

CFA® Level I

One-Page Learning Module Summaries

Equity Investments

8 learning modules · one page each · built from CFA Program Level I curriculum, Volume 5

How each page works

■ Module banner	Exact module title, exam relevance (High/Medium/Low-yield) and whether it is calculation- or concept-heavy.
■ The big picture	Two or three sentences of intuition: why the module exists.
■ Learning outcomes	Every LOS of the module, in book order, rewritten as what you must know or do.
■ Key formulas / key facts	Formulas in curriculum notation with every variable defined; fact tables for concept modules.
■ Worked example	One numerical example (or a short Ethics case). Tagged [CFA curriculum] when taken from the curriculum, [Illustrative] when made up by RBei.
■ What examiners like to test	Traps, key distinctions and typical question angles.

Notes. (1) The curriculum lists LOS without letters; “LOS 1, 2, 3” follows the order in the book. (2) Exam relevance is RBei’s judgement from the number of LOS, the calculation LOS and the weight of worked examples and practice problems in each module; the curriculum does not rate modules. (3) [India context, not curriculum] marks Indian examples added for context; they are not curriculum. (4) [Note: ...] marks places where the curriculum is inconsistent or offers two framings.

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Module 1 — Market Organization and Structure

Topic: Equity Investments · Exam relevance: **High-yield · Calculation + concept**

The big picture

The financial system lets strangers contract with each other to move money through time, hedge risks and swap assets; intermediaries make this cheap and safe. The one calculation to master is **leverage**: buying on margin multiplies both gains and losses on the equity you put up.

Learning outcomes in plain language

- LOS 1 Functions.** Help people save, borrow, raise equity, manage risk, exchange assets, trade on information; discover rates that equate savings and borrowing; allocate capital.
- LOS 2 Classify assets and markets.** Financial vs real; debt vs equity; public vs private; primary vs secondary; money vs capital markets; cash (spot) vs derivative; traditional vs alternative.
- LOS 3 Instruments.** Securities (debt, equity, warrants, pooled vehicles), currencies, contracts (forwards, futures, swaps, options, insurance), commodities, real assets.
- LOS 4 Intermediaries.** Brokers, exchanges, ATSs, dealers, securitizers, banks, insurers, arbitrageurs, clearinghouses, custodians: connect traders or transform risk.
- LOS 5 Positions.** Long gains if price rises; short gains if it falls (loss potentially unlimited); short seller borrows, sells, buys back, pays **payments-in-lieu** of dividends.
- LOS 6 Margin maths.** Leverage ratio, return on equity of a margin purchase (after interest, dividends, commissions), margin-call price.
- LOS 7 Instructions.** Execution = how to fill (market, limit, AON, hidden, iceberg); validity = when (day, GTC, IOC, on-close, stop); clearing = how to settle.
- LOS 8 Market vs limit orders.** Market: fills fast, uncertain price. Limit: controls price but may never fill (execution risk).
- LOS 9 Primary vs secondary.** Issuers sell new securities (IPO, seasoned, private placement, shelf, rights); liquid secondary markets lower issuers' cost of capital.
- LOS 10 Market structures.** Call vs continuous; quote-driven (dealers), order-driven (precedence rules, discriminatory pricing), brokered.
- LOS 11 Well-functioning system.** Complete markets, operational efficiency (low trading costs), timely disclosure, informational and allocational efficiency.
- LOS 12 Regulation.** Control fraud and agency problems, promote fairness, set standards, curb undercapitalised firms' risk, fund long-term liabilities.

Key formulas

$$\text{Leverage ratio} = \frac{\text{Value of position}}{\text{Equity in position}}, \quad \text{Return on equity} = \frac{\text{Remaining equity} - \text{Initial investment}}{\text{Initial investment}}$$

$$\text{Margin call if } \frac{P_0(\text{IM}) + (P - P_0)}{P} < \text{MM} \Leftrightarrow P < P_0 \frac{1 - \text{IM}}{1 - \text{MM}}$$

where P_0 = purchase price; P = current price; IM = initial margin (equity fraction at purchase); MM = maintenance margin (usually 25%). Maximum leverage ratio = $1/\text{IM}$ (40% margin $\Rightarrow$ 2.5). Remaining equity = sale proceeds – loan – margin interest + dividends – sales commission. Ignoring costs, return on equity = leverage ratio $\times$ price return. Short sellers face a margin call when the price **rises**.

