



CredGuild

STUDY NOTES

CFA® Program Level I

Equities

2027 curriculum · 12 readings · 47 practice questions

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ABOUT THIS EDITION

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USING THIS BOOK

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How to use this book

These are the CredGuild notes for the 2027 CFA® Program Level I curriculum, Equities: 12 readings. They are the same notes as on credguild.com, set out for reading on paper or offline.

What each reading contains

- **What you'll learn:** the learning outcome statements the reading covers.
- **The notes, module by module:** worked examples, key concepts, common exam traps, exam shortcuts and a bottom line.
- **A quick check after each module:** one question with its answer and the full explanation.
- **Practice questions at the end, with the answers.** The full explanation for each one is free on the reading's page at credguild.com; the link is under the answers.

The coloured boxes

KEY CONCEPT

Definitions and formulas to know.

Example. A worked problem, step by step. Try it before you read the working.

COMMON EXAM TRAPS

Mistakes that cost marks.

EXAM SHORTCUTS

Faster ways through a question.

BOTTOM LINE

What to remember from the module.

Using it with the website

Paper is good for reading. Practice works better on the site: it scores each answer as you go, explains every option, keeps a list of the questions you got wrong and spreads the readings across the weeks before your exam. If you are not sure where to start, the free diagnostic test (credguild.com/cfa/level-1/diagnostic/) gives you a score in each topic.

If this book helps you, pass it on to someone else who is studying.

CFA® PROGRAM LEVEL I · TOPIC

Equities

Exam weight 11–14% · 12 readings

How shares are issued, traded and voted, where equity returns come from, and how analysts value a company with discounted cash flow models and multiples. It also covers industry and company analysis, research reports and factor models such as the CAPM.

Reading 39	Common Stock vs Preferred Stock
Reading 40	Equity Jurisdictions, Classes, and the Voting Process
Reading 41	Equity Issuance and Trading
Reading 42	Sources of Equity Returns
Reading 43	Introduction to Equity Valuation
Reading 44	Discounted Cash Flow (DCF) and Growth Models
Reading 45	Relative Value Equity Valuation Approaches
Reading 46	Financial Statement Forecasting in Equity Valuation
Reading 47	Industry and Competitive Analysis
Reading 48	Company Analysis: Past, Present, and Future
Reading 49	Equity Analyst Research Reports
Reading 50	The Capital Asset Pricing Model, Market Model, and Other Factor-Based Equity Models

EQUITIES · READING 39

Common Stock vs Preferred Stock

What you'll learn

LOS 39.a Describe what equity instruments are, how they differ from debt, and the features of common shares and the main types of preference shares.

LOS 39.b Contrast private equity with publicly listed equity and describe venture capital, growth equity, buyout equity and special situations.

MODULE 39.1

Public and Private Equity Investments

This reading defines an equity instrument, compares common shares with preference shares and their features, and contrasts public equity with private equity and its four main types.

LOS 39.a — What an equity instrument is, and the main types

An **equity instrument** is a security that gives its holder ownership of part of a corporation. The owners (**shareholders**) share in whatever is left of the company's assets after higher-ranking claims (debts, taxes) are met, and they may be able to vote on company policies and decisions. Their liability is limited. If the company goes bankrupt they can lose what they invested, but they are not otherwise liable for the company's obligations.

Equity versus debt

KEY CONCEPT

Feature	Equity instrument	Debt instrument (loan, bond)
Relationship with the company	Ownership interest	Creditor relationship
Life	Indefinite; exists until a corporate event (e.g., acquisition or liquidation) ends it	Finite; has a maturity
Payments	Dividends are paid at the company's discretion	Interest and principal are contractual obligations
Claim in liquidation	Residual, after debt and other higher-priority claims	Ranks ahead of equity

Dividends and the company life cycle

A company's willingness to pay dividends usually changes as it moves through four phases:

- **Start-up phase:** little or no revenue, negative cash flow as invested capital is spent building the business; nothing to distribute.
- **Growth phase:** revenue rising and cash flow may turn from negative to positive, but earnings are mostly reinvested to grow the business.

- **Mature phase:** stable cash flows and fewer growth opportunities, so shareholders prefer that earnings be distributed regularly as dividends. This is the phase most associated with dividend payments.
- **Decline phase:** falling revenue and cash flow; future dividends become doubtful.

Rights disclosed in an equity prospectus

When equity is issued, the **equity prospectus** describes the security's features and how the money raised will be used. It states whether the security carries:

- **voting rights** on company matters;
- **dividend rights** (regular or special dividends);
- **conversion rights:** to change the security into another type, such as preferred into common shares;
- **liquidation rights:** what the holder receives if the company is dissolved;
- **split, subdivision, or combination rights:** how the holder's position is treated if shares are split, divided or combined;
- **preemptive rights:** a first opportunity to buy any new shares the company issues in the future (protecting the holder's proportional stake).

Common shares

Common shares are the most widely issued form of equity. Common shareholders:

- have a **residual claim** on the firm's assets in liquidation: they are paid only after debtholders, other creditors and preferred shareholders;
- govern the company through voting rights: electing the board of directors, approving mergers, selecting auditors. A shareholder who cannot attend the annual meeting can **vote by proxy** (someone else casts the vote as instructed);
- receive **variable dividends** that the company has no legal obligation to pay.

The company benefits because it raises capital while retaining control of its operations; investors benefit because they can own a fraction of a large company with a small outlay.

Preference shares (preferred stock)

Preference shares (preferred stock) are a hybrid of common stock and debt:

Like common stock

Dividends are not a contractual obligation

Usually no maturity

Like debt

Payments are usually fixed

Usually no voting rights

Preferred shares have a stated **par value** and pay a dividend equal to a fixed percentage of par. If the firm is liquidated, preferred holders may receive a set **liquidation preference payout** before common shareholders receive anything.

KEY CONCEPT

$$\text{Annual preferred dividend} = \text{dividend rate} \times \text{par value}$$

Types of preference shares:

Type	Key feature	Whose right?
Callable preference shares	Firm may repurchase the shares at a set call price	Issuer
Putable preference shares	Holder may sell the shares back to the issuer at a set price (the put contingency price)	Holder
Cumulative preference shares	Unpaid dividends accumulate (dividends in arrears) and must be paid before any common dividend	Holder
Noncumulative preference shares	Missed dividends are lost; but in any period, the current preferred dividend still comes before common dividends	—
Participating preference shares	Extra dividends if profits exceed a preset level; may receive more than par in liquidation	Holder
Nonparticipating preference shares	Claim limited to par value in liquidation; no extra dividends	—
Convertible preference shares	Can be exchanged for common stock at a conversion ratio fixed at issuance	Holder

For the embedded options in the table, whose right it is tells which way the option moves value and risk. A holder's put or conversion right makes the shares more valuable than otherwise identical shares without it, while an issuer's call right makes them less valuable. Preferred shares are less risky than the same company's common shares because preferred distributions, when declared, and preferred liquidation claims rank ahead of common claims. Cumulative shares are less risky than noncumulative shares because a skipped cumulative dividend must be made up before any common dividend can be paid. Reading 44 applies the option-value relationship when valuing preferred stock.

Example. A preferred share with a \$25 par value and a 5.5% dividend rate pays $0.055 \times 25 = \$1.375$ per year. If the shares are cumulative and last year's dividend was skipped, the company must pay $2 \times 1.375 = \$2.75$ per preferred share this year before any common dividend is allowed. If they are noncumulative, only this year's \$1.375 must be paid first.

Participating preferred stock is often issued by smaller, riskier firms, whose investors want a share of the upside. Convertible preferred shares are common in financing risky early-stage firms: the conversion option compensates investors for risk and lets the firm raise capital more cheaply than by issuing common shares.

Common exam traps

- A fixed preferred dividend is still discretionary; interest and principal on debt are contractual obligations.
- "Fixed dividend, no maturity" describes typical preferred stock; debt has a maturity.
- A call is the issuer's right to buy the shares back; a put is the holder's right to sell them back.
- Missed dividends are owed only on cumulative shares. A participating or convertible feature gives no right to arrears.
- Common shareholders do not need to attend the meeting to vote; they can vote by proxy.

- A statement that puts common shareholders ahead of any liability or of preferred shares reverses the priority of claims.

LOS 39.b — Public versus private equity

Private equity is usually issued to institutional investors through **private placements**, and there is no public market for it. Both private firms and publicly listed firms can issue private equity (a listed company selling shares privately is an example).

