Unearned Portion	Contract amount	Amount unearned
2008	75%	5.3	4.0
2007	50%	4.0	2.0
2006	25%	3.2	0.8
Total			**6.8**

- The more recent the revenue, the **larger the unearned portion**.
- These amounts should be **removed from current revenue and deferred**.

Cost Adjustments

Costs must also be adjusted to match the corrected revenue timing.

Year	Contract cost	Proportion unearned (end-2008)	Cost associated with unearned revenues (end-2008)
2008	0.8	75%	0.6
2007	0.4	50%	0.2
2006	0.4	25%	0.1
Total			**0.9**

Step 1: Balance Sheet Adjustment

The first adjustment affects **assets on the balance sheet**. Results:

- Trade receivables decrease by 6.8.
- Non-current assets (prepaid expense) increase by 0.9.

Step 2: Adjust DTL (here an asset) & equity

Assuming a tax rate of 28,5%

- **DTL** → (- 6.8 + 0.9) x 0.285 = - 5.9 x 0.285 = - 1.7
- **Equity** → (- 6.8 + 0.9) x (1 - 0.285) = - 5.9 x 0.715 = - 4.2

Summary of Balance Sheet Changes →

	Adjustments	
(£ mn)	**Assets**	**Liabilities and Equity**
Balance sheet		
Trade Receivables	−6.8 (1)	
Other Current/Non-Current Assets	+0.9 (1)	
Deferred Tax Liability		−1.7 (2)
Shareholders' Equity		−4.2 (2)

Step 3: Revenue Adjustment

The analyst calculates the correct revenue for 2008.

Earned revenue calculation: (0.25 × 1.0) + (0.25 × 3.2) + (0.25 × 4.0) + (0.25 × 5.3) = 3.4
Reported 2008 revenue: 5.3
Correct revenue: 3.4
Adjustment: 5.3 - 3.4 = 1.9

Therefore: Revenue is **overstated by 1.9**.

Step 4: Cost of Sales Adjustment

Correct cost of sales: (0.25 × 0.8) + (0.25 × 0.4) + (0.25 × 0.4) + (0.25 × 0.1) = 0.425
Reported cost of sales: 0.8
Adjustment: 0.8 - 0.425 = 0.375

Thus: Cost of sales should **decline by 0.375**.

Step 5: Tax Adjustment

Since profits decrease after correcting revenue, **tax expense must also decrease**.

Profit reduction before tax: 1.9 - 0.375 = 1.525
Tax rate: 28.5%
Tax adjustment: 1.525 × 0.285 ≈ 0.4

Thus: Tax expense decreases by **0.4**, Deferred tax liabilities decrease accordingly.

Summary of Income Statement Changes →

Income statement	
Revenue	−1.9 (3)
Cost of Sales	−0.4 (4)
Tax Expense	−0.4 (5)
Profit or Loss	−1.1 (5)

Cash Flow Analysis (Chapter 5.8)

Cash flow statement: provides information about how a company generates and uses cash. It is useful for assessing the quality of earnings.

- Key warning sign: An increasing gap between net income and cash flow from operations (CFO) may indicate earnings manipulation or low earnings quality.

Cash flow statement structure

1. **Cash Flow from Operations (CFO)**: Cash generated from core business activities.
2. **Cash Flow from Investing (CFI)**: Cash used to buy or sell long-term assets.
3. **Cash Flow from Financing (CFF)**: Cash from or paid to investors and lenders.

Change in Cash = CFO + CFI + CFF

Two methods to report operating cash flow

1. **Direct method**: Shows cash receipts and payments directly.
2. **Indirect method** (most common): Starts from net income, adjusts for accruals.

Cash Flows and Accruals

Net Income = CFO + Accruals

Accruals arise because accounting shifts the timing of cash flows.

Example: Inventory purchase

- Cash is paid immediately
- But inventory becomes an asset
- Expense occurs later when inventory is sold

Therefore: CFO decreases, Net income does not change immediately
→ This difference is an **accrual adjustment**.

Indirect Cash Flow Calculation

Rearranging the equation: CFO = Net Income - Accruals

This is what the **indirect cash flow method** does:

1. Start with net income
2. Adjust for changes in non-cash assets and liabilities

Accruals are essentially: Changes in non-cash assets or liabilities over time.

Current vs Non-Current Accruals

Accruals can be divided into two categories.

- **Current accruals**: Changes in (non-cash) current assets and liabilities.
  Examples: Accounts receivable, Inventory, Accounts payable
- **Non-current accruals**: Changes in long-term assets and liabilities.
  Examples: PPE, Investments, Deferred tax assets/liabilities

CFO = Net Income - Current Accruals - Noncurrent Accruals

Cash Flow as a Quality Check

An increasing gap between **earnings and cash flow** is considered a **red flag**.

Example:

	2022	**2023**	**2024**	**2025**
Net Income	100	105	110	110
CFO	120	100	50	-20

Observation: Net income stays stable, Cash flows deteriorate dramatically
Implication: Earnings may be **inflated through accrual accounting**.

Earnings Management via Accruals

Managers may manipulate earnings using accounting discretion.

Examples of **income-increasing accruals**: Accelerating credit sales, Understating allowances, Capitalizing expenditures, Reducing liability reserves, Reducing depreciation expense

These actions increase **net income without increasing cash flows**.

Balance Sheet Trail of Earnings Management

Earnings manipulation through accruals leaves a **trace in the balance sheet**.

Examples:

Manipulation	**Balance Sheet Effect**
Accelerating credit sales	Higher accounts receivable
Understating allowances	Higher net receivables
Capitalizing expenditures	Higher assets
Reducing liability reserves	Lower liabilities
Reducing depreciation	Higher non-current assets

Therefore: Analysts can detect manipulation by examining balance sheet distortions.

Lecture 4: Ratio Analysis

Review: Why Accounting Analysis?

- "Garbage in, garbage out". Important for: Ratio analysis, Forecasting, Valuation.
- Accounting analysis ensures reliable inputs before doing ratio analysis.

6 Steps in Accounting Analysis:

1. Identify key accounting policies
2. Assess flexibility
3. Evaluate strategy
4. Evaluate disclosure quality
5. Identify red flags
6. Recast financial statements

Review: Assets & Liabilities

Asset: Resource, Controlled by entity, From past events, Future economic benefit
Liability: Obligation, From past events, Leads to outflow of resources

Review: Accounting Adjustments

Purpose: Make firms comparable, Focus on economic substance, Remove noise
Examples: R&D capitalization, Leasing, Depreciation differences, Revenue recognition
Process:

1. Start with reported numbers
2. Compute adjustment
3. Apply corrections

Review: Cash Flow Statement

Helps assess earnings quality. Red flag when earnings ≠ cash flow
Cash flows: 1. Operating (CFO), 2. Investing (CFI), 3.Financing (CFF)

Lecture 4: Ratio Analysis

Ratio Analysis

- Uses adjusted financial statements
- Evaluates company performance
- Foundation for forecasting

In ratio analysis, an analyst compares ratios:

1. Over time within a company
2. Between a company and its (industry) peers
3. With absolute benchmarks

Ratio Analysis Techniques

Time-series analysis: Compare same firm over time
Cross-sectional analysis: Compare with comparable firms

Before starting Ratio Analysis understand financial statement items first, because there is no universal reporting standard

ROE

Ratios explain: Company's performance and drivers of that performance

ROE formula: ROE = Net Income / Shareholders' Equity

In the long-run, value of a company's equity is determined by the **relation between ROE and the cost of equity capital** (r_e).