Worked example (CFA curriculum)

Total return (Example 19). Buy 1,000 shares at \$20 with leverage ratio 2.5, call money rate 5%, dividend \$0.10, commission \$0.01/share; sell at \$15 after one year. Equity = $20,000/2.5 = \$8,000$ plus \$10 commission = **\$8,010**; loan = \$12,000. Remaining equity = $15,000 - 12,000 - 600 + 100 - 10 = \$2,490$. Return = $(2,490 - 8,010)/8,010 = -68.9\%$, versus -25% on the stock ($2.5 \times -25\% = -62.5\%$ from leverage; the rest is mostly interest).

Margin call price (Example 20). IM = 40% of \$20 = \$8 equity; MM = 25%. Solve $(8 + P - 20)/P = 0.25 \Rightarrow P = \$16$; shortcut $20 \times 0.60/0.75 = 16$.

What examiners like to test

- **Leverage from margin:** a 55% minimum margin gives a maximum leverage ratio of $1/0.55 = 1.82$; the return on equity uses the **initial investment including the purchase commission** as the base.
- **Stop orders:** a “stop 30, market sell” becomes valid once a trade occurs at or below 30 but may fill well **below** 30 — it does not guarantee a price (a put option does).
- **Limit order jargon:** a buy limit above the best offer is **marketable**; between bid and offer it **makes a new market**; at the best bid it **makes market**; below the bid it is **behind the market**. Precedence = price, then display, then time.

Module 2 — Security Market Indexes

Topic: Equity Investments · Exam relevance: **High-yield · Calculation + concept**

The big picture

An index is a portfolio on paper: a set of constituent securities chosen to represent a **target market**, combined with a weighting rule. The weighting rule decides whose returns matter most, so the same five stocks can give very different index returns.

Learning outcomes in plain language

- LOS 1 What an index is.** Securities representing a market, segment or asset class; **price return** and **total return** versions.
- LOS 2 Index value and returns.** Value = $\sum n_i P_i / \text{divisor}$; price return uses prices only; total return adds income, chain-linked over periods.
- LOS 3 Construction choices.** Target market, which securities, how to weight, when to rebalance, when to re-examine.
- LOS 4 Weighting methods.** Price (arbitrary weights), equal (small-cap bias, rebalancing), market-cap (momentum), fundamental (value tilt).
- LOS 5 Compute value and return under each method.** Sum of weight $\times$ constituent return; adjust the divisor after a split.
- LOS 6 Rebalancing vs reconstitution.** Rebalancing restores weights (usually quarterly); reconstitution changes constituents.
- LOS 7 Uses.** Sentiment gauge; proxy for market return, beta and alpha; asset-class proxy; benchmark; model portfolio (ETFs).
- LOS 8 Equity index types.** Broad market ($>90\%$ of a market), multi-market, sector, and style (value/growth, size).
- LOS 9 Compare indexes** by target market, constituents, weighting and rebalancing.
- LOS 10 Fixed-income indexes.** Huge, changing universe; illiquid, dealer-priced bonds; costly to replicate; aggregate, sector, style.
- LOS 11 Alternative-investment indexes.** Commodity (futures; own weights; roll yield), real estate (appraisal, repeat sales, REIT), hedge fund (survivorship bias).

Key formulas

$$V_{PRI} = \frac{\sum_{i=1}^N n_i P_i}{D}, \quad PR_I = \frac{V_{PRI1} - V_{PRI0}}{V_{PRI0}} = \sum_{i=1}^N w_i PR_i, \quad TR_I = \frac{V_{PRI1} - V_{PRI0} + Inc_I}{V_{PRI0}} = \sum_{i=1}^N w_i TR_i$$

$$w_i^P = \frac{P_i}{\sum_{i=1}^N P_i}, \quad w_i^E = \frac{1}{N}, \quad w_i^M = \frac{f_i Q_i P_i}{\sum_{j=1}^N f_j Q_j P_j}, \quad w_i^F = \frac{F_i}{\sum_{j=1}^N F_j}, \quad V_{PRIT} = V_{PRI0}(1 + PR_{I1})(1 + PR_{I2}) \cdots (1 + PR_{IT})$$

where n_i = units of security i in the index; P_i = price; D = divisor; Inc_I = income (dividends/interest) on the index; Q_i = shares outstanding; f_i = fraction of shares in the market float ($f_i = 1$ for plain market-cap weighting); F_i = fundamental size measure (book value, earnings, sales, dividends...).