How private equity differs from public equity

Company-specific characteristics of private equity	Stock-specific characteristics of private equity
1 Typically smaller companies	Less liquidity: no public market to trade the shares; no quoted price, so a seller must negotiate with other investors
2 Earlier (start-up, growth) or later (decline) in the company life cycle	More concentrated control of the company
3 More limited financial disclosure (not subject to public-company reporting rules, so lower reporting costs)	Restrictions on the sale of shares by owners
4 Greater overlap between ownership and management	
5 More concentrated ownership	

Public equity, by contrast, tends to feature larger, mature-stage companies with dispersed ownership, liquid secondary markets and public reporting requirements.

The four main types of private equity investment

1. **Venture capital:** capital for firms early in their life cycle (start-up, development, early growth). Providers include family, friends, wealthy individuals and private equity funds. Investments are illiquid; investors' money is usually tied up for several years before an **exit** is possible.
2. **Growth equity:** capital a firm raises during its growth stage (e.g., to expand). Bringing in growth equity investors can dilute the concentrated ownership typical of the venture capital stage.
3. **Buyout equity:** focuses on mature-stage companies that investors believe are underperforming and could be improved by restructuring operations or capital.
 - **Take-private transaction:** a buyout of a publicly traded company in which the investing group assumes full control (the shares are delisted).
 - **Leveraged buyout (LBO):** buying all of a firm's equity using debt financing (leverage); targets usually have enough cash flow to service the debt, or undervalued assets whose sale can pay it down over time.
 - **Management buyout (MBO):** an LBO in which the buyers are the firm's current managers.
4. **Special situations:** investments in distressed firms (e.g., decline stage) or firms that are restructuring or reorganizing. One form is a **private investment in public equity (PIPE):** a listed firm that needs capital quickly sells equity privately to a select group of investors.

Common exam traps

- Buyout equity targets mature companies, not start-ups; venture capital stakes cannot be sold readily in a secondary market.
- A take-private deal is defined by full control and delisting; an MBO is defined by who buys (current management); a PIPE is a public company raising private capital.
- When asked how private equity differs from public equity, an option such as a more liquid market or more dispersed ownership describes public equity. Lower reporting costs do describe private equity.
- A firm that is already restructuring or reorganizing points to special situations. Buyout investors instead buy an underperforming mature firm and restructure it after taking control.

EXAM SHORTCUTS

- For a preferred share's embedded option, ask whose right it is: a holder's put or conversion right adds value, and an issuer's call right reduces it.

BOTTOM LINE

- Equity is an ownership claim with a residual claim, an indefinite life and discretionary dividends; debt is a creditor claim with contractual payments and a maturity.
- Dividend payments are most associated with the mature phase of the company life cycle.
- Common shareholders have a residual claim, voting rights (which they can exercise by proxy) and variable dividends the company has no obligation to pay.
- Preferred shares pay a fixed percentage of par, rank ahead of common shares and usually carry no voting rights.
- Dividends in arrears on cumulative preferred shares must be paid before any common dividend; missed dividends on noncumulative shares are lost.
- Private equity is less liquid than public equity, with more concentrated ownership and control and more limited financial disclosure.
- Private equity investments fall into four types: venture capital, growth equity, special situations and buyout equity.

QUICK CHECK**Question 1**

A trainee asks how an equity instrument differs from the other securities a company may issue. An equity instrument is *best* described as a security that:

- A** establishes a creditor relationship with a company.
- B** represents an ownership interest in a company.
- C** can represent either an ownership interest or a creditor position, depending on its terms.

Answer: B

An equity instrument gives its holder ownership of a portion of a corporation. Debt instruments such as loans and bonds, by contrast, create a creditor relationship between the investor and the company.

Why the other options are wrong

- **A.** Loans, bonds and other debt instruments create a creditor relationship.
- **C.** An equity instrument is by definition an ownership interest; it does not switch between ownership and creditor status.

Key takeaway Equity is ownership; debt is a creditor relationship.

Practice questions

Question 2

Under the terms in its equity prospectus, holders of Qarth Energy's shares will be offered any new shares the company issues before those shares are offered to other investors. This feature is known as:

- A** conversion rights.
- B** preemptive rights.
- C** split, subdivision, or combination rights.

Question 3

Brackley Utilities has three series of preference shares outstanding, identical apart from the features below. For the investors who hold them, which series is the *most* risky?

- A** Puttable, cumulative preference shares.
- B** Noncallable, cumulative preference shares.
- C** Callable, noncumulative preference shares.

Question 4

An analyst is preparing a briefing on the main categories of private equity investment. Which of her statements is *most accurate*?

- A** Buyout equity concentrates on companies at the start-up and early stages of their development.
- B** Venture capital stakes can readily be sold in active, liquid secondary markets.
- C** Growth equity is capital a company raises during its growth stage, for example to finance expansion.

Answers: 2. B · 3. C · 4. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/common-stock-vs-preferred-stock/. The full bank has 25 questions on this reading.

EQUITIES · READING 40

Equity Jurisdictions, Classes, and the Voting Process

What you'll learn

LOS 40.a Describe how economic and voting rights differ across jurisdictions (direct investing, depository receipts, dual listing) and across share classes (dual-class structures).

LOS 40.b Describe the voting process and the roles of management, the board, custodians, proxy advisors, asset managers and asset owners.

MODULE 40.1

Rights of Equity Shareholders

This reading explains how shareholder rights vary with the jurisdiction and the class of shares: direct and indirect foreign investing, depository receipts, dual listing and dual-class structures. It then describes how shareholder voting works and what management, the board, shareholders, custodians, asset managers and proxy advisors each do in it.

LOS 40.a — Rights across jurisdictions and share classes

The economic and voting rights of shareholders (Reading 39) can differ when a company has more than one class of shares, or when the investor holds shares of a foreign company.

Investing in foreign shares: direct versus indirect

Investors often show **home asset bias**: they overweight assets from their own country. Buying foreign shares counters this bias, and there are two routes.

Direct investing means buying a foreign company's securities in that company's own (foreign) market.

Obstacles include:

- extra cost of opening and running securities accounts abroad;
- unfamiliar market procedures (e.g., clearing and settlement);
- different tax rules, trading hours and reporting requirements, with disclosures possibly in a foreign language;
- **foreign exchange risk** and extra transaction costs, because the investment and its return are in a foreign currency;
- possible restrictions or taxes on moving capital back home;
- a foreign stock exchange that may be illiquid.

Indirect investing means owning an instrument that represents the foreign shares instead of buying the shares on their home exchange. Such vehicles reduce some of the obstacles to direct investing. A common one is the **depository receipt (DR)**.

Depository receipts

KEY CONCEPT

A **depository receipt** represents ownership of shares in a foreign company and trades in another country's market, in that market's currency. A domestic **depository bank** holds the deposited foreign shares, issues receipts each representing a set number of those shares, and acts as **custodian**, handling dividends, stock

splits and other corporate events.

- The investor does not have to exchange currency to buy a DR, but the DR's value is still affected by exchange rate changes, as well as by the firm's fundamentals and economic events. So a DR holder's return can differ from that of a home-market holder of the same shares.
- To rule out arbitrage, the DR price should equal the foreign share price converted at the current exchange rate (times the number of shares per DR), although this can break down.

Example. One DR represents 3 shares of a eurozone company whose shares trade at €40, and the exchange rate is \$1.10 per €. The DR should trade near $3 \times 40 \times 1.10 = \132 . If the euro weakens to \$1.05 while the share price is unchanged, the DR falls to $3 \times 40 \times 1.05 = \126 . The dollar-based holder loses \$6 per DR, a loss that a euro-based holder does not suffer.

Type	Where issued / traded	Currency	Notes
American depository receipt (ADR)	United States	US dollars	
European depository receipt (EDR)	Europe	Typically euros	
Global depository receipt (GDR)	Outside the United States and outside the issuer's home country	Usually US dollars	Not listed on US exchanges but can be sold to US institutional investors. Usually listed where investors know the firm

Exam convention: GDRs are not subject to the capital flow restrictions that governments impose, so they give the firm and investors greater opportunities for foreign investment. Current practice: because GDRs are sold outside the issuer's home country, they avoid the home government's limits on direct foreign purchases, but DR programs still have to follow the foreign-investment and DR rules that apply to them.