- This is helpful because in most industries ROE tends to be driven towards a 'normal' level of r_e.
- Deviations from a normal level arise due to: Industry conditions, Competitive strategy and Accounting distortions

Important note for formula: Use **average equity** (not beginning or end)

Example: Coca-Cola ROE Calculation

- Net income: 10,649
- Average equity: 26,926 (average from begin and end balance 'total equity')

→ ROE = Net income / Average equity = 10,649 / 26,926 = **39.55%**

Benchmarks: S&P 500: ~13%, Beverage industry: ~30.6%

Interpretation: Coca-Cola highly profitable. Likely strong competitive advantage

ROE Decomposition

A decomposition of ROE helps better understand the sources of profitability
Because most companies have both equity and debt financing, part of profitability for shareholders comes from investments made through debt financing

Step 1: Decompose ROE into (1) ROA and (2) Equity Multiplier

$$ROE = \frac{NetIncome}{Assets} * \frac{Assets}{Equity}$$

Explanation: Debt increases ROE. If no debt → ROE = ROA

Step 2: Decompose ROA into: (1) Return on Sales (ROS) and (2) Asset Turnover (ATO)

$$ROE = \frac{NetIncome}{Sales} * \frac{Sales}{Assets}$$

Where:

- ROS (net profit margin) = profitability
- ATO = efficiency

Consolidated Net income	10,649
Total Equity, begin	27,480
Total Equity, end	26,372
Average Equity	26,926
Total assets begin	97,703
Total assets end	100,549
Average total assets	99,126
Sales revenue	47,061

Step 3: Decompose ROE into: (1) Return on Sales (ROS), (2) Asset Turnover (ATO), (3) Equity Multiplier

$$ROE = \frac{NetIncome}{Sales} * \frac{Sales}{Assets} * \frac{Assets}{Equity}$$

→ This is also known as "DuPont" analysis or decomposition

Example: Coca-Cola Decomposition

- ROS = 10,649 / 47,061 = 22.63%
- ATO = 47,061 / 99,126 = 0.4748
- Equity Multiplier = 99,126 / 26,926 = 3.6814

ROE = 22.63% × 0.4748 × 3.6814 = 39.55%
ROE = Net income / Average equity = 10,649 / 26,926 = **39.55%**

High ROE driven by: Strong margins, High leverage

Interpretation of ROE Decomposition

Profitability increases via:

1. Higher margins (ROS ↑)
2. Better efficiency (ATO ↑)

Trade-off:

- High margin → low turnover (ATO)
- Low margin → high turnover (ATO)

Examples:

- Capital-intensive industries (shipping, utilities) → high margins, low turnover
- Competitive industries (food stores, retail) → low margins, high turnover

Problems with Basic Analysis

Ratios are useful but flawed

Main issue: Financial statements mix up operating, investing and financing activities

Important concept:

- Only **operations & investments create value**
- Financing should NOT create value

Breaking Down the Balance Sheet

Assets:

- Operating assets (OA) → generate sales
- Investment assets (IA) → excess cash investments

Liabilities:

- Operating liabilities (OL)
- Financial obligations (FO)

→ Capital is provided by equity- and debt-holders and used to invest in assets

ROA Mismatch Problem

- Numerator (Net Income): After interest (debt costs)
- Denominator (Assets): Includes assets financed by debt
- Assets include operating + investment assets
- Income includes different types of returns

To conclude: ROA mixes inconsistent elements → leads to distortion.

Reformulating Financial Statements

Step 1: Classify items into: OA (Operating Assets), OL (Operating Liabilities), IA (Investment Assets) and FO (Financial Obligations)

Example Coca-Cola

December 31,		ASSETS
Current Assets		
Cash and cash equivalents	IA	
Short-term investments	IA	
Total Cash, Cash Equivalents and Short-Term Investments		
Marketable securities	IA	
Trade accounts receivable, less allowances of $506 and $502, respectively		OA
Inventories		OA
Prepaid expenses and other current assets		OA
Total Current Assets		
Equity method investments		OA
Deferred income tax assets		OA
Property, plant and equipment — net		OA
Trademarks with indefinite lives		OA
Goodwill		OA
Other noncurrent assets		OA
Total Assets		

Assets Classification

- Most assets = operating
- Cash/investments = investment assets

Liabilities Classification

- OL (operating liabilities: accounts payables, accrued income taxes, other noncurrent liabilities, deferred income tax)
- FO (financial obligations: loans and notes payable, long-term debt)

Reformulated Balance Sheet (Assets Side)

Operating assets (OA): Receivables, inventory, PPE, goodwill, etc. Total OA ≈ 85,978
Investment assets (IA): Cash, short-term investments. Total IA ≈ 14,571
Total assets = 100,549

Reformulated Liabilities & Equity

Operating liabilities (OL): ≈ 29,655
Financial obligations (FO): ≈ 44,522
Equity: ≈ 26,372

Reformulation = reclassification, not recalculation.

ASSETS	LIABILITIES + EQUITY
Operating assets (OA)	
– Operating liabilities (OL)	
= NOA (Net Operat. Assets)	
	Financial obligations (FO)
	Equity
Investment assets (IA)	
= Business Assets	*= Net Capital*

Net Operating Assets (NOA)

NOA captures pure operating investment.
NOA = Operating Assets - Operating Liabilities
Concept: Move OL to asset side

- NOA + IA = Business Assets
- FO + Equity = Net Capital

Full Reformulation (Coca-Cola)

- OA = 85,978
- OL = 29,655
- NOA = 56,323
- IA = 14,571
- Business assets = 70,894
- FO = 44,522
- Equity = 26,372

December 31, (In millions except par value)		2024	2023
Operating assets (OA)			
OA	Trade accounts receivable, less allowances of $506 and $502, respectively	3,569	3,410
OA	Inventories	4,728	4,424
OA	Prepaid expenses and other assets	3,129	5,235
OA	EQUITY METHOD INVESTMENTS	18,087	19,671
OA	DEFERRED INCOME TAX ASSETS	1,319	1,561
OA	PROPERTY, PLANT AND EQUIPMENT net	10,303	9,236
OA	TRADEMARKS WITH INDEFINITE LIVES	13,301	14,349
OA	GOODWILL	18,139	18,358
OA	OTHER NONCURRENT ASSETS	13,403	7,796
		85,978	**84,040**
Operating liabilities (OL)			
OL	Accounts payable and accrued expenses	21,715	15,485
OL	Accrued income taxes	1,387	1,569
OL	OTHER NONCURRENT LIABILITIES	4,084	8,466
OL	DEFERRED INCOME TAX LIABILITIES	2,469	2,639
		29,655	**28,159**
Net operating assets (NOA)		**56,323**	**55,881**
Investment assets (IA)			
IA	Cash and cash equivalents	10,828	9,366
IA	Short-term investments	2,020	2,997
IA	Marketable securities	1,723	1,300
		14,571	**13,663**
Business assets (BA)		**70,894**	**69,544**
Financial obligations (FO)			
FO	Loans and notes payable	1,499	4,557
FO	Current maturities of long-term debt	648	1,960
FO	LONG-TERM DEBT	42,375	35,547
		44,522	**42,064**
Equity			
	EQUITY ATTRIBUTABLE TO SHAREOWNERS OF THE COCA-COLA CO	24,856	25,941
	EQUITY ATTRIBUTABLE TO NONCONTROLLING INTERESTS	1,516	1,539
		26,372	**27,480**
Net capital		**70,894**	**69,544**

Income Statement Reformulation

Define:

1. **NOPAT** (Operating profit after tax)
   = (operating revenue - operating expense) × (1 – tax rate)
2. **NIPAT** (Investment profit after tax)
   = (investment income + interest income) × (1 – tax rate)
3. **IEAT** (Interest expense after tax)
   = (interest expense) × (1 – tax rate)

Net income = NOPAT + NIPAT - IEAT

Important: Tax rate must be computed from statements → 2,437 / 13,086 = 18.62%

Linking Balance Sheet & Income

Assets (NOA and IA) generate income (NOPAT and NIPAT) that will be used to remunerate capital providers in the following order

1. External capital providers (IEAT)
2. Shareholders (Net Profit)

Coca-Cola Reformulated Income Statement

Content:

- NOPAT ≈ 11,193
- NIPAT ≈ 804
- IEAT ≈ 1,348

Net income = 10,649

Extra detail: Tax rate ≈ 18.62%

Combined View

Summary of Reformulation advantages:

- Separate:
  1. Operating activities
  2. Investment activities
  3. Financing
- Identify: NOPAT, NIPAT, IEAT

Result: Better ratio analysis. Better identification of value drivers

Summary: Reformulation allows more accurate and meaningful analysis.