Worked example (CFA curriculum)

Stocks A–E (Exhibits 1–4). BOP prices 50, 25, 12.50, 10, 4 (sum 101.50); EOP 55, 22, 8, 14, 6 (sum 105.00); dividends/share sum 0.90.

Price-weighted, divisor 5: index = $101.50/5 = 20.30 \rightarrow 105.00/5 = 21.00$. $PR = (21.00 - 20.30)/20.30 = 3.45\%$; income = $0.90/5 = 0.18$, so $TR = (21.00 - 20.30 + 0.18)/20.30 = 4.33\%$.

2-for-1 split in A (55 $\rightarrow$ 27.50): new divisor = $77.50/21.00 = 3.69$ keeps the index at 21.00.

Equal-weighted: PR = average of 10%, -12%, -36%, 40%, 50% = **10.40%** (TR 10.88%). *Market-cap-weighted* (same stocks): PR 1.49%, TR 2.13%.

What examiners like to test

- **Price-weighting quirks:** the highest-priced stock dominates regardless of company size; a split changes every weight and lowers the divisor.
- **Price vs total return:** equal at inception; they diverge whenever constituents pay income.
- **Biases:** market-cap = momentum; fundamental = value/contrarian; equal = small-cap bias and high turnover; hedge fund indexes = survivorship bias because “the constituents determine the index”.

Module 3 — Market Efficiency

Topic: Equity Investments · Exam relevance: **Medium-yield** · **Concept-heavy**

The big picture

In an efficient market, prices adjust quickly and rationally to new information, so no one can *consistently* earn returns above those justified by risk once costs are counted. The key question is always “which information set is already in the price?” — past market data (weak form), all public information (semi-strong) or all information including private (strong). Anomalies and behavioural finance are the challenges to this view.

Learning outcomes in plain language

- LOS 1 Efficiency and why it matters.** Prices reflect relevant information quickly and accurately; the time frame for adjustment matters. Efficient markets favour **passive** management; inefficient ones reward active research.
- LOS 2 Market vs intrinsic value.** Market value = price at which the asset can be bought or sold now; intrinsic value = value investors would place on it with a complete understanding of its characteristics (often PV of expected cash flows).
- LOS 3 Factors affecting efficiency.** Number of participants and analyst coverage, information availability and disclosure, limits to trading (arbitrage, short-selling limits), transaction and information-acquisition costs.
- LOS 4 Three forms.** Weak: past prices and volume. Semi-strong: all public information (includes weak). Strong: public and private information (includes both).
- LOS 5 Implications.** Weak form $\Rightarrow$ technical analysis cannot earn consistent abnormal returns; semi-strong $\Rightarrow$ neither can fundamental analysis of public data; passive investing then preferred, managers still set risk and objectives.
- LOS 6 Anomalies.** Time series (calendar effects, momentum, overreaction), cross-sectional (size, value) and other (closed-end fund discounts, earnings surprise drift, IPO underpricing then long-run underperformance, predictability); many vanish after risk adjustment or out of sample.
- LOS 7 Behavioural finance.** Loss aversion, herding, overconfidence, information cascades, representativeness, mental accounting, conservatism, narrow framing may explain anomalies; markets can still be efficient if investors cannot consistently beat them.

Key facts

Form	Past market data	Public info	Private info	Evidence / test
Weak	✓			Serial correlation, trading rules; no consistent profits in developed markets
Semi-strong	✓	✓		Event studies: excess return = actual – expected; developed markets mostly semi-strong
Strong	✓	✓	✓	Insider/private-information tests; evidence does not support the strong form

Modern view of costs: a market is inefficient only if active investing earns superior returns *after* deducting transaction and information-acquisition costs (Grossman–Stiglitz: gross of costs, information gathering must earn a return). Prices are efficient “within the bounds of arbitrage”.

Calendar anomalies: January (turn-of-year; tax-loss selling, window dressing), turn-of-month, day-of-week, weekend, holiday. **Overreaction** = 3–5 year losers beat winners; **momentum** = short-term winners keep winning (contradicts weak form). **Value effect** disappears under the Fama–French three-factor model.

Worked example (Illustrative)

Event study of a special-dividend announcement. Expected return on the event day is taken as the market index return (one model the curriculum allows). Stock X returns +4.6% on the announcement day while the index returns +0.8%: excess (abnormal) return = $4.6\% - 0.8\% = +3.8\%$. Over the next five days X returns +1.2% versus +1.1% for the index: excess = $+0.1\%$, statistically indistinguishable from zero.