KEY CONCEPT

	Sponsored DR	Unsponsored DR
Foreign company involved in the issue?	Yes	No; a bank issues it on its own
Voting rights	Passed to the DR investor	Retained by the depository bank
Disclosure requirements	Usually greater	Usually lower

Dual listing

Some large multinationals make their shares easier for nondomestic investors to own through **dual listing**: the shares are listed on a home-market exchange and also on at least one exchange abroad. The investor owns the actual shares rather than a receipt.

Dual-class share structures

A company may have more than one class of common stock (e.g., **Class A and Class B shares**). In a **dual-class share structure**, some classes carry more **voting rights** than others (e.g., 10 votes per share versus 1). This lets a group such as the founders keep effective control while owning less than a majority of the shares. Classes may also differ in **economic rights**, such as dividends or priority in a liquidation. Economic rights are sometimes in the same proportion as votes; in other cases one class has more economic rights and another has more votes. The rights attached to each class appear in the company's regulatory filings (in the United States, those made with the SEC).

Differences in dividends, votes or liquidation priority between two holders of the same company's common shares are therefore often explained by different share classes. Cumulative/noncumulative and participating/nonparticipating are features of preferred shares; they do not distinguish classes of common stock. Preferred shares usually carry no vote, and under an unsponsored DR the depository bank keeps the vote, so of these three instruments a common share is the one that normally gives its holder a vote.

Common exam traps

- GDRs: issued outside the US *and* outside the home country, but usually denominated in US dollars.
- Sponsored and unsponsored are easily swapped. The investor gets the votes only when the foreign company takes part in the issue (sponsored).
- DR holders still bear currency risk even though they never exchange currency themselves.
- Dual listing (same shares on several exchanges) is not the same as a dual-class share structure (share classes with unequal votes).
- Buying a foreign company's shares on its home exchange is direct investing; buying DRs is indirect investing.

LOS 40.b — The voting process and who takes part in it

Voting rights are how owners exercise authority over a company. Participants and their roles:

KEY CONCEPT

Participant	Role in the voting process
Management and board	Put forward routine matters for a vote (e.g., selection of the auditor , board candidates); decide which matters go to shareholders; solicit shareholder proposals; prepare the proxy statement , often with voting recommendations
Shareholders (asset owners)	Vote in person at the annual meeting or by proxy (proxy cutoff is usually slightly earlier); may submit shareholder proposals ; may delegate their votes to asset managers
Custodian (broker or bank)	Holds shares on behalf of the beneficial owner ; distributes proxy statements; determines the shareholder of record eligible to vote
Asset managers	Vote proxies delegated to them; CFA Institute members and candidates must vote proxies on relevant issues in an informed, responsible way and in the beneficial owners' interests (Standard III(A) Loyalty, Prudence, and Care)

Participant**Role in the voting process****Proxy advisors**

Specialist firms that recommend to institutional investors (e.g., mutual funds holding many companies across markets) how to vote proxies, based on current information and good corporate governance principles

Exam convention: a custodian holds the shares in the name of the beneficial owner. Current practice: shares held through a broker are often registered in the name of a nominee ("street name"); the custodian's own records show the investor as beneficial owner, and the economic and voting rights stay with the investor.

Shareholder proposals

A **shareholder proposal** recommends (or requires) that the company or its board take a specific action. Proposals are typically **nonbinding**, but strong support signals issues shareholders expect management to address. A company need not put every shareholder proposal to a vote, although regulations may require management to explain why it rejected one.

Proxy statement and record date

The **proxy statement** sets out the agenda, including every proposal that shareholders will vote on, frequently with a recommendation from management or the board. It also states the voting requirements and deadlines. Only the **shareholder of record** on the **record date** may vote; the record date is often 30 days or more before the meeting. A holder who sells between the record date and the meeting keeps the right to vote those shares, and someone who buys after the record date cannot vote them at that meeting.

Common exam traps

- Custodians distribute proxy materials and determine the holder of record; they do not decide how shares are voted or draft proposals. Voting power stays with the beneficial owner.
- Strong support does not usually make a shareholder proposal binding, and the company may leave some proposals off the ballot (regulations may require it to give reasons).
- Buying shares shortly before the meeting does not confer a vote: eligibility is fixed on the record date.
- Proxy advisors recommend; asset managers (when delegated) vote; custodians administer.

EXAM SHORTCUTS

- When two holders of the same company's common shares get different votes, dividends or liquidation priority, the likely explanation is different share classes; cumulative, noncumulative, participating and nonparticipating are preferred-share features and can be eliminated.

BOTTOM LINE

- Direct investing means buying a foreign company's securities in its home market, with obstacles such as account costs, unfamiliar procedures, different tax and reporting rules, foreign exchange risk and a possibly illiquid exchange; indirect vehicles such as depository receipts reduce some of these obstacles.
- A depository receipt represents a set number of a foreign company's shares held by a depository bank and trades in another market in that market's currency, yet its value still changes with the exchange rate, so the holder bears currency risk without exchanging currency.

- To rule out arbitrage, a DR should be priced at the foreign share price converted at the current exchange rate, times the number of shares per DR, although this relationship can break down.
- A GDR is issued neither in the United States nor in the issuer's home country; it is usually denominated in US dollars and, although not listed on US exchanges, can be sold to US institutional investors.
- In a sponsored DR the foreign company takes part in the issue and the voting rights pass to the investor; in an unsponsored DR a bank issues it alone and the depository bank keeps the votes.
- Dual listing puts the same shares on a home exchange and at least one foreign exchange, whereas a dual-class structure gives some classes of common stock more votes (and possibly different economic rights), which can let a group such as the founders keep effective control with less than a majority of the shares.
- Shareholder proposals are typically nonbinding, and a company need not put every one to a vote, although regulations may require management to give reasons for rejecting one.
- Only the shareholder of record on the record date, often 30 days or more before the meeting, may vote, so a holder who sells between the record date and the meeting can still vote and a buyer after the record date cannot vote those shares at that meeting.

QUICK CHECK

Question 1

A Chilean pension fund opens a brokerage account in Tokyo and buys the shares of a Japanese manufacturer on that company's home stock exchange. This is an example of:

- A indirect investing.
- B direct investing.
- C dual listing.

Answer: B

Direct investing in foreign companies means buying the foreign firm's securities in its own (foreign) market. The pension fund does this when it buys on the Tokyo exchange.

Why the other options are wrong

- **A.** Indirect investing means holding an instrument that represents the company's shares, such as a depository receipt, instead of buying the shares on their home exchange.
- **C.** Dual listing is something a company arranges: its shares trade on one or more foreign exchanges in addition to its home exchange. The pension fund is simply buying the shares on the company's home exchange, which is direct investing.

Key takeaway Buying foreign shares on their home exchange is direct investing; buying DRs is indirect investing; dual listing is a company's decision to list its shares abroad.

Practice questions

Question 2

The founders of Veridian Apps own 15% of its shares but control a majority of the votes, because each of their shares carries ten votes while every other share carries one. This arrangement is an example of a:

- A cumulative preference share issue.
- B participating preference share issue.
- C dual-class share structure.

Question 3

Kavanagh Dairy set the record date for voting at its annual meeting 35 days before the meeting. Ingrid Solheim, who owned 800 Kavanagh shares on the record date, sells them to Paulo Mendes 5 days before the meeting. Who is entitled to vote those 800 shares at the meeting?

- A Mendes, because he owns the shares on the meeting date.
- B Solheim, because she was the shareholder of record on the record date.
- C Neither of them, because the shares changed hands after the record date.

Answers: 2. C · 3. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/equity-jurisdictions-classes-and-the-voting-process/. The full bank has 15 questions on this reading.

EQUITIES · READING 41

Equity Issuance and Trading

What you'll learn

LOS 41.a Describe primary and secondary equity markets: IPOs and other listing routes, seasoned offerings, and the functions of secondary trading.

LOS 41.b Compare exchange, off-exchange and over-the-counter equity trading, including quotes, spreads, order types, the limit order book and VWAP.

LOS 41.c Describe liquidity measures for a listed share and calculate market float, average daily volume and turnover.

LOS 41.d Describe the main types of equity indexes and match them to benchmarking needs.

MODULE 41.1

Equity Markets and Exchanges

This reading covers how shares are first issued in the primary market and then traded on exchanges, off-exchange and over the counter, including the bid-ask spread, order types and VWAP. It then shows how to calculate market float, average daily volume and the turnover ratio, and describes the main types of equity index.

LOS 41.a — Primary and secondary equity markets

Primary equity markets are where newly issued shares are sold to investors for the first time; the issuer receives the proceeds. **Secondary equity markets** are where those shares change hands afterward, between investors.