Year Ended December 31, (In millions except per share data)	2024	2023
NET OPERATING REVENUES	47,061	45,754
Cost of goods sold	(18,324)	(18,520)
Selling, general and administrative expenses	(14,582)	(13,972)
Other operating charges	(4,163)	(1,951)
Equity income (loss) net	1,770	1,691
Other income (loss) net	1,992	570
Net operating income	13,754	13,572
Tax	2,561	2,357
Net operating profit after tax (NOPAT)	**11,193**	**11,215**
Interest income	988	907
Tax	184	157
Net investment profit after tax (NIPAT)	**804**	**750**
Interest expense	1,656	1,527
Tax	308	265
Interest expense after tax (IEAT)	**1,348**	**1,262**
Net income = NOPAT + NIPAT - IEAT	**10,649**	**10,703**

13,754 × 18.62% = 2,561

Balance Sheet

Assets	2024	2023	Liabilities & Equity	2024	2023
Net operating assets (NOA)	56,323	55,881	Financial obligations (FO)	44,522	42,064
Investment assets (IA)	14,571	13,663	Equity	26,372	27,480
Business assets (BA)	**70,894**	**69,544**	**Net capital**	**70,894**	**69,544**

Income Statement

	2024	2023
NET OPERATING REVENUES	**47,061**	**45,754**
Net operating profit after tax (NOPAT)	11,193	11,215
Net investment profit after tax (NIPAT)	804	750
Interest expense after tax (IEAT)	1,348	1,262
Net income = NOPAT + NIPAT - IEAT	**10,649**	**10,703**

Practical Issues (1): aggregation

- Reformulation is challenging in practice
- Financial statement items are aggregated

Key points:

- Use notes to financial statements
- Some items mix operating & investing
- If both are material → split them

Practical Issues (2): Tax Rate

Tax rate:

- Use effective tax rate
- Formula: Tax rate = Tax expense / Pretax income

Reason: Ensures consistency when splitting income

Advanced ratio analysis.

RNOA (Return on Net Operating Assets)

RNOA measures pure operating performance (better than ROA).
Formula: RNOA = NOPAT / NOA
Coca-Cola example: RNOA = 11,193 / 56,102 = 19.95%
Comparison: Higher than traditional ROA (10.74%)

RNOA = operating return on sales (OROS) x operating asset turnover (OATO)
= (NOPAT / Sales) × (Sales / NOA)

ROIA (Return on Investment Assets)

Formula: ROIA = NIPAT / IA
Coca-Cola: ROIA = 804 / 14,117 = 5.70%
Interpretation: Investment assets yield much lower returns

ROBA (Return on Business Assets)

Formula: ROBA = (NOPAT + NIPAT) / Business Assets
Coca-Cola: ROBA = 17.09%
Question: Why different from ROA? Explanation:

- ROA mixes financing effects
- ROBA removes financing distortion

Summary: ROBA = return on total business operations + investments.

Linking ROBA and ROE

→ If company has no debt and was financed only with equity: ROE = ROBA
Difference depends on: Return on borrowed funds vs interest cost

ROE Decomposition (Advanced)

ROE = (NOPAT + NIPAT)/Equity – Interest expense after tax/equity
→ ROE = ROBA + (Spread × Financial Leverage)
If no debt → ROE = ROBA

Coca-Cola Advanced Decomposition

- ROE ≈ 39.5%
- ROBA = 17.09%
- Spread = [17.09%] - [1,348 / 43,293] = 13.97%
- Leverage = 43,293 / 26,926 = 1.61

Formula: ROE = ROBA + Spread × Leverage = 17.09% + (13.97%) × 1.6079 = 39.55%
Interpretation: High ROE partly due to positive leverage effect

Reformulation C

Split NOA into:

- OWC (Operating Working Capital)
- NNCOA (Net Non-Current Operating Assets)

Condensed Balance Sheet

- **Operating working capital (OWC)**
  = Non-cash current assets -/-Non-debt current liabilities
- **Net non-current operating assets (NNCOA)**
  = Total long-term operating assets - non-interest bearing long-term liabilities

Purpose: Simplify for forecasting

Profitability Ratios

Gross Profit Margin = (Revenue - Cost of sales) / Revenue

The gross profit margin is an indicator of: Pricing power and Production efficiency

EBITDA Margin = EBITDA / Revenue

Measures operating profitability at different levels.

Financial Leverage

→ Debt increases capital access but raises risk. Leverage = risk vs return trade-off.
Types of analysis: Liquidity (short-term) vs Solvency (long-term)

Liquidity Ratios

Consists of: Current ratio, Quick ratio, Cash ratio
Purpose: Assess ability to generate sufficient cash to meet short-term obligations

Liquidity Interpretation

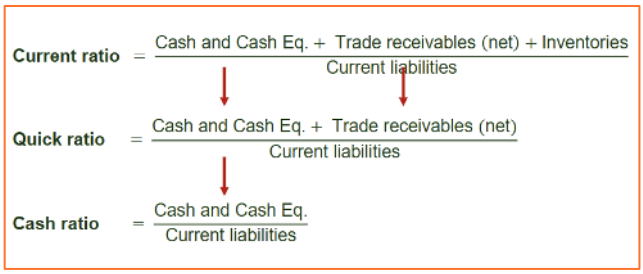
- Important for creditors
- Focus on liquid assets and collectable liabilities

Key idea: Efficient firms minimize excess liquidity
Summary: Too much liquidity = inefficiency, Too little = risk

Current Ratio

Formula: Current assets / Current liabilities
where Current Assets = C&CE + Trade Receivables + Inventories

Expresses the degree of the coverage of the short-term liabilities by current assets
Rule: CR>1 = acceptable
Summary: Basic measure of short-term solvency.



Quick Ratio

Formula: (Cash + receivables) / Current liabilities
→ Excludes inventory
Summary: More conservative liquidity measure.

Cash Ratio

Formula: Cash / Current liabilities
Summary: Strictest liquidity measure.

Long-Term Solvency Ratios

Solvency measures the ability of a firm to meet long-term obligations.

- Debt-to-equity: Debt / Equity
- Financial leverage: Assets / Equity

Interpretation: Higher = more risk
Summary: Measures long-term financial stability.

Lecture 5 – Forecasting & Valuation

Chapter 6: Forecasting

Prospective Analysis

- Shift from **backward-looking → forward-looking**
- Two parts: (1) Forecasting and (2) Valuation
- Flow of analysis tools:
    - Business strategy → Accounting → Financial → **Prospective analysis**

Forecasting

- Forecasting is **Step 1**, valuation is **Step 2**
- Prospective Analysis (Forecasting) summarizes what has been learned from:
    1. Business strategy analysis
    2. Accounting analysis
    3. Financial analysis
- Techniques help structure forecasts

Comprehensive Forecasting

- Forecast **everything**, not just earnings, but also balance sheet and cash flow
- Balance sheet prevents unrealistic assumptions
    - Example: Sales growth → requires: working capital, assets, financing

Key Drivers of Forecasting

1. Sales growth
2. Profit margin (NOPAT margin)
3. Asset turnover

Explanation:

- Most forecasts rely on a **few core assumptions**
- Linking items avoids inconsistencies, e.g. balance sheet linked to sales

Condensed Statements

- Use simplified (“condensed”) financial statements
- Easier forecasting (fewer assumptions)
- Focus on: Operating vs investing vs financing
- Key outputs: Net profit, Equity

Condensed Balance Sheet

- Need forecasts of:
  - OWC, NNCOA, IA and FO
  - → to derive equity

Operating working capital (OWC)
+ Net non-current operating assets (NNCOA)
= Net operating assets (NOA)
+ Investment assets (IA)
= Business assets (BA)
Financial obligations [Debt] (FO)
+ Equity
= Net capital

Condensed Income Statement

Flow:

- Sales → Net operating profit (NOP) → Tax → **NOPAT**
- Investment income – tax → **NIPAT**
- Interest expense - tax→ **IEAT**
- Net income = NOPAT + NIPAT - IEAT

Explanation:

- Net income is built from **operating + investing - financing effects**

Important Note

- Financial analysis → uses **average balance sheet values**
- Forecasting → uses **beginning values**

Example:

- OATO = Sales / Beginning NOA (forecasting)

Forecasting Steps

Steps:

1. Start with last known condensed balance sheet (e.g., 2024)
2. Forecast sales growth
3. Forecast NOPAT margin
4. Operating:
   - Operating working capital to revenue → OWC/Sales
   - Net operating non-current asset to revenue → NNCOA/Sales
5. Investment:
   - Ratio of investment assets to revenue → IA/Sales
   - Return on investment assets → Return on IA
6. Financing:
   - Ratio of debt to capital → Debt %
   - Interest rate after tax → Interest expense %

- Framework of assumptions:

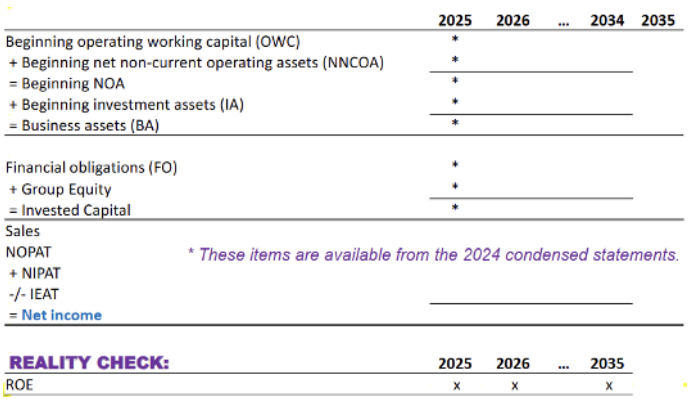
10 years

Assumptions	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1. Sales growth	X%	X%	X%	X%	X%	X%	X%	X%	X%	X%	
2. NOPAT margin	X%	X%	X%	X%	X%	X%	X%	X%	X%	X%	
3. Operating working capital turnover	X%										
4. Net non-current operating asset turnover	X%										
5. Investment assets turnover	X%										
6. Return on investment											
7. Debt / Equity	X%										
8. Interest rate after tax	X%										
9. Cost of equity	X%										
10. Terminal growth rate											X%

"Terminal" year

Condensed Balance sheet and Income statement

Explanation: ROE consistency ensures forecasts are reasonable



	2025	2026	...	2034	2035
Beginning operating working capital (OWC)	*				
+ Beginning net non-current operating assets (NNCOA)	*				
= Beginning NOA	*				
+ Beginning investment assets (IA)	*				
= Business assets (BA)	*				
Financial obligations (FO)	*				
+ Group Equity	*				
= Invested Capital	*				
Sales					
NOPAT					
+ NIPAT					
-/- IEAT					
= Net income					

** These items are available from the 2024 condensed statements.*

REALITY CHECK:	2025	2026	...	2035
ROE	x	x		x

How to Calculate Forecasts

- Sales (2025) = Sales (2024) × growth (2025)
- NOPAT (2025) = Sales (2025) × NOPAT margin
- NIPAT (2025) = IA (2025) × ROIA (2025)
- IEAT (2025) = Debt (2025) × interest rate (2025)

Linking Balance Sheet to Sales

- OWC (2026) = Sales (2025) × (OWC/Sales) (2025)
- NNCOA = Sales (2025) × NNCOA/Sales (2025)
- IA = Sales (2025) × IA/Sales (2025)
- Financial obligations (2026) = Business assets (2026) × Debt/BA (2026)
- Group Equity (2026) = Business assets (2026) - Debt (2026)

Repeat calculations for each year

Regular Performance Behavior

- Use past performance to understand behavior of key measures (time series)
- Earnings are *persistent*; future earnings can be predicted by current earnings

Formula: $\text{Earnings}_{t+1} = a + b \times \text{Earnings}_t + e$, where $b > 0$

Sales Growth Behavior

- Sales growth is **mean-reverting** (Long-run: ~6–10%)
- Growth slows due to: market saturation and industry competition

Regular Performance Behavior (Earnings & ROE)

- **Earnings:**
  - Follow a *random walk* (or with drift)
  - Trends tend to persist over time
- **ROE:**
  - Depends on earnings + asset base
  - Mean-reverting (Long-run: 8–12%)
  - Persistent high ROE only if:
    1. Competitive advantage
    2. Conservative accounting (e.g., R&D)

ROE Behavior

- Top performers (top fifth): start high → decline
- Bottom performers: start low → improve
- All groups converge toward similar ROE levels over time

ROE Components

- **Operating Asset Turnover (OATO)** → stable
- **Financial leverage** → stable
- **NOPAT margin & spread** → more variable, competitive forces drive down abnormal ROE through NOPAT margins and spread

Chapter 7: Valuation

Valuation Methods

- Discounted dividends
- Discounted abnormal earnings
- Multiples

Value for Shareholders

- Shareholders earn returns via: dividends and/or price appreciation

Discounted Dividends Model (DDM)

- Value = Present Value of expected future dividends: $V = \frac{Div_1}{1+r_e} + \frac{Div_2}{(1+r_e)^2} + \ldots$
- With constant growth: $V = \frac{Div_1}{r_e - g}$

DDM: Pros & Cons

Advantages:

- Easy concept/Intuitive: dividends = shareholder payoff
- Stable (short-term predictability)

Disadvantages:

- Dividends ≠ value creation (they are financing decisions)
- Many firms don't pay dividends

When DDM Fails

- Problems:
    1. High-growth firms → no dividends (e.g., Amazon, Tesla)
    2. Firms that prefer buybacks to dividends
    3. Unstable dividend policies

Discounted Abnormal Earnings (AE) valuation model

- Also called **Residual Income Model**
- Better linked to value creation
- Does NOT require dividends forecasts

Key assumption: Clean surplus relation: $BVE_1 = BVE_0 + Earnings_1 - Dividends_1$

Explanation:

- All equity changes (except share issues/repurchases) go through income

Transforming the Model

- Rewrite clean surplus equation: $Dividends_1 = Earnings_1 + BVE_0 - BVE_{E1}$
- Substitute into DDM
- Introduce "zero-sum" equation
- Add to valuation formula
- Repeating process infinitely

Result: Expression for value in terms of Book value and Earnings
Explanation: Leads to abnormal earnings model

AE Model Result

- Value expressed as:
  - Current book value (BVE_0)
  - Future earnings ($Earnings_{1,2,3,...}$)
  - Future book values of equity ($BVE_{1,2,3,...}$)

$$V = BVE_0 + \sum_{t=1}^{\infty} \frac{Earnings_t - r_e BVE_{t-1}}{(1+r_e)^t}$$

This is the **Discounted Abnormal Earnings** (AE) valuation model, also known as the **Residual Income valuation model**

Why AE Model is Better

- Does not directly rely on dividend forecast
- Uses forecast of earnings (value creation measure)
  - Unlike dividends, earnings have a close connection with value creation
- Does not only require forecasts
  - Starts from shareholder value in balance sheet (BVE)

Abnormal Earnings Defined

- Normal earnings = ($r_e \times BVE_0$)
- Abnormal earnings (AE): ($AE = Earnings - r_e \times BVE$)
- Discounted AE: ($AE/(1+r_e)^t$)

Explanation: AE = extra value created above required return

Interpretation of AE Model

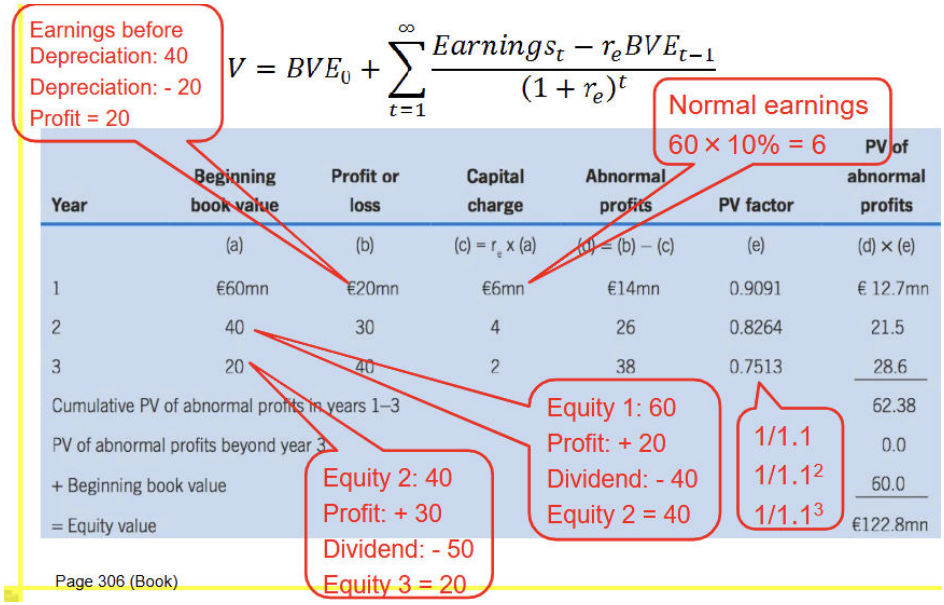
The model suggests that equity value should be equal to the accountant's estimate of value (BVE_0) if the company makes earnings that are 'normal' or 'expected'.