Interpretation: a large excess return *confined to the announcement* is consistent with semi-strong efficiency (prices react quickly). Consistent excess returns *after* the announcement would signal an exploitable inefficiency.

What examiners like to test

- **Nesting:** strong includes semi-strong includes weak. If a market is semi-strong efficient it must be weak-form efficient; the reverse is not true.
- **Intrinsic vs market value:** intrinsic above market $\Rightarrow$ undervalued. In an efficient market, finding intrinsic value moderately above price most likely means you **underestimated risk** (discount rate too low).
- **Behaviour is not inefficiency:** irrational behaviour such as herding does not by itself make a market inefficient; what matters is whether abnormal risk-adjusted returns can be earned consistently.

Module 4 — Overview of Equity Securities

Topic: Equity Investments · Exam relevance: **Medium-yield · Concept-heavy**

The big picture

Equity is the residual claim: shareholders are paid after creditors and preference holders, which is why common shares carry the most risk and the highest expected return. Features such as call, put, cumulative or participating rights shift risk between issuer and investor. Management can directly raise **book** value, but only investors' expectations set **market** value.

Learning outcomes in plain language

- LOS 1 Types of equity.** Common shares (residual claim, voting, callable or putable versions); preference shares (fixed dividend ahead of common; cumulative vs non-cumulative, participating vs non-participating, convertible).
- LOS 2 Voting and share classes.** Statutory voting (one vote per share per director) vs **cumulative voting** (votes = shares × directors, can be concentrated); dual/multiple share classes separate control from ownership.
- LOS 3 Public vs private equity.** Private equity is placed with institutions, has no secondary market, less disclosure, longer horizon; types: venture capital, leveraged buyouts (MBO), PIPEs.
- LOS 4 Investing abroad.** Direct investing (foreign currency, local rules); depository receipts (sponsored/unsponsored; GDRs, ADRs Level I–III and Rule 144A), global registered shares, baskets of listed DRs (BLDRs).
- LOS 5 Risk and return.** Return = price change + dividends (+ FX for foreign shares). Preference less risky than common; putable less risky, callable riskier; cumulative less risky than non-cumulative.
- LOS 6 Role in financing.** Equity funds long-lived assets, expansion, R&D, acquisitions; also provides a “currency” for acquisitions and stock options, and meets capital-adequacy or covenant needs.
- LOS 7 Market vs book value.** Book value = assets – liabilities (historical decisions, grows with retained earnings); market value reflects expected amount, timing and risk of future cash flows. P/B signals growth expectations.
- LOS 8 Cost of equity vs ROE vs required return.** ROE = accounting return on book equity; cost of equity = minimum return the company must offer investors (estimated with DDM or CAPM), used as a proxy for investors' required return, which varies across investors.

Key formulas

$$R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}, \quad ROE_t = \frac{NI_t}{\text{Average } BVE_t} = \frac{NI_t}{(BVE_t + BVE_{t-1})/2} \quad \text{or} \quad ROE_t = \frac{NI_t}{BVE_{t-1}}$$

$$\text{Market value of equity} = \text{Market price per share} \times \text{Shares outstanding}, \quad \text{Price-to-book} = \frac{\text{Market price per share}}{\text{Book value of equity per share}}$$

where P_t = price at end of period t ; D_t = dividends in period t ; NI_t = net income available to ordinary shareholders (after preferred dividends); BVE = book value of equity. Use average BVE when year-end book values are volatile, beginning BVE when they are stable — either is fine if applied consistently.

Worked example (CFA curriculum)

Pfizer (Exhibits 16–19, USD thousands). Net income 2016 = 7,215,000 and 2017 = 21,308,000; equity 2015 = 64,998,000, 2016 = 59,840,000, 2017 = 71,287,000.

$$ROE_{2016} = 7,215,000 / [(64,998,000 + 59,840,000) / 2] = \mathbf{11.6\%}; \quad ROE_{2017} = 21,308,000 / [(59,840,000 + 71,287,000) / 2] = \mathbf{32.5\%}.$$

Price \$35.74, shares 5,952,900: market value = $35.74 \times 5,952,900 = \mathbf{\$212,756,646}$ thousand; book value per share = $71,287,000 / 5,952,900 = \mathbf{\$11.98}$; P/B = $35.74 / 11.98 = \mathbf{2.98}$ (Novartis 2.84, GlaxoSmithKline 19.16).

Caution (book): Pfizer reports under US GAAP, Novartis and GSK under IFRS, so comparing their ROEs directly is inappropriate.