KEY CONCEPT

	Primary market	Secondary market
What trades	New issues (IPOs, primary follow-on offerings, private placements)	Shares already issued
Who receives the cash	Issuer	The selling investor
Sensitivity to market direction	Most active when share prices are rising overall; slower when prices fall	Active in rising and falling markets
Main function	Raising capital, changing ownership structure	Liquidity for holders, price discovery, feedback on performance

Why firms issue equity in the primary market

Typical situations: an early-stage company outgrows **venture capital** funding; a public company **spins off** a division as a separately listed company; a company goes public after several years of restructuring by private owners; or a government sells all or part of a **state-owned enterprise**, which is a **privatization**: the business

moves from government to private ownership. In market language, "publicly held" means that a company's shares trade publicly; it does not mean that the state owns the company.

The IPO process

In an **initial public offering (IPO)** a company that has never had publicly traded shares lists on an exchange and sells shares, usually with an investment bank acting as **equity underwriter**. The underwriter prices the offer, handles compliance and may guarantee that the whole issue is bought; underwriters play the same role in later (secondary) offerings. Before the offer, the company must meet listing and other regulatory requirements and market the shares. The marketing introduces the company to analysts and investors, tests how the market will receive it, measures demand and leads to a price range for the issue. An approximate timeline:

Time before issuance	Regulatory track	Marketing track
About 6 months	Issuer and bank propose the listing and timeline to regulators	Issuer and bank meet equity analysts and gauge market acceptance
About 3 months	Issuer files a confidential prospectus with regulators	Issuer and bank look for potential investors; analysts publish research
Issuance date	Regulators approve; prospectus released to investors	Bank sets the price range and starts book building

The **equity prospectus** covers the business model, the main risks facing the company and its industry, audited financial statements, the offer terms (share count, expected price range) and the use of proceeds. The issuer and its advisers, including the underwriters, prepare it, and the relevant market authority must approve it before the issuer releases it. Regulatory approval does not mean the regulator endorses the offer or vouches for the prospectus's accuracy.

IPO underpricing

Underwriters and the issuer's owners have a conflict of interest. Owners want the highest price, and a higher offer price also earns the underwriters higher fees, but over time underwriters may gain more by placing underpriced shares with institutional clients (strong demand, investors keen to join future deals). This conflict helps explain why IPOs are often underpriced and jump on the first trading day. That benefits the underwriters and the investors who were allocated shares; it costs the existing owners, who raise less than the shares are worth.

Other routes to a listing

Route	How it works	New capital raised?
Direct listing	A private company's existing shares are admitted to trading; no underwriter, price set by the market	No
Special purpose acquisition company (SPAC)	A listed shell raises cash in its own IPO, holds it in a trust account, and must buy a private company (approved by shareholders) within a set period (the de-SPAC transaction) or return the cash	Yes, at the SPAC IPO
Back-door listing	A private company acquires a company that is already listed and uses that listing	No (for the acquirer)

Exam convention: a direct listing creates no new shares and raises no new capital. Current practice: this describes the traditional (secondary) direct listing; some exchanges, the NYSE among them, also permit a primary direct listing in which the company sells newly issued shares.

Shareholders vote on the de-SPAC target, but an individual who voted against it can still end up owning shares in the acquired business.

Seasoned equity offerings

KEY CONCEPT

A company that already has listed equity can sell more shares in a **seasoned equity offering** (a follow-on offering); a prospectus is still required. Whether the offering dilutes existing holders depends on whose shares are sold:

- **Primary follow-on offering:** the company sells new shares. Each existing share's proportional claim on net income and assets falls, so the offering is **dilutive**. Used to raise equity or pay down debt.
- **Secondary follow-on offering:** existing privately held shares (founders, insiders, private equity funds) are sold to the public for the first time. No new shares are created, so it is **nondilutive**, and the company receives no proceeds; the sellers diversify their concentrated holdings.

A **private placement** sells shares directly to qualified investors rather than to the public.

What the secondary market does

It gives holders liquidity and lets new investors buy in. Its prices let investors and analysts measure returns, volatilities and correlations and judge a company's performance, and they feed back into the issuer's decisions on financing, payouts and compensation (e.g., firms that pay in **restricted stock units (RSUs)** use share price changes to evaluate performance).

Common exam traps

- A back-door listing does not raise new capital for a listed company. It is a way for a *private* firm to become listed.
- "Seasoned" does not mean dilutive: only a *primary* follow-on is necessarily dilutive.
- An IPO is a first public *offering*, usually underwritten, and it typically includes new shares. Any selling shareholders receive proceeds only for the existing shares they sell; those shares are the secondary part of the offer. A direct listing, which uses no underwriter, is a different route.
- Analyst meetings start roughly six months before issuance; the price range is set at issuance.

LOS 41.b — Exchange, off-exchange and over-the-counter trading

Equity exchanges

An **equity exchange** is a rules-based venue with regular trading hours; its rules promote liquidity and transparency. Investors trade through **broker-dealers**, who route orders to a centralized **order matching system** that pairs buy and sell orders. A broker-dealer acts either as an *agent*, arranging the client's trade with another party, or as a *principal*, taking the other side of the client's trade itself (the counterparty). The exchange usually

appoints one **designated market maker** per listed stock, which stands ready to buy, hold or sell the shares so that the stock trades continuously. It supports liquidity and **price discovery** during normal trading hours and at times of order imbalance or high volatility.

Quotes and the spread

The **bid price** is what a dealer will pay; the **ask price (offer price)** is what a dealer will sell at. The **bid-ask spread** (bid-offer spread) is the dealer's compensation and the investor's round-trip cost:

KEY CONCEPT

$$\text{bid-ask spread} = \text{lowest ask} - \text{highest bid} \quad \text{bid-ask spread}(\%) = \frac{\text{lowest ask} - \text{highest bid}}{\text{lowest ask}}$$

$$\text{mid-market price} = \frac{\text{lowest ask} + \text{highest bid}}{2}$$

An investor always trades on the less favorable side of the spread, buying at the ask and selling at the bid.

Example. The best quotes for a stock are a bid of 24.90 and an ask of 25.00. Spread = 25.00 – 24.90 = 0.10, or 0.10/25.00 = 0.40%; mid-market price = 24.95.

Order types

A **market order** executes immediately at the best available price. A **limit order** sets a boundary: a *maximum* price for a buy, a *minimum* price for a sell. The limit can be above, at, or below the current market price; a sell limit above the market simply waits until the price rises to it.

The limit order book

In a **limit order book**, buy limit orders (the bid side) sit at prices below the mid-market price and sell limit orders (the offer side) sit above it; the gap between the highest bid and the lowest offer is the spread.



A limit order book: shares posted at each limit price

Market depth is the relative *size* of the orders at or near the best bid and ask (or the mid-market price). **Market breadth** is the *number* of orders at price levels close to the best bid and ask. Both measure how much can be traded without moving the price, and they are compared with market resiliency under LOS 41.c.

Example. The book above lies behind the quotes in the spread example: the highest bid is 24.90 and the lowest offer is 25.00. Depth at the best prices is 1,200 shares bid and 800 shares offered. A market order to buy 1,000 shares therefore fills 800 shares at 25.00 and the other 200 at the next price, 25.05, an average of $(800 \times 25.00 + 200 \times 25.05) / 1,000 = 25.01$. The average is worse than the best offer because the order is larger than the depth at that price. A price that moves against a large order in this way is market impact, one of the implicit costs of trading described below. A buy limit order at 24.95 would not trade at once. It would become the new highest bid and narrow the spread to 0.05.

VWAP

The **volume-weighted average price (VWAP)** tracks intraday trading:

$$\text{VWAP} = \frac{\sum_i (\text{price}_i \times \text{volume}_i)}{\sum_i \text{volume}_i}$$

Example. Trades of 2,000 shares at 10.00, 3,000 at 10.20 and 5,000 at 10.10 give $\text{VWAP} = (20,000 + 30,600 + 50,500) / 10,000 = 10.11$.

Off-exchange and OTC trading

Off-exchange trading is used for illiquid, thinly traded shares and for **block trades** (usually 10,000 shares or more). Its purpose is to reduce the **implicit costs of trading**, the indirect and unobservable costs that come from the market impact of trading: **market impact** (the price moves against a large order executed at once), **delay**

costs or **slippage** (the trade cannot be completed immediately), and **opportunity costs** (profit forgone because the trade was not done quickly).