- AE = 0 → Value = Book value
- AE > 0 → Value > Book value
- AE < 0 → Value < Book value

AE Example

Company: Equity = 60m. Horizon = 3 years.Cost of equity = 10%

Given: Expected dividends and profit; year 1: 40, year 2: 50, year 3: 60 (in millions)



Year	Beginning book value	Profit or loss	Capital charge	Abnormal profits	PV factor	PV of abnormal profits
	(a)	(b)	(c) = r_e x (a)	(d) = (b) – (c)	(e)	(d) × (e)
1	€60mn	€20mn	€6mn	€14mn	0.9091	€ 12.7mn
2	40	30	4	26	0.8264	21.5
3	20	40	2	38	0.7513	28.6
Cumulative PV of abnormal profits in years 1–3						62.38
PV of abnormal profits beyond year 3						0.0
+ Beginning book value						60.0
= Equity value						€122.8mn

Page 306 (Book)

Effect of Accounting Treatments

- AE valuation depends on: earnings and book value (BVE)
- Accounting choices affect both
- Accounting is self-correcting over time

Example: R&D expensing → understates equity

Accounting Treatment Example

- Year 1: Earnings understated by 10m, BVE understated by 10m
- Year 2: Earnings overstated by 10m

Impact on abnormal earnings: Year 1: AE ↓ by 10m, Year 2: AE ↑ by 11m:

- +10m earnings
- +1m from lower "normal earnings" (due to lower BVE → AE is higher by 10% × 10m)

Key result: Total valuation remains unchanged → Accounting distortions cancel out

Market-to-Book Ratio (MTB)

- MTB = Price / Book value (BVE)
- Observation: Often **MTB > 1**

Why?

- Market reflects **future value (forward-looking)**
- Accounting reflects **past costs (backward-looking)**

MTB and AE Model

- Divide valuation equation by BVE_0
- Result: MTB depends on:
  → ROE, Cost of equity (r_e), Growth (g)

$$\frac{V}{BVE_0} = 1 + \frac{ROE_1 - r_e}{(1+r_e)} + \frac{(ROE_2 - r_e)(1+g_1^{equity})}{(1+r_e)^2} + \frac{(ROE_3 - r_e)(1+g_1^{equity})(1+g_2^{equity})}{(1+r_e)^3} + \dots$$

Explanation: shows link → Value depends on **ROE vs expected rate r_e**

ROE-Based Valuation Formula

If we assume that the company is in a steady state, with a permanent growth rate in equity (g^{equity}) and a stable level of ROE, the ratio of equity value to book value can be rewritten as:

$$\text{Equity value-to-book multiple} = 1 + \frac{ROE_0 - r_e}{r_e - g^{equity}}$$

Question Example (ROE Implied by Price)

Current market price is €15 per share, book value is €5 per share. Analysts forecast that book value will grow by 10 percent per year indefinitely and the cost of equity is 15 percent. What is the market's expectation of the long-term average ROE?

Answer: $\frac{15}{5} = 1 + \frac{ROE - 0.15}{0.15 - 0.10}$ → $\frac{ROE - 0.15}{0.05} = 2$ → ROE = 0.25

Interpretation: Market expects very high profitability

Question: What will the stock price be if the market revises its expectations of long-term average ROE to 20 percent?

Answer: $\frac{P}{5} = 1 + \frac{0.20 - 0.15}{0.15 - 0.10} = 2$ → $P = 10$

So, price drops from €15 → €10, this is a change in stock price of -33.3%

Lecture 6 – Valuation & Security Analysis (Part 1)

Recap

Focus from **backward-looking (financial analysis)** → to **forward-looking (prospective analysis)**

Two steps: Forecasting and Valuation

- **Forecasting** should be **comprehensive**: Not just earnings, but also **balance sheet**
- Key drivers: Sales, Profit margin (NOPAT), Asset turnover (assumed constant)

Forecasting Steps

Steps for forecasting (e.g., 2025–2034):

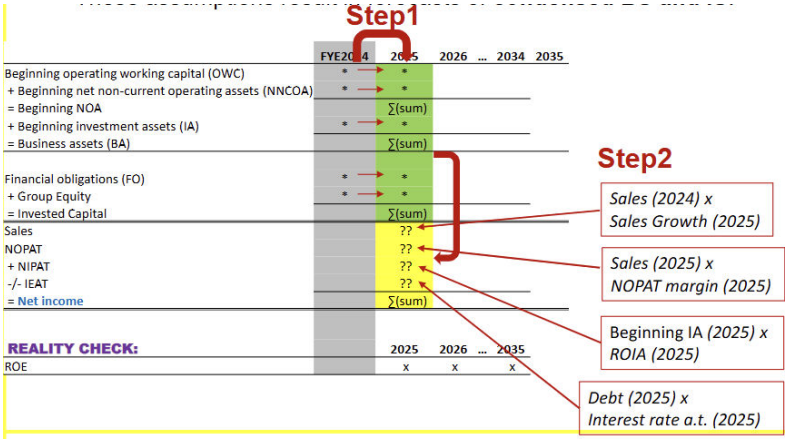
1. Start with **2024 balance sheet**
2. Forecast **sales growth**
3. Forecast **NOPAT margin**
4. Operating items:
    - Operating working capital to revenue (OWC / Sales) %
    - Net operating non-current asset to revenue (NNCOA / Sales) %
5. Investment items:
    - Ratio of investment assets to revenue (IA / Sales) %
    - Return on investment assets (NIPAT / IA) %
6. Financing items:
    - Ratio of debt to capital (Debt / Business Assets) → Gives us Debt %
    - Interest rate after tax (IEAT) → Gives us Interest expense %

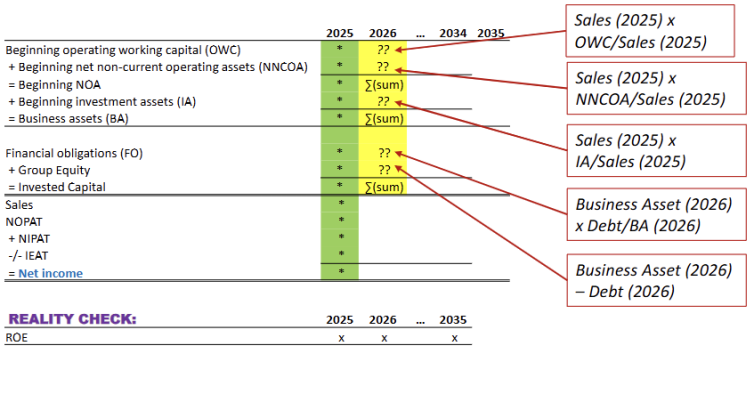
▪ Framework of assumptions: 10 years

Assumptions	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1. Sales growth	X%	X%	X%	X%	X%	X%	X%	X%	X%	X%	
2. NOPAT margin	X%	X%	X%	X%	X%	X%	X%	X%	X%	X%	
3. Operating working capital turnover	X%										
4. Net non-current operating asset turnover	X%										
5. Investment assets turnover	X%										
6. Return on investment											
7. Debt / Equity	X%										
8. Interest rate after tax	X%										
9. Cost of equity	X%										
10. Terminal growth rate											X%

"Terminal" year

Forecasting Financial Statements





Dividend Discount Model (DDM)

Value = PV of expected future dividends

$$V = \frac{Dividends_1}{1 + r_e} + \frac{Dividends_2}{1 + r_e} + \frac{Dividends_3}{1 + r_e} + \cdots$$

Pros:

- Dividends = actual cash to shareholders
- Stable and easy to forecast

Cons:

- Not all firms pay dividends
- Buybacks may replace dividends
- Not directly linked to value creation

Discounted Abnormal Earnings Model

Value = Book value of equity + PV of abnormal earnings

- Normal level of earnings = (r_e × BVE_0)
- Abnormal earnings = ($Earnings_1$ - r_e × BVE_0)

$$V = BVE_0 + \sum_{t=1}^{\infty} \frac{Earnings_t - r_e BVE_{t-1}}{(1 + r_e)^t}$$

"Normal" Earnings Explained

- ROE = NI / BVE
- "Normal" when: **ROE = required return (r_e)**
- Thus: Normal earnings = (r_e × BVE)

If AE > 0: Equity grows over time → **clean surplus relation**.