What examiners like to test

- **A rising ROE is not always good:** it rises if net income falls more slowly than equity, or if debt-funded buybacks shrink equity (more leverage, riskier equity). Use DuPont to find the source.
- **Cumulative voting:** 100 shares and 4 directors = 400 votes that can all go to one candidate, helping minority holders; statutory voting allows at most 100 per candidate.
- **Foreign-currency return:** a 10% local return with the yen falling 10% against the USD gives a US investor in the ADR about 0%; P/B comparisons are only meaningful within an industry.

Module 5 — Company Analysis: Past and Present

Topic: Equity Investments · Exam relevance: **Medium-yield** · **Calculation + concept**

The big picture

Before forecasting anything, an analyst must understand how the company makes money today. This module builds the “past and present” half of a research report: the business model, what drives revenue (volume, price and pricing power), how costs behave (fixed vs variable, operating leverage), how much capital is tied up in working capital and fixed assets, and how it is financed.

Learning outcomes in plain language

- LOS 1 Research report elements.** All reports: recommendation and target price, valuation, risks. Initial reports add business model and strategy, industry overview and competitive positioning, detailed financial analysis and model, ESG considerations.
- LOS 2 Business model.** What the firm sells, to whom, through which channels, how it prices and gets paid, and which suppliers/resources it relies on. Sources: issuer filings and calls, public and proprietary third parties, primary research.
- LOS 3 Revenue and pricing power.** Bottom-up (volume $\times$ price, by segment/product/geography) or top-down (market size $\times$ market share, GDP-linked). Pricing power = ability to set prices without losing volume; shown by margins rising over time.
- LOS 4 Operating profitability and working capital.** Gross, EBITDA and operating margins; fixed vs variable costs (limited by disclosure by function or nature); DOL; working capital via activity ratios, cash conversion cycle and NWC/sales.
- LOS 5 Capital investments and structure.** Map historical sources and uses of capital; compare ROIC with WACC over the long run (value creation); assess leverage and coverage ratios, credit ratings, net debt/EBITDA and DFL.

Key formulas

$$\text{Market size} = \frac{\text{Revenue}}{\text{Market share}}, \quad \text{Net sales} = \text{Average selling price} \times \text{Volume}, \quad \text{Operating profit} = [Q \times (P - VC)] - FC$$

$$\text{DOL} = \frac{\% \Delta \text{Operating profit}}{\% \Delta \text{Sales}}, \quad \text{DFL} = \frac{\% \Delta \text{Net income}}{\% \Delta \text{Operating income}}, \quad \text{CCC} = \text{DOH} + \text{DSO} - \text{DPO}$$

where Q = units sold; P = price per unit; VC = variable operating cost per unit (so $P - VC$ = contribution margin); FC = total fixed operating costs. Gross margin = gross profit/revenue; EBITDA margin = EBITDA/revenue; operating (EBIT) margin = EBIT/revenue. DOL rises with fixed operating costs; DFL rises with fixed interest costs; together they give total leverage. DOH, DSO, DPO = days of inventory on hand, sales outstanding, payables outstanding. Negative net working capital means suppliers finance the company.

Worked example (CFA curriculum)

Top-down revenue. Distributor revenue EUR800 million, market share 10%: market size = $800/0.10 = \text{EUR}8,000$ million.

Bottom-up revenue. 2 million cases at USD20 = USD40 million; forecast 3 million cases at 20×1.05 : $21 \times 3 = 63$; growth = $63/40 - 1 = 57.5\% \approx 58\%$.

DOL (Company XYZ). Operating income = $9,707 - 4,850 - 993 - 1,700 - 491 = 1,673$ (prior year 1,527); $\text{DOL} = (1,673/1,527 - 1)/(9,707/9,256 - 1) = 1.96$.

CCC (OldShips vs CleanYards). $12 + 27 - 55 = -16$ days vs $46 + 98 - 40 = 104$ days: OldShips is financed by its suppliers.

What examiners like to test

- **DOL traps:** use *operating* income, not pre-tax income (gives 1.08), and do not invert the ratio (0.51). Interest expense is a financing cost, so it affects DFL, not DOL.
- **Fixed vs variable:** cost of sales and sales commissions are variable; amortisation, interest and G&A are fixed in the short run. A firm with high operating leverage may avoid financial leverage to limit total risk.
- **Pricing power evidence:** raising prices 3% a year while costs rise 5% shows *no* pricing power; look for stable or rising margins, not just rising prices.