Over-the-counter (OTC) trading is **quote-driven**: broker-dealers in a network act as market makers and post bid and ask prices that are **firm quotes**, meaning they must trade at those prices. Dealers hold inventory and offset trades with one another. Quote-driven markets are also called **dealer markets** or **price-driven markets**; most non-equity securities trade this way, often electronically.

	Exchange	Off-exchange	OTC (quote-driven)
Matching	Centralized order matching system	Negotiated / alternative venues	Dealers trade from inventory
Typical use	Liquid listed shares	Block trades, illiquid shares	Dealer network; most non-equity securities
Transparency	Highest	Lower	Lower than exchanges; best price not guaranteed

Common exam traps

- The spread is the *lowest* ask minus the *highest* bid. The extremes of the book are irrelevant.
- A sell limit is a *minimum* price, but it need not be below the market price.
- OTC quotes are firm, yet OTC markets are *less* transparent than exchanges.

EXAM SHORTCUTS

- Of the two follow-on offerings, only the primary one creates new shares, so a secondary follow-on can be ruled out whenever a question asks which offering is dilutive or brings the company cash.

BOTTOM LINE

- In the primary market newly issued shares are sold and the issuer receives the cash, and it is most active when share prices are rising overall; in the secondary market investors trade shares already issued, and it is active whether prices rise or fall.
- Underwriters may gain more over time by placing underpriced shares with institutional clients than from the higher fees of a higher offer price, a conflict with the issuer's owners that helps explain why IPOs are often underpriced and jump on the first trading day.
- Exam convention: a direct listing admits a private company's existing shares to trading without an underwriter and raises no new capital; current practice: that describes the traditional direct listing, and some exchanges, the NYSE among them, also permit a primary direct listing of new shares.
- A SPAC raises cash in its own IPO, holds it in a trust account and must buy a shareholder-approved private company within a set period or return the cash, while a back-door listing has a private company acquire an already listed company to use its listing.
- A primary follow-on offering sells new shares and dilutes each existing share's claim on net income and assets; a secondary follow-on sells existing privately held shares, creates no new shares and brings the company no proceeds.

- The bid-ask spread is the lowest ask minus the highest bid (as a percentage, divided by the lowest ask), and an investor buys at the ask and sells at the bid; OTC dealers post firm quotes, yet OTC markets are less transparent than exchanges.

QUICK CHECK

Question 1

An analyst lists three recent transactions. Which one took place in the primary market?

- A Two pension funds trade a block of listed shares directly with each other.
- B A bank buys investment-grade corporate bonds from a dealer's inventory.
- C A utility sells newly issued common shares to investors to fund a new plant.

Answer: C

The primary market is the market for new issues: the securities are sold for the first time and the issuer receives the proceeds. The utility's sale of newly issued shares to finance a plant is a primary market transaction.

Why the other options are wrong

- **A.** Institutions trading existing listed shares with each other is a secondary market trade; the issuer receives nothing.
- **B.** Buying bonds that already sit in a dealer's inventory is a secondary market purchase. Credit quality (investment grade or not) has nothing to do with whether a market is primary or secondary.

Key takeaway A primary market sale is the first sale of a new security, with proceeds going to the issuer.

MODULE 41.2

Equity Indexes and Liquidity Measures

LOS 41.c — Float, trading volume and other liquidity measures

Market float is the portion of a company's shares available to the investing public; it is often quoted as the market value of those shares. Shares held by controlling shareholders, restricted shares (e.g., executives' shares under selling restrictions) and other shares not available for trading are excluded. Institutional investors such as mutual funds, pension funds and ETFs are part of the investing public, so their holdings stay in the float.

KEY CONCEPT

$$\text{market float} = \text{shares outstanding} - \text{restricted shares or shares not available for trading}$$

Average daily volume (ADV) is the average number of shares traded per day over a chosen period:

$$\text{average daily volume} = \frac{\sum_{i=1}^n (\text{shares traded on day } i)}{n}$$

The **turnover ratio** shows what fraction of the float changes hands on a typical day:

KEY CONCEPT

$$\text{turnover ratio} = \frac{\text{average daily volume}}{\text{market float}}$$

These measures tell an investor how quickly a position can be built or unwound without moving the price.

Example. A company has 50 million shares outstanding, of which 8 million are held by its controlling family. Float = 50 – 8 = 42 million. Over the last month ADV was 1.26 million shares, so turnover = 1.26/42 = 3.0% per day. A fund holding 900,000 shares may trade no more than 15% of ADV per day, i.e. 0.15 × 1,260,000 = 189,000 shares; it needs 900,000/189,000 = 4.76, so 5 trading days to exit fully. A fractional result is rounded *up*.

Order-book liquidity measures show how easily shares can be traded without a big adverse price move. Depth and breadth were introduced with the limit order book under LOS 41.b; the table compares them with resiliency:

Measure	What it captures	Falls when...
Market depth	Relative <i>size</i> of orders posted at or near the best bid and offer	Orders near the best prices get smaller
Market breadth	<i>Number</i> of orders at prices just above and below the best bid and offer	Fewer separate orders near the best prices
Market resiliency	Ability of the shares to hold a steady price that clears every buy and sell order; after a shock, a more resilient market settles at its new clearing price sooner	Prices take longer to stabilize

Common exam traps

- Institutional holdings stay in the float. Only controlling, restricted or otherwise untradeable shares are subtracted.
- The turnover ratio uses float in the denominator rather than total shares outstanding. In the example, dividing ADV of 1.26 million by the 50 million shares outstanding gives 2.52% instead of 3.0%.
- Smaller orders with the same number of orders mean lower depth and unchanged breadth.
- Days-to-liquidate: divide by the *daily* allowed volume and round up. In the example, dividing 900,000 by the full ADV of 1,260,000 gives 0.71 days and rounding 4.76 down gives 4 days, but the fund needs 5.

LOS 41.d — Types of equity indexes

A **security market index** represents the performance of an asset class, market or market segment. It is built as a portfolio of **constituent securities**, and its value is computed from their prices at a point in time. Indexes are used as **benchmarks** for managers and as the basis for index funds.

KEY CONCEPT

Index type	What it holds / how weighted	Typical use
Broad-based equity index (often called a broad market index)	The largest listed companies, market-capitalization-weighted and adjusted for market float ; may be tiered by size. A composite market index measures the overall market and usually covers more than 90% of its total value	Measuring the overall market
Sector index	Companies in one industry sector (e.g., health care, financials), national or global	Benchmarking sector managers; building index portfolios; business-cycle (cyclical) analysis, since sectors lead or lag in different phases
Investment theme index	Companies selected by an investor trend that cuts across industries and sizes (e.g., ESG-screened firms, an aging-population or clean-energy theme)	Thematic funds
Alternatively weighted index	Same constituents as a broad-based equity index but equal-weighted, or weighted by fundamental factors (factor-based indexes, e.g., quality, value)	Reducing large-cap concentration; factor investing
Multi-market index	Combines national indexes for a region, a development stage (e.g., emerging markets), or the world	Global and regional benchmarks

The weighting method decides which companies drive an index. In a market-capitalization-weighted index of three companies with market capitalizations of 600, 300 and 100, the largest carries 60% of the weight and the smallest 10%. An equal-weighted index of the same three gives each one-third, so the smallest company's influence more than triples. When an equal-weighted index outperforms a cap-weighted index with the same constituents, the smaller constituents have therefore done better, on average, than the larger ones.

Choosing a benchmark

Match the index to the mandate. A fund confined to one industry is benchmarked against a sector index, a fund built around a cross-industry trend against an investment theme index, and a fund that picks stocks by value or quality characteristics against a factor-based index.

Common exam traps

- Broad-based equity indexes are typically float-adjusted and cap-weighted. Equal weighting and factor weighting are alternative methods.
- A theme spanning several industries is *not* a sector index.
- A factor-based index selects on stock characteristics such as value, quality or dividend yield; a theme index selects on a trend.

EXAM SHORTCUTS

- When an equal-weighted index outperforms a cap-weighted index with the same constituents, the smaller constituents have done better on average than the larger ones, so no weight calculation is needed to answer which group drove the gap.