Interpretation of Abnormal Earnings

- PV(AE) > 0 → **Value > Book Value**
- PV(AE) = 0 → **Value = Book Value**
- PV(AE) < 0 → **Value < Book Value**

Chapter 8: Valuation Implementation

Valuation Approaches Overview

Start from condensed balance sheet → Can value equity using multiple approaches

Assets			Claims		
Asset	**Primary performance forecast**	**Discount rate**	**Claim**	**Primary performance forecast**	**Discount rate**
Value of operating assets	NOPAT	Required return on operating assets (r_{NOA})	After-tax value of debt claims	(1 − tax rate) × Interest expense	Cost of debt (r_D)
+ Value of investment assets	+ NIPAT	Required return on investment assets (r_{NIA})	+ Value of equity claim	+ Net profit	Cost of equity (r_E)
= Total value of business assets	= NOPAT + NIPAT	Weighted average cost of capital (WACC)	= Total value of capital claims	= Net profit + (1 − tax rate) × Interest expense	Weighted average cost of capital (WACC)

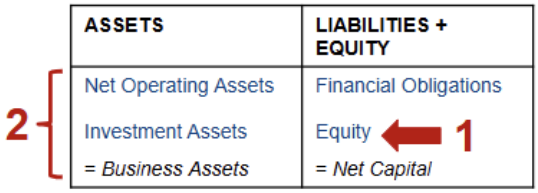
Two Main Approaches

1. Equity-side valuation

Value the equity directly using the Discounted Abnormal Earnings Valuation model, discounted at the cost of equity

2. Asset-side (enterprise valuation)

- Value business assets first using **WACC**
- Then: **Subtract debt → get equity value**



Cost of Equity (CAPM)

- Needed for equity valuation

$$\rightarrow Cost\ of\ equity\ \ (r_e) = r_f + \beta[E(r_m) - r_f]$$

Risk-free rate (r_f)

- Compensation for delaying consumption
- Measured using: Government bonds (10-year)

Systematic risk (β)

- Computed using firm returns and market returns
- Often use industry averages (Damodaran)

Market Risk Premium ($E(r_m) - r_f$)

- Difference between (i) the return on a broad-based equity market indexand (ii) return on government debt
- Source: Damodaran datasets

Enterprise Valuation

- Relies on a version of the Discounted Abnormal Earnings Valuation model
- Values business assets instead of equity
- Instead of: Net income → use **NOPAT + NIPAT**
- Formula: →
  - where BVA is the book value of business assets (= NOA + IA)

$$V = BVA_0 + \frac{NOPAT_1 + NIPAT_1 - r_{wacc}BVA_0}{(1 + r_{wacc})} + \frac{NOPAT_2 + NIPAT_2 - r_{wacc}BVA_1}{(1 + r_{wacc})^2} + \cdots$$

Enterprise Valuation (Interpretation)

- Replace net income with: **NOPAT + NIPAT** (before interest)
- This reflects: Returns to **both debt and equity holders**
- Discount rate: Use **WACC (r_{wacc})**

Process:

1. Value total business assets
2. Subtract **debt → get equity value**

Weighted Average Cost of Capital (WACC)

- Captures the weighted average of required returns on debt and equity
- $(1 - tax\%) * r_d$ is simply the interest rate after-tax (IEAT / FO)

Formula: $r_{wacc} = \frac{Financial\ obligations}{Net\ capital} * (1 - tax\%) * r_d + \frac{Equity}{Net\ capital} * r_e$

Terminal Values

- Previous examples assumed: Short life (3 years) or steady state
- Reality: Firms require **finite forecast horizon (5–10 years)**

Definitions:

- Final forecast year = **terminal year**
- Terminal period is the period in which we expect salesgrowth, margins turnover ratios and leverage ratios to remain attheir steady state levels.

Terminal value = **PV of abnormal earnings after terminal year**

Implication: Need to estimate long-run future performance
→ Requires **simplifying assumptions** (cannot forecast forever)

Terminal Value Formula

Formula:

$$TV = \frac{Abnormal\ earnings_t(1 + g)}{(r_e - g)(1 + r_e)^T}$$

Terminal Value (Steps)

1. Forecast AE in **T+1** using the AE in year Tand an assumed growth rate g
2. Assume **constant growth g forever**
3. Discount infinite stream: Divide by (r_e - g)
4. Discount back T years: Divide by $(1 + r_e)^T$

Terminal Value Assumptions

Impact depends on forecast horizon:

- Long horizon → TV less important
- Short horizon → TV very important

Three cases:

1. **Competitive equilibrium**: AE = 0 → TV = 0
2. **Sustainable advantage**: AE constant
3. **Growing advantage**: AE grows at rate g

Valuation Decomposition

Total value: **V = BVE + PV(AE) + TV**

Where:

- BVE = current book value
- PV(AE) = forecast period abnormal earnings
- TV = value beyond horizon

Insights:

- Short horizon + high growth → TV dominates
- Want more weight on **BVE and PV(AE)**, less on TV

Growth Rate Issues

Terminal value formula problems:

- g > r_e → impossible
- g = r_e → undefined
- g ≈ r_e → extremely large TV

$$TV = \frac{Abnormal\ earnings_T(1+g)}{(r_e - g)(1+r_e)^T}$$

Conclusion:

- Must have: **g << r_e**

Accounting Distortions

- If analyst correctly adjusts: Valuation remains valid

However:

- Distortions increase **uncertainty**
- Effects: Less weight on book value. More reliance on forecasts.

→ Less uncertainty would exist if accounting quality was high and the analyst could simply start with current book value and earnings

Negative Book Value of Equity

Causes:

- Start-ups (high investment)
- Conservative accounting
- Poor performance

Problems:

- AE model becomes difficult

Solutions:

1. Use **enterprise valuation** (abnormal NOPAT + NIPAT) and subtract thevalue of financial obligations
2. Adjust book value
3. Reverse-engineer: Start with observed market price and work backwards. Infer assumptions from market price

Valuation Using Multiples

Common multiples: P/E, Market-to-book, EV/EBITDA

Steps:

1. Find comparable firms
2. Compute average multiple
3. Apply to target firm

Example:

- Value = Earnings × industry P/E

Law of One Price

- Identical assets → same price

Application:

- Use benchmark P/E: Multiply by firm's EPS
- Compare: Estimated price vs actual price

Multiples: Disadvantages

- Hard to find **true comparable firms**
- Industry averages may be misleading
- Cross-country differences: Growth, Risk, Markets

Key limitation:

- Multiples depend on **accounting choices**

Examples:

- R&D accounting: Can distort earnings and equity

Compared to AE model:

- Multiples are **less theoretically grounded**

Lecture Summary

- Two valuation approaches: **Equity (AE model)**, **Enterprise (WACC-based)**
- Terminal value: Critical but assumption-heavy
- Growth assumptions: Must be realistic ($g < r_e$)
- Practical issues: Accounting distortions, Negative equity
- Alternative: **Multiples (simple but less precise)**