Module 6 — Industry and Competitive Analysis

Topic: Equity Investments · Exam relevance: **Medium-yield** · **Concept-heavy**

The big picture

Industry structure largely decides how profitable a company can be over the long run: competition “pulls” company profitability toward an industry base rate, acting as a ceiling but not a floor. The analyst defines the industry, surveys its size, growth, profitability and concentration, tests its structure with Porter’s Five Forces and PESTLE, and then asks whether the company’s strategy gives it a defensible advantage.

Learning outcomes in plain language

- LOS 1 Purpose and steps.** Understand structural drivers of economic profit, improve forecasts, find opportunities. Steps: define industry → survey → structure (Five Forces) → external influences (PESTLE) → competitive analysis.
- LOS 2 Classification and grouping.** Industry = firms selling similar products from the customer’s view. Legacy (SIC, NACE, ISIC) vs commercial (GICS, ICB, TRBC: global, updated at least annually); limits: substitutes, multi-product firms, geography, changes over time. Other groupings: geography, statistical similarities, ESG.
- LOS 3 Industry survey.** Size (total annual sales), growth (YoY or CAGR, split into volume and price/mix), growth style box (growth/mature × defensive/cyclical), profitability (distribution of ROIC), market share trends and concentration (HHI).
- LOS 4 Five Forces and PESTLE.** Threat of new entrants, threat of substitutes, bargaining power of customers and of suppliers, rivalry; PESTLE = political, economic, social, technological, legal, environmental influences.
- LOS 5 Competitive strategy and position.** Generic strategies: cost leadership, differentiation, focus (avoid “stuck in the middle”). Test: defends against the five forces, fits PESTLE trends, company has resources to execute.

Key facts

$$HHI = \sum_i s_i^2 \quad (s_i = \text{market share of firm } i \text{ as a whole number, } 50\% = 50; \text{ monopoly} = 100^2 = 10,000)$$

Force	Stronger force (lower industry profitability) when...
New entrants	many recent entrants; no network effects, scale or scope economies; weak brand loyalty; low switching costs; no exclusive resources or entry-restricting policy
Substitutes	another product meets the same need; customers can go without; substitute improving; switching easy
Customers	few, concentrated buyers; standardised products; product not critical or a large share of budget; buyers can backward-integrate
Suppliers	few, concentrated or specialised suppliers; high costs of switching suppliers; no substitutes for their inputs
Rivalry	history of price competition; many roughly equal competitors; undifferentiated products; high exit barriers

Concentration: HHI 1,500–2,500 = moderately concentrated; above 2,500 = highly concentrated; deals in highly concentrated markets that raise HHI by more than 200 points often face regulatory challenge. Rising concentration ⇒ falling rivalry, higher profitability. **Cyclical:** discretionary, energy, financials, industrials, materials; **defensive:** staples, health care, utilities, technology, real estate. [Note: the book’s answer key labels technology and real estate defensive, yet its style box shows semiconductors as cyclical — expect judgement by sub-industry]

Worked example (CFA curriculum)

HHI. Four firms with shares 30, 30, 20, 20: $30^2 + 30^2 + 20^2 + 20^2 = 2,600$ (highly concentrated). Three firms with 50, 30, 20: $2,500 + 900 + 400 = 3,800$ — not $0.5^2 + 0.3^2 + 0.2^2 = 0.38$ (decimals) and not $50^2 = 2,500$ (leader only).

Extension (illustrative): if the two 20% firms in the first market merged, $HHI = 30^2 + 30^2 + 40^2 = 3,400$, a rise of 800 points (> 200), so regulators would likely challenge it. A merger always raises HHI; the number of stores or locations is irrelevant.

What examiners like to test

- **Industry vs company factors:** over the long run *structural* factors explain profitability differences across industries; business cycles drive short-run profits; strategy and execution create variation around the industry median.
- **Classification limits:** GICS/ICB/TRBC assign each company to one group by majority of revenue, profit or assets, so multi-segment firms (e.g., a retailer whose profits come from cloud services) can be misleadingly grouped.
- **Match strategy to industry:** cost leadership suits capital-intensive industries with price-conscious customers; differentiation suits customers who value distinctiveness; risks include cost inflation, imitation and an unbearable price premium.

Module 7 — Company Analysis: Forecasting

Topic: Equity Investments · Exam relevance: **Medium-yield · Calculation + concept**

The big picture

Forecasting turns the past-and-present analysis into numbers for future revenue, costs, working capital, capital spending and financing. The skill is choosing *what* to forecast (the object) and *how* (the approach), keeping the pieces consistent with each other, and recognising that one point forecast hides risk — hence scenarios.