BOTTOM LINE

- Market float is shares outstanding less restricted or otherwise untradeable shares, so shares of controlling shareholders and restricted shares are excluded while holdings of institutions such as mutual funds, pension funds and ETFs stay in.
- Average daily volume is total shares traded over a period divided by the number of days, and the turnover ratio is average daily volume divided by market float.
- The days needed to exit a position equal the position divided by the volume allowed per day (the permitted share of ADV times ADV), with a fractional result rounded up.
- Market depth is the relative size of orders at or near the best bid and offer, market breadth is the number of orders at prices close to them, and market resiliency is the ability to hold a stable market-clearing price, a more resilient market reaching its new clearing price sooner after a shock.
- Broad-based equity indexes hold the largest listed companies, weighted by float-adjusted market capitalization, and a composite market index usually covers over 90% of the total value of the market.
- A fund confined to one industry is benchmarked against a sector index, a fund built on a cross-industry trend against an investment theme index, and a fund selecting on value or quality against a factor-based index; multi-market indexes combine national indexes for a region, a development stage or the world.

QUICK CHECK**Question 2**

An index provider designing a broad-based equity index for a national stock market would *most typically* weight the constituent stocks:

- A** by float-adjusted market capitalization.
- B** in proportion to their share prices.
- C** equally, regardless of company size.

Answer: A

Broad-based equity indexes include the largest listed firms and are calculated on a market-capitalization-weighted basis, adjusted for market float. Larger companies therefore carry larger weights.

Why the other options are wrong

- **B.** Price weighting is not the typical method for broad-based equity indexes.
- **C.** Equal weighting is an alternative weighting method used to reduce the dominance of the largest companies in a broad-based equity index; it is not the standard approach.

Key takeaway Broad-based equity indexes are float-adjusted and cap-weighted; equal-weighted and factor-weighted versions are the alternatives.

Practice questions

Question 3

An analyst makes three statements about methods of issuing equity. Which statement is *least accurate*?

- A** A private company can obtain listed status through either a back-door listing or a direct listing.
- B** A SPAC shareholder can end up owning part of an acquired company even after voting against that target.
- C** Every seasoned equity offering reduces the proportional ownership of the company's current shareholders.

Question 4

Owen Achebe owns 2,000 shares of Kilnsey Water and enters a limit order to sell all of them at 27.35. Just before his order arrives, the limit order book looks like this:

Limit order book for Kilnsey Water shares

Bid size (shares)	Limit price	Offer size (shares)
	27.60	800
	27.55	1,200
900	27.45	
600	27.40	
1,100	27.30	

Any shares that cannot be sold at once remain in the book as an offer. The average price of the shares he sells immediately is *closest* to:

- A** 27.35.
- B** 27.40.
- C** 27.43.

Answers: 3. C · 4. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/equity-issuance-and-trading/. The full bank has 32 questions on this reading.

credguild.com

EQUITIES · READING 42

Sources of Equity Returns

What you'll learn

LOS 42.a Describe the features and uses of cash dividends, share repurchases, stock dividends, stock splits and reverse splits.

LOS 42.b Describe the dividend payment chronology and the share price behavior on the ex-dividend date.

LOS 42.c Calculate price return and total return on equity, including splits and reinvested dividends, and relate price to the present value of expected cash flows.

MODULE 42.1

Dividends, Stock Splits, and Share Repurchases

This reading describes cash dividends, share repurchases, stock dividends, stock splits and reverse splits, and the chronology of a dividend from declaration to payment. It then shows how to calculate price return and total return, including returns with reinvested dividends, and how a share's value follows from discounting its expected price and dividend.

LOS 42.a — Dividends, share repurchases, stock splits and reverse splits

Cash dividends are cash payments to shareholders. They are subject to income tax in the period received. Paying them is at the discretion of the board of directors. Mature companies with few growth opportunities tend to pay out cash; fast-growing companies tend to retain it for reinvestment.

KEY CONCEPT

Distribution	What happens	Typical use
Regular cash dividend	A portion of profits paid on a consistent schedule (e.g., quarterly)	A stable or rising record signals financial stability; firms often hold dividend per share steady to avoid a negative signal from a cut
Special cash dividend (extraordinary dividend)	One-time cash payment on top of any regular dividend	Cyclical firms share profits in good years without committing to higher payments in bad years
Liquidating dividend	Paid by a company that is ceasing operations and has positive net assets	Viewed more as a return of capital than a distribution of earnings
Share repurchase (buyback)	The company buys its own outstanding shares	Alternative way to distribute cash; each holder decides whether to sell
Stock dividend (bonus issue)	New shares instead of cash, stated as a percentage (a 10% stock dividend gives 10 more shares per 100 held)	Share count rises, price per share falls, total equity unchanged

Distribution	What happens	Typical use
Stock split (forward split)	Each share becomes several shares, stated as a ratio (3-for-1: each old share becomes three)	Makes a high-priced share more affordable for retail investors, which can improve liquidity and broaden the shareholder base. Today stock splits are used more often than stock dividends
Reverse stock split	Several shares become one (1-for-5: five old shares become one)	Raises the price per share, e.g., to stay above an exchange's minimum price and avoid delisting

Share repurchases in more detail

A repurchase has the same effect on total shareholder wealth as a cash dividend of the same amount. Reasons to buy back shares: to support the share price or signal that management thinks the shares are undervalued; to offset the increase in shares outstanding when employees exercise stock options; to raise reported EPS by shrinking the share count; to keep flexibility, since a company that wants to hold cash for growth opportunities as they arise may prefer buybacks to regular dividends (a buyback creates no expectation of repetition); and, where capital gains are taxed more lightly than dividends, because shareholders prefer it.

Splits and stock dividends do not create value

The company's total value is unchanged, so the price per share adjusts in proportion to the change in the share count. A shareholder's wealth and proportional ownership are unchanged. A 3-for-2 split is economically identical to a 50% stock dividend: 50% more shares, each worth one-third less.

Example. An investor holds 200 shares at 90. After a 3-for-1 split she holds 600 shares; other things equal the price falls to 30, and the position is still worth $600 \times 30 = 18,000 = 200 \times 90$.

Common exam traps

- Among cash distributions, only a share repurchase reduces the number of shares outstanding; regular and special cash dividends leave it unchanged. A reverse split also cuts the share count, but it rescales every holding proportionally and distributes no cash. It therefore cannot offset dilution from option exercises the way a buyback can.
- A forward split or a stock dividend *lowers* the price per share; a reverse split raises it.

LOS 42.b — Dividend payment chronology

In time order, a dividend passes through its declaration date, its ex-dividend date, its record date and finally its payment date. The ex-dividend and record dates can fall on the same day, as explained below.

KEY CONCEPT

Date	What happens
Declaration date	The board approves the dividend and announces the amount per share, the record date and the payment date

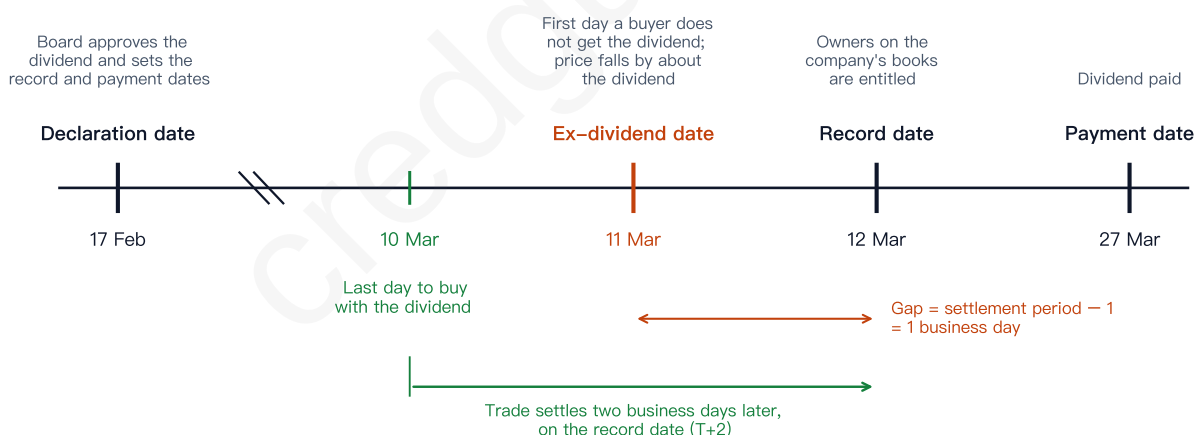
Date	What happens
Ex-dividend date	The first day on which a buyer of the shares will not receive the declared dividend. Its position depends on the settlement period for share trades
Record date (holder-of-record date)	The company identifies the owners entitled to the dividend. This dividend record date is separate from the record date used for proxy voting
Payment date	The dividend is paid (checks mailed or electronic transfer)

How the ex-dividend date is set relative to the record date

A trade takes time to settle. The last purchase that carries the dividend is the one made the business day before the ex-dividend date; it settles exactly on the record date. So the gap between the ex-dividend date and the record date is one business day less than the settlement period: with T+3 settlement the gap is two business days, with T+2 it is one, and with T+1 the two dates coincide. Anyone who buys *before* the ex-dividend date receives the dividend. Anyone who sells *on or after* the ex-dividend date still receives it, because they were the owner at the cutoff, and their buyer does not.