Lecture 7 – Valuation & Security Analysis (Part 2)

Prospective Analysis Framework

1. Accounting analysis
2. Financial analysis
3. **Prospective analysis**
   - Focus: forecasting and valuation

Key Valuation Models Overview

- **Abnormal earnings**

$$V = BVE_0 + \frac{Earnings_1 - r_e BVE_0}{(1+r_e)} + \frac{Earnings_2 - r_e BVE_1}{(1+r_e)^2} + \frac{Earnings_3 - r_e BVE_2}{(1+r_e)^3} + \cdots$$

- **Equity value-to-book multiple**

$$1 + \frac{ROE_0 - r_e}{r_e - g^{equity}}$$

- **ROE Version**

$$\frac{V}{BVE_0} = 1 + \frac{ROE_1 - r_e}{(1+r_e)} + \frac{(ROE_2 - r_e)(1+g_1^{equity})}{(1+r_e)^2} + \frac{(ROE_3 - r_e)(1+g_1^{equity})(1+g_2^{equity})}{(1+r_e)^3} + \cdots$$

- **Enterprise Valuation**

$$V = BVA_0 + \frac{NOPAT_1 + NIPAT_1 - r_{wacc} BVA_0}{(1+r_{wacc})} + \frac{NOPAT_2 + NIPAT_2 - r_{wacc} BVA_1}{(1+r_{wacc})^2} + \cdots$$

Exercise 1

- Case: **Coca-Cola valuation**
- Data provided: Income statement 2024, Balance sheet 2024, Forecasts 2025-2027

Goal: Apply **Discounted Abnormal Earnings (DAE)** model.

Condensed income statement	**2024**	**2025**	**2026**	**2027**
Sales	47,061	47,930	50,330	53,113
Sales growth	2.86%	1.85%	5.01%	5.53%
NOPAT	11,193	11,400	11,970	12,632
NIPAT	804	819	860	907
IEAT	1,348	1,427	1,498	1,581
Minority interest	18	18	19	20
Net income	10,631	10,773	11,313	11,938

Income Statement Data

- Shows actual (black) vs forecast (red)
- Assumptions: Margins and ratios **constant**

Condensed balance sheet	**2024**	**2025**	**2026**	**2027**
Beginning NOA	55,881	56,323	59,143	62,414
Beginning investment assets	13,663	14,571	15,301	16,147
Beginning business assets	69,544	70,894	74,444	78,560
Beginning financial obligations	42,064	44,522	46,751	49,336
Beginning common equity	25,941	24,856	26,101	27,544
Beginning minority interest	1,539	1,516	1,592	1,680
Beginning net capital	69,544	70,894	74,444	78,560

Balance Sheet Data

- Values increase over time
- Assumptions: Capital structure and NOA turnover constant

Exercise 1 (Questions)

a. Assuming an equity beta of 0.80, a risk-free rate of 4.25 percent (based on the 10-year US treasury rate), and a market risk premium of 5 percent, compute Coca-Cola's cost of equity capital.

- Apply CAPM: Cost of equity (r_e) = risk-free rate (r_f)+ systematic risk (b) × market risk premium ($E[r_m]$-/-r_f)
- = 4.25% + 0.80 × 5% = 8.25%

b. Given the information above, your estimate of the cost of equitycapital (re), and an assumption of a permanent annual growth inabnormal earnings of 0.5 percent after 2027 (g), compute the totalvalue of common equity for Coca-Cola on March 21, 2025.

To apply AE model:

1. Forecast horizon (T = 3)
2. Book value of equity
3. Earnings forecasts
4. Future book values
5. Cost of equity (8.25%)
6. Terminal growth rate (g)

- V = BVE_0 + discounted AE_1 + AE_2 + AE_3 + terminal value

Steps:

1. Calculate abnormal earnings (AE) in years 2025, 2026, and 2027:

- $AE_1 = NI_1$ -/- $r_e \times BVE_0$ = 10,773 -/- 8.25% × 24,856 = 8,723
- $AE_2 = NI_2$ -/- $r_e \times BVE_1$ = 11,313 -/- 8.25% × 26,101 = 9,160
- $AE_3 = NI_3$ -/- $r_e \times BVE_2$ = 11,938 -/- 8.25% × 27,544 = 9,666

2. Discount the AEs at the appropriate rate:

- $PV(AE_1) = AE_1 / (1 + r_e)$ = 8,723 / (1.0825) = 8,058
- $PV(AE_2) = AE_2 / (1 + r_e)^2$ = 9,160 / $(1.0825)^2$ = 7,817
- $PV(AE_3) = AE_3 / (1 + r_e)^3$ = 9,666 / $(1.0825)^3$ = 7,620

3. Take the sum of discounted AEs [PV(AE)]:

- $PV(AE) = PV(AE_1) + PV(AE_2) + PV(AE_3)$ = 8,058 + 7,817 + 7,620= 23,495

4. Compute the terminal value (TV):

a) Let the undiscounted AE3 grow with g to AE4:
AE4 = AE3(1 + g) = 9,666 × (1.005) = 9,714.39

b) Assume a permanent growth rate of g:
AE4 / (re − g) = $\frac{9{,}714.39}{0.0825-0.005}$ = 125,347.02

c) Discount back to present value today:
[AE4 / (re − g)] / (1 + re)3 = 125,347.02 / $(1.0825)^3$ = 98,817

5. Take the sum of BVE, PV(AE), and TV:
BVE + PV(AE) + TV = 24,856 + 23,495 + 98,817= 147,168 ($millions) = V

c. Given a total number of 4,311,000,000 common shares outstanding, compute the value of common equity per share for Coca-Cola on March 21, 2025.

- $ 147,168 mln / 4,311 mln = $34.14 per share

d. The closing market price was $68.67 on March 21, 2025. What does this value imply about the market's expected rate of future growth in abnormal earnings?

- Holding all else constant, we can now 'search' for a growth rate (g) that equates the valuation V (34.14) to the current stock price P (68.67)
- Filling in different rates in Excel suggests that V = P when g is close to 5.0%
- Using the Excel 'solver' function, we find the exact number: g = 5.02%
- → This suggests that the market expects a growth rate of ~5.02% in abnormal earnings after 2027, which is higher growth than model assumption.

Exercise 2

- Instead of Discounted Abnormal Earnings Valuation, use **enterprise valuation**
- Steps: 1. Value business assets, 2. Subtract debt → get equity

Given data from 2024 income statement and balance sheet for AFSA Corp.

- No investment assets
- Sales growth: **4% (2025–2027)**
- NOPAT and NOA: **constant**
- Growth in abnormal NOPAT (g): **3.5%**
- WACC: **8.5%**
- Debt: **$36,000m**
- Shares: **3,200m**

Sales Revenue	$ 68,000 m
Net operating profit before tax	$ 13,000 m
Net operating profit after tax	$ 9,000 m
Beginning net operating assets	$ 100,000 m
Ending net operating assets	$ 104,400 m

- NOPAT margin = NOPAT/Sales = 9,000/68,000 = 0.132 = 13.2%

Goal: Compute **enterprise value → equity value → price per share**

Model using $T = 3$:

$$V = BVA_0 + \frac{ANOPAT_1 + ANIPAT_1}{(1+r_{wacc})} + \frac{ANOPAT_2 + ANIPAT_2}{(1+r_{wacc})^2} + \frac{ANOPAT_3 + ANIPAT_3}{(1+r_{wacc})^3} + \frac{(ANOPAT_3 + ANIPAT_3)(1+g)}{(r_{wacc}-g)(1+r_{wacc})^3}$$

Because there are no investment assets/income:

$$V = NOA_0 + \frac{ANOPAT_1}{(1+r_{wacc})} + \frac{ANOPAT_2}{(1+r_{wacc})^2} + \frac{ANOPAT_3}{(1+r_{wacc})^3} + \frac{ANOPAT_3(1+g)}{(r_{wacc}-g)(1+r_{wacc})^3}$$

Where $ANOPAT_t = NOPAT_t - r_{wacc} \times NOA_{t-1}$

To apply enterprise valuation:

1. Forecast horizon (T = 3)
2. Business assets (NOA)
3. Forecast NOPAT
4. Forecast NOA
5. WACC (8.5%)
6. Growth rate g (3.5%)

1. Calculate expected NOPAT and beginning NOA in years 2025-2027

a. Starting point: Forecast sales in years 2025-2027 using the 2024 number and the expected growth rate of 4%:

- Sales2025 = Sales2024 × (1.04) = 68,000 × (1.04) = 70,720
- Sales2026 = Sales2025 × (1.04) = 70,720 × (1.04) = 73,548.80
- Sales2027 = Sales2026 × (1.04) = 73,548.80 × (1.04) = 76,490.75

b. Compute NOPAT margin for 2024:

- NOPAT / Sales = 9,000 / 68,000 = 13.2%

c. Forecast NOPAT in 2025-2027 given the sales forecasts and a constant NOPAT margin of 13.2%:

- NOPAT2025 = Sales2025 × 13.2% = 9,360
- NOPAT2026 = Sales2026 × 13.2% = 9,734.40
- NOPAT2027 = Sales2027 × 13.2% = 10,123.78

d. Compute expected NOA turnover for 2025:

- NOA turnover2025 = Sales2025 / NOA2025 = 70,720 / 104,400 = 0.677

e. Forecast the beginning NOA for 2026 and 2027 (i.e., ending 2025 and 2026):

- NOA2026 = 73,548.80 / 0.677 = 108,576.00
- NOA2027 = 76,490.75 / 0.677 = 112,919.04

We now have:

		2024		2025		2026		2027
Sales revenue	$	68,000.00	$	70.720,00	$	73.548,80	$	76.490,75
NOPAT	$	9,000.00	$	9.360,00	$	9.734,40	$	10.123,78
NOPAT+NIPAT	$	9,000.00	$	9.360,00	$	9.734,40	$	10.123,78
Beginning NOA	$	100,000.00	$	104,400.00	$	108.576,00	$	112.919,04
Beginning business assets	$	100,000.00	$	104,400.00	$	108.576,00	$	112.919,04
NOPAT margin		13.2%		13.2%		13.2%		13.2%
NOA turnover				0.677		0.677		0.677

2. Calculate abnormal NOPATs (AN) in years 2025, 2026, and 2027:

- AN1 = NOPAT1 -/- rwacc × NOA0 = 9,360 – 8.5% × 104,400 = 486
- AN2 = NOPAT2 -/- rwacc × NOA1 = 9,734.40 – 8.5% × 108,576 = 505.4
- AN3 = NOPAT3 -/- rwacc × NOA2 = 10,123.78 – 8.5% × 112,919.04= 525.66

Discount the ANs at the appropriate rate:

- PV(AN1) = 486 / (1.085) = 447.93
- PV(AN2) = 505.44 / (1.085)2 = 429.35
- PV(AN3) = 525.66 / (1.085)3 = 411.54

3. Take the sum of discounted ANs [PV(AN)]:
PV(AN) = PV(AN1) + PV(AN2) + PV(AN3) = 447.93 + 429.35 + 411.54 = 1,288.82

4. Compute the terminal value TV:
a. Let the undiscounted AN3 grow with g to AN4:
AN4 = AN3(1 + g) = 525.66 × (1.035) = 544.06
b. Assume a permanent growth rate of g:
AN4 / (rwacc – g) = $\frac{544.06}{0.085-0.035}$ = 10,881.11
c. Discount back to present value today:
[AN4 / (rwacc – g)] / (1 + re)3 = 10,881.11 / (1.085)3 = 8,518.91

5. Take the sum of NOA, PV(AN), and TV:
NOA + PV(AN) + TV = 104,400 + 1,288.82 + 8,518.91 = 114,207.73 = value of the business assets ("enterprise")

6. Subtract the value of debt:
Equity value = Enterprise value - Debt value= 114,207.73 – 36,000 = 78,207.73

7. Value per share = Equity value / shares = 78,207.73 / 3,200= $24.44

Clean Surplus

- Book value evolves via retained earnings only
- Reality: clean surplus relation does often not hold
- Why? → Some items go directly to equity, not income statement

$$BVE_1 = BVE_0 + Earnings_1 - Dividends_1 + \varepsilon_1$$

Other Comprehensive Income (OCI)

- OCI = "dirty surplus" items
- Formula: **Comprehensive income = Net income + OCI**
- Found in: Statement of comprehensive income

Examples:

1. Unrealized gains/losses
2. Foreign currency translation adjustments

Clean Surplus in Practice

- AE model still works despite violations. Clean surplus holds in expectation.
- Reason: OCI behaves like random noise. Expected value E(OCI) ≈ 0

Chapter 9 – Equity Security Analysis

Equity Security Analysis

= The evaluation of a firm and its prospects from the perspective of a current or potential. Goals:

1. Identify mispriced securities
2. Gain an appreciation of how a security would affect the risk of given portfolio

Key logic:

- If P > V → overpriced
- If V > P → underpriced

Market Efficiency

- Semi-strong efficiency: Prices reflect public info

Implications:

- Most stocks fairly priced. But: Noise → mispricing exists

Role of analysis:

- Obtain private information beyond the publicly available information

Limits to Efficiency

- Prices reflect private info only if: benefits > costs

Insights:

- Information is costly
- Markets not perfectly efficient
- Also: Investors often misinterpret accounting info

Types of Analysts

1. **Sell-side**
   - Brokerage firms
   - Public recommendations
2. **Buy-side**
   - Fund managers
   - Internal analysis

Sell-side Analyst Incentives

- Accuracy matters: Promotions vs job loss
- Analysts are: Economic agents responding to incentives

Face incentives to issue biased forecasts:

1. Generate trading activity
2. Support investment banking
3. Please managers; they rely on management for info. Managers prefer optimistic long-term, and pessimistic short term (to "beat expectations")

Walk-Down Phenomenon

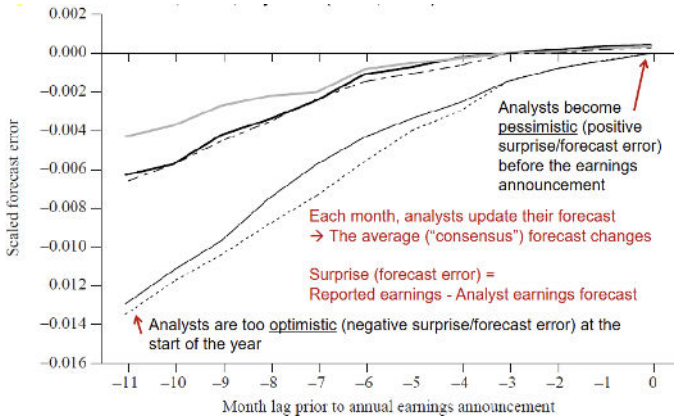
- Forecasts start high → gradually revised downward

Pattern:

- Early optimism
- Late pessimism

Earnings surprises:

- Often positive near announcement



Earnings Surprise Distribution

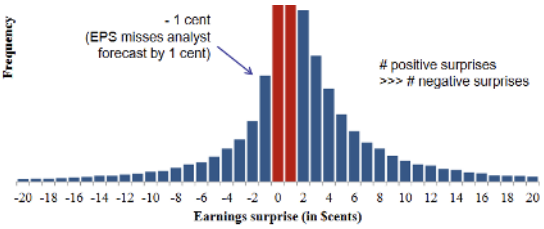
- More small positive surprises than negative ones

Interpretation:

- Firms tend to just beat expectations

→ Suggests:

- Forecast manipulation / expectation management



Regulation & Information Flow

- Incentive #3 reduced due introduction of Reg FD (US): Limits private info sharing
- Similar EU rules

Reality: Private communication still exists → Imperfect regulation.

Supplemental Signals

1. Management forecasts
2. Dividend changes
3. Insider trading

Summary Lecture 7

- Full valuation exercises: AE model and Enterprise model
- Key takeaway: Most value = terminal value
    - Market prices reveal growth expectations
- Clean surplus & OCI: Mostly noise in valuation
- Security analysis: Goal = find mispricing
- Market efficiency: Not perfect → opportunities exist
- Analysts: Incentives → biased forecasts