Learning outcomes in plain language

- LOS 1 Principles and approaches.** Objects: drivers, individual lines, summary measures (efficient but less transparent), ad hoc items. Prefer regularly disclosed objects; avoid over-complex models. Approaches: historical results, historical base rates and convergence, management guidance, analyst's discretionary forecast. Horizon depends on strategy, cyclicity, company factors, employer.
- LOS 2 Revenue forecasts.** Top-down (growth relative to GDP; market growth and market share) or bottom-up (volume × average selling price; product line, geography or segment; capacity- or return-based). Separate recurring from non-recurring items; cross-check approaches.
- LOS 3 Operating costs and working capital.** Forecast cost of sales via gross margin (watch input prices, pass-through lags, hedging); SG&A less tied to sales; keep costs coherent with revenue. Working capital = efficiency ratios (DSO, DOH, DPO) × revenue or COGS forecasts.
- LOS 4 Capital investments and structure.** Maintenance capex based on D&A (plus an inflation adjustment); growth capex tied to expansion plans and revenue growth; D&A from asset base and useful lives; debt via leverage ratios (debt/capital, debt/EBITDA), financial strategy and guidance.
- LOS 5 Scenario analysis.** Build several forecasts around key risk factors (business cycle, competition, inflation/deflation, technology), judge each one's likelihood and compare with consensus and market-implied forecasts.

Key formulas

$$\text{DSO} = \frac{\text{Accounts receivable}}{\text{Revenue}/365}, \quad \text{DOH} = \frac{\text{Inventory}}{\text{COGS}/365}, \quad \text{DPO} = \frac{\text{Accounts payable}}{\text{COGS}/365}, \quad \text{COGS}_t = \text{Revenue}_t (1 - \text{GM}_t)$$

$$\Rightarrow \text{AR}_t = \text{DSO} \times \frac{\text{Revenue}_t}{365}, \quad \text{Inventory}_t = \text{DOH} \times \frac{\text{COGS}_t}{365}, \quad \text{AP}_t = \text{DPO} \times \frac{\text{COGS}_t}{365}$$

GM = gross margin; year-end balances and a 365-day year, as in the curriculum example. **Which approach when?** Historical results for stable, mature firms with unique business models; base rates/convergence when a firm is expected to move toward industry norms; guidance where management has an information edge (not for macro-sensitive items); discretionary forecasts for cyclical companies. **Price pass-through:** if COGS is 25% of sales and input costs double, a full pass-through (sales 100 → 125, COGS 25 → 50) keeps gross profit at 75 but cuts gross margin from 75% to 60%.

Worked example (CFA curriculum)

YY Ltd. (Example 2, CNY millions). Year 3: revenue 245,866; COGS 209,114; AR 10,161; inventory 41,671; AP 72,199. Year-3 ratios: $\text{DSO} = 10,161 / (245,866 / 365) = 15$; $\text{DOH} = 73$; $\text{DPO} = 126$ days.
 Year-4 forecast: revenue growth 18%, gross margin 17%: revenue = $245,866 \times 1.18 = \mathbf{290,122}$; $\text{COGS} = 290,122 \times 0.83 = \mathbf{240,801}$.
 Holding year-3 ratios constant (unrounded 15.08, 72.74, 126.02 days): AR = **11,990**, inventory = **47,985**, AP = **83,139**.
 Rounded day counts give slightly different balances (e.g., $15 \times 290,122 / 365 = 11,923$).

What examiners like to test

- **Cyclical firms:** use a discretionary forecast (business cycle phase), not historical results or guidance — management has no edge in forecasting GDP or commodity prices.
- **Working capital:** do not grow every current asset and liability at the sales growth rate; use efficiency ratios with revenue or COGS. Market share is a **top-down** driver; average selling price is bottom-up.
- **Capex split:** D&A anchors *maintenance* capex only; growth capex is discretionary. Commodity prices can move both revenue and cost of sales.

Module 8 — Equity Valuation: Concepts and Basic Tools

Topic: Equity Investments · Exam relevance: **High-yield · Calculation-heavy**

The big picture

An analyst estimating intrinsic value is questioning the market's price. Three families of models do this: **present value** (discount dividends or FCFE), **multiplier** (price or EV relative to a fundamental) and **asset-based** (assets minus liabilities). Keep models as simple as the inputs allow and compare estimates across models.