Exam convention: the ex-dividend date comes one or two business days ahead of the record date, with the exact gap set by the settlement cycle. Current practice: US equity trades have settled on a T+1 basis since May 2024, so a US company's ex-dividend date and record date are now normally the same day.

The timeline shows the exam-convention case of T+2 settlement, with a one-day gap, for a dividend whose record date is 12 March.



Dividend payment chronology under T+2 settlement (exam convention)

Price behavior

Other things equal, the share price drops by the amount of the dividend (relative to the prior close) when the stock goes ex-dividend, because buyers no longer get the payment.

Separating the causes of a price change on the ex-dividend date

The day's percentage change equals the negative dividend effect plus the market effect plus the company-specific effect. If the stock's risk equals the market's, its expected market-driven move equals the index move.

Example. A share closes at 60.00 the day before going ex-dividend; the dividend is 1.20 (2.0% of 60). On the ex-dividend date it closes at 59.40, while the market index rises 0.8%.

- Actual change = $(59.40 - 60.00)/60.00 = -1.0\%$
- Change not caused by the dividend = $-1.0\% - (-2.0\%) = +1.0\%$
- Company-specific part = $1.0\% - 0.8\% = +0.2\%$

In price terms the share fell 0.60, even though the dividend alone would have taken off 1.20: the other +0.60 came from the market ($0.8\% \times 60 = 0.48$) and company news (0.12).

Common exam traps

- The cutoff for buyers is the ex-dividend date, not the record date.
- A seller between the ex-dividend date and the record date still gets the dividend.
- The price drops on the ex-dividend date. The declaration, record and payment dates bring no such drop.
- When isolating the company-specific move, *add back* the dividend drop and *subtract* the market move. In the example, subtracting the 0.8% market move from the -1.0% actual change without adding back the 2.0% dividend drop gives -1.8% instead of +0.2%.

EXAM SHORTCUTS

- A 3-for-2 split and a 50% stock dividend are economically identical (50% more shares, each worth one-third less), so other things equal neither lowers the share price more than the other.
- The ex-dividend date comes one business day less than the settlement period before the record date, so T+2 settlement gives a one-day gap and T+1 settlement puts the two dates on the same day.

BOTTOM LINE

- A share repurchase has the same effect on total shareholder wealth as a cash dividend of the same amount, but each holder decides whether to sell, and among cash distributions only a repurchase reduces the number of shares outstanding.
- A special cash dividend is a one-time payment on top of any regular dividend, which lets cyclical firms share profits in good years without committing to them in bad years, while a liquidating dividend is viewed more as a return of capital.
- Stock dividends and forward splits raise the share count and lower the price per share in proportion, and reverse splits do the opposite, so the company's total value, a shareholder's wealth and proportional ownership are unchanged.
- In time order a dividend is declared, the stock goes ex-dividend, the record date passes and the dividend is paid; other things equal, the share price falls by the dividend amount when the stock goes ex-dividend, the first day a buyer no longer receives it.
- Exam convention: the ex-dividend date precedes the record date by one or two business days, with the gap set by the settlement cycle; current practice: US equity trades have settled T+1 since May 2024, so a US company's two dates are now normally the same day.

- On the ex-dividend date the percentage price change equals the negative dividend effect plus the market effect plus the company-specific effect, so for a stock as risky as the market the company-specific part is the actual change plus the dividend percentage minus the index move.

QUICK CHECK

Question 1

Torvald Steel's profits rise and fall with the business cycle. After an exceptionally profitable year, its board wants to share the windfall with shareholders without committing to larger payments in future years. The type of distribution the board is *most likely* to declare is a:

- A special dividend.
- B regular dividend.
- C stock dividend.

Answer: A

A special (extraordinary) cash dividend is a one-time payment made when favorable circumstances allow, in addition to any regular dividend. Many cyclical companies use special dividends to share profits in good years while keeping the flexibility to conserve cash when profits fall.

Why the other options are wrong

- B.** Raising the regular dividend creates an expectation that the higher payment will continue; cutting it later would send an adverse signal, and the board wants to avoid both.
- C.** A stock dividend distributes new shares rather than cash and does not share any profits: total equity and shareholder wealth are unchanged.

Key takeaway A cyclical firm that wants to share a good year without a lasting commitment pays a special dividend.

MODULE 42.2

Return Calculations for Equities

LOS 42.c — Price return and total return on equity

A **price return** uses only the change in the share price (adjusted for stock splits). A **total return** adds income, i.e., cash dividends received.

KEY CONCEPT

$$\text{price return} = \frac{P_1 - P_0}{P_0} \quad \text{total return} = \frac{P_1 - P_0 + D}{P_0}$$

Example. Buy at 30.00, receive a 0.60 dividend just before selling at 33.00. Price return = $3.00/30.00 = 10.0\%$; total return = $3.60/30.00 = 12.0\%$.

Stock splits and stock dividends do not change returns

Adjust the beginning price, ending price and dividend per share to the same share basis (or simply work with the value of the whole position). An investor who ends up with more shares after a split receives the same total dividend and holds a position of the same value, so the rate of return is unchanged. The same is true of stock dividends and reverse splits. The common mistake is to compare a *post-split* ending price with a *pre-split* purchase price.

Reinvested dividends

When a dividend received part-way through the holding period is used to buy more of the same stock (**reinvested dividends**), the investor acquires **fractional shares** of D/P_{PD} per share originally held, where P_{PD} is the price on the dividend payment date. The holding period return is:

KEY CONCEPT

$$r_E = \frac{P_1 \left(1 + \frac{D}{P_{PD}} \right) - P_0}{P_0}$$

With several reinvested dividends, track the share count step by step: each dividend adds (shares held × dividend per share) / price on that payment date.

Example. Buy at 40.00; halfway through the period a 1.00 dividend is paid when the price is 50.00 and reinvested; the ending price is 45.00. Extra shares = $1.00/50.00 = 0.02$ per share, so $r_E = [45.00(1.02) - 40.00]/40.00 = 14.75\%$. Had the dividend instead been deposited in an account paying 4% over the whole holding period, it would earn interest only for the second half and grow to $1.00 \times 1.04^{0.5} = 1.0198$, and $r_E = (45.00 - 40.00 + 1.0198)/40.00 = 15.05\%$.

Summary: how a dividend enters the holding period return

KEY CONCEPT

Treatment of the dividend

How it enters the holding period return

Received just before the sale

Add it once to the price change: $(P_1 - P_0 + D)/P_0$

Reinvested in the same stock

Convert it into extra shares at P_{PD} ; value all shares at P_1

Invested elsewhere (e.g., a bank deposit)

Add the dividend *plus* what it earns until the end of the period to the price change

Paid in shares (stock dividend) or a split

Not income; once prices are on the same share basis the return is unchanged

The holding period used in these calculations may be shorter or longer than a year; read the question to see whether an annualized figure is wanted.

Equity value as a present value

Rearranging the return formula for a stock with no dividend, $1 + r_E = P_1/P_0$, gives $P_0 = P_1/(1 + r_E)$. Because the ending price is not known in advance, use expectations, and include a dividend expected at the end of the period:

$$P_0 = \frac{E(P_1) + E(D_1)}{1 + r_E}$$

Here r_E is investors' **required rate of return** on the equity. This is the foundation of **discounted cash flow models**: a share is worth the present value of its expected future cash flows.

Example. Expected price in one year 52.50, expected dividend 1.50, required return 8%: $P_0 = 54.00/1.08 = 50.00$.

Common exam traps

- When dividends are reinvested, do not also add the cash dividend; it has already been turned into shares. In the reinvestment example, adding the 1.00 dividend on top of the extra shares gives 17.25% instead of 14.75%.
- Use the price on the *payment date* to compute the shares bought with each dividend. In the same example, buying the extra shares at the 40.00 purchase price gives 15.31% instead of 14.75%.
- After a split, put both prices (and the dividend) on the same share basis before computing returns.
- In the present value formula, discount the expected dividend as well as the expected price. In the example, adding the 1.50 dividend undiscounted to $52.50/1.08$ gives 50.11 instead of 50.00.