Learning outcomes in plain language

- LOS 1 Value vs price.** Estimate $>$ price $\Rightarrow$ undervalued; $=$ fairly valued; $<$ overvalued; price inside the estimated range = fairly valued; require a marked difference before acting.
- LOS 2 Model categories.** Present value (DDM, FCFE), multiplier (price multiples, EV multiples), asset-based (market value of assets – liabilities and preferred).
- LOS 3 Distributions.** Regular and extra (special) cash dividends; stock dividends, splits and reverse splits change share count, not value; repurchases $\approx$ cash dividends of equal value.
- LOS 4 Dividend chronology.** Declaration date $\rightarrow$ ex-dividend date (first day without the dividend; price falls by it) $\rightarrow$ holder-of-record date $\rightarrow$ payment date.
- LOS 5 Why PV models; DDM and FCFE.** Value = PV of expected future benefits. DDM discounts dividends; FCFE discounts dividend-paying capacity (useful for non-payers).
- LOS 6 Pros and cons.** PV: theoretically sound but input-sensitive. Multiples: simple, market-based, but look backward and depend on comparables. Asset-based: a floor; weak with intangibles or hyperinflation.
- LOS 7 Preferred stock value.** Perpetual: D_0/r ; with maturity: PV of dividends plus par; calls lower value, retraction (put) options raise it.
- LOS 8 Gordon and two-stage DDM.** Constant growth $D_1/(r - g)$ with $r > g$; two-stage = PV of high-growth dividends + PV of Gordon terminal value; $g = b \times \text{ROE}$.
- LOS 9 Which DDM?** Gordon: mature, dividend-paying firms insensitive to the cycle; two-stage: moving from high to sustainable growth; three-stage: young firms entering growth.
- LOS 10 Price multiples.** Link to fundamentals: justified forward $P/E = p/(r - g)$; method of comparables vs a benchmark; use trailing or forward multiples consistently.
- LOS 11 Calculate multiples.** P/E, P/CF (operating or free cash flow), P/S and P/B per share; low multiples relative to peers suggest undervaluation.
- LOS 12 Enterprise value.** EV = market cap + preferred + debt – cash and short-term investments; EV/EBITDA works when earnings are negative and capital structures differ.
- LOS 13 Asset-based models.** Fair values of assets minus liabilities; suits firms with mostly current, tangible assets; often combined with multiples for private companies.

Key formulas

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}, \quad V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}, \quad V_0 = \sum_{t=1}^n \frac{D_0(1+g_S)^t}{(1+r)^t} + \frac{V_n}{(1+r)^n}, \quad V_n = \frac{D_{n+1}}{r-g_L}$$

$$\text{Preferred: } V_0 = \frac{D_0}{r} \text{ or } \sum_{t=1}^n \frac{D_t}{(1+r)^t} + \frac{F}{(1+r)^n}, \quad \text{FCFE} = \text{CFO} - \text{FCInv} + \text{Net borrowing}, \quad \frac{P_0}{E_1} = \frac{D_1/E_1}{r-g} = \frac{p}{r-g}$$

where r = required return; g_S, g_L = short-term and long-term growth; $D_{n+1} = D_0(1+g_S)^n(1+g_L)$; F = par value; b = retention rate = $1 - \text{payout}$; p = payout ratio. Note the book writes the perpetual preferred as D_0/r (level dividend, so $D_0 = D_1$).

Worked example (CFA curriculum)

Gordon: $D_0 = \text{EUR } 5.00$, $g = 4\%$, $r = 8\%$: $V_0 = 5.20/0.04 = 130$ (numerator is D_1 , not D_0). **Preferred:** $\$5.50$ perpetual at 6% : $5.50/0.06 = \$91.67$.

Two-stage (Example 9): $D_0 = \$5.00$, 10% for 3 years then 5% , $r = 15\%$: $D_1 - D_3 = 5.50, 6.05, 6.655$; $D_4 = 6.98775$; $V_3 = 6.98775/0.10 = 69.8775$; $V_0 = 5.50/1.15 + 6.05/1.15^2 + (6.655 + 69.8775)/1.15^3 \approx \$59.68$.

What examiners like to test

- **Classic slips:** using D_0 instead of D_1 ; forgetting to discount V_n by n (not $n + 1$) periods; applying Gordon when $g \geq r$.
- **P/E and fundamentals:** justified P/E rises with g and payout, falls with r — but a higher payout can lower g (dividend displacement of earnings). EV/EBITDA $\rightarrow$ subtract debt and preferred to reach equity.