EXAM SHORTCUTS

- Splits, stock dividends and reverse splits leave the rate of return unchanged, so working with the value of the whole position avoids restating every per-share figure on a new share basis.

BOTTOM LINE

- Price return is $(P_1 - P_0)/P_0$, using only the split-adjusted price change, and total return is $(P_1 - P_0 + D)/P_0$, adding the cash dividends received.
- Stock splits, stock dividends and reverse splits do not change the rate of return once the beginning price, ending price and dividend per share are on the same share basis.
- A dividend reinvested in the same stock buys D/P_{PD} extra shares per share held at the price on the payment date, and the return is $r_E = [P_1(1 + D/P_{PD}) - P_0]/P_0$, with the cash dividend not added again.
- A dividend invested elsewhere, such as in a bank deposit, enters the holding period return as the dividend plus what it earns until the end of the period.

- A share's value is $P_0 = [E(P_1) + E(D_1)] / (1 + r_E)$, where r_E is the required rate of return; this is the basis of discounted cash flow models, in which a share is worth the present value of expected future cash flows.
- A holding period may be shorter or longer than a year, so a return question has to be read for whether an annualized figure is wanted.

QUICK CHECK

Question 2

An analyst expects shares of Marlow Utilities to trade at \$66.00 one year from now and to pay a dividend of \$2.20 per share at the end of the year. Investors' required rate of return on Marlow's equity is 11%. The value of a Marlow share today is *closest* to:

- A \$59.46.
- B \$61.44.
- C \$61.66.

Answer: B

The value of an equity security today is the present value of the cash flows the investor expects to receive, discounted at the required rate of return. Over one period, those cash flows are the expected dividend and the expected ending price, both received at the end of the year.

$$P_0 = \frac{E(P_1) + E(D_1)}{1 + r_E} = \frac{66.00 + 2.20}{1.11} = \frac{68.20}{1.11} = \$61.44$$

Why the other options are wrong

- **A.** \$59.46 ($66.00/1.11$) discounts only the expected price and leaves out the expected dividend.
- **C.** \$61.66 ($66.00/1.11 + 2.20$) discounts the expected price but adds the dividend undiscounted, even though it is also received a year from now.

Key takeaway $P_0 = [E(P_1) + E(D_1)] / (1 + r_E)$: discount every future cash flow, including the dividend.

Practice questions

Question 3

Galloway Brewing pays a dividend of \$0.90 per share. Its shares close at \$48.00 on the day before the ex-dividend date and at \$45.60 on the ex-dividend date. Assume Galloway has the same risk as the overall market and there is no company news. The fraction of Galloway's ex-dividend-date price drop that is attributable to the market is *closest* to:

- A 62.5%.
- B 37.5%.
- C 3.3%.

Answers: 3. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/sources-of-equity-returns/. The full bank has 17 questions on this reading.

EQUITIES · READING 43

Introduction to Equity Valuation

What you'll learn

LOS 43.a Contrast market price with intrinsic and perceived value, and the naïve, relative and absolute approaches to valuation.

LOS 43.b Contrast book value of equity, market capitalization and enterprise value as indicators of intrinsic value, including P/B and EV/EBITDA.

LOS 43.c Describe present value, asset-based and multiplier valuation models and their advantages and disadvantages.

MODULE 43.1

Measures and Models of Equity Value

This reading separates market price from intrinsic value and describes naïve, relative and absolute ways of forming a perceived value. It shows how to calculate book value, market capitalization, P/B and enterprise value, and how to tell the categories of valuation model apart.

LOS 43.a — Price versus value

Market price is observable: it is what the shares trade at. **Intrinsic value (fundamental value)** is the value a rational investor would place on the stock with full knowledge of its characteristics; it cannot be observed, so analysts estimate it with **valuation models**.

Each investor's own estimate, based on his or her assumptions, is a **perceived value**, and market prices aggregate the perceived values of active participants. Compare perceived value with price:

Perceived value vs. market price	Investor's view	Likely action
Higher	Undervalued	Buy / overweight
Lower	Overvalued	Sell / underweight
Equal	Fairly valued	Hold

Three ways investors form a perceived value

KEY CONCEPT

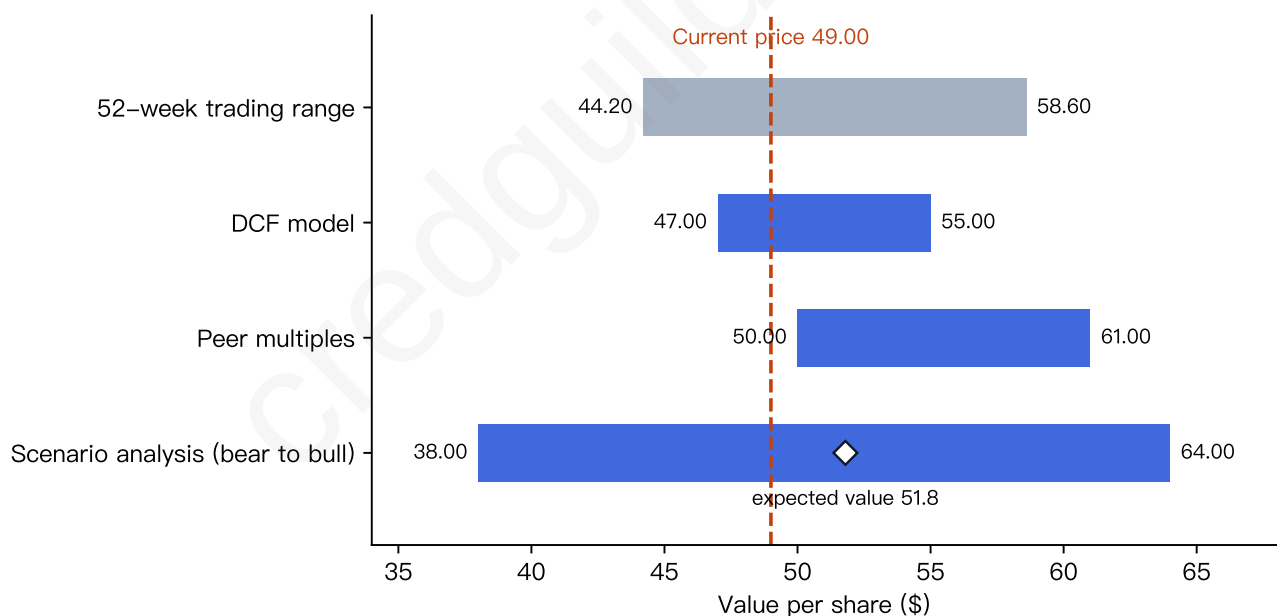
Approach	Basis	Example
Naïve or story-based valuation	An informal story with no link to the company's finances or fundamentals	Meme stocks driven by social-media buzz; cult stocks whose value rests on devotion to a founder or product

Approach	Basis	Example
Relative valuation	Compare the company's multiples with a peer group; similar companies should trade at similar multiples (e.g., P/E, P/B, EV/EBITDA)	"Its P/E is below the sector average, so it looks cheap"
Absolute valuation (fundamental valuation)	The company's own characteristics only, without a benchmark — e.g., present value of expected future cash flows at a risk-adjusted discount rate	A dividend discount or free cash flow model

Ranges and scenarios

Analysts often express intrinsic value as a range (from different inputs or different models) and compare it with the stock's recent trading range, sometimes side by side in a **floating bar valuation chart**. In **scenario analysis** the analyst values the stock under a **base case**, a **bullish** (more favorable) case and a **bearish** (less favorable) case; the expected value is the probability-weighted average of the three.

Example. Base, bull and bear values of 50, 64 and 38 with probabilities 0.5, 0.3 and 0.2 give an expected value of $0.5(50) + 0.3(64) + 0.2(38) = 51.8$.



Floating bar valuation chart: estimated value ranges compared with the recent trading range (illustrative figures)

Common exam traps

- A story with no financial analysis is naïve valuation, even if the story is plausible.
- P/E comparisons with peers are *relative* valuation.

LOS 43.b — Book value, market capitalization and enterprise value

Book value of equity is balance sheet assets minus liabilities (and minus minority, i.e., noncontrolling, interest). It rises when the company earns net income and retains it; a company that pays no dividends retains all of its net income, so positive net income raises its book value, other things equal. Equivalently, add up the components of stockholders' equity, excluding noncontrolling interest:

$$\text{book value} = \text{share capital} + \text{additional paid-in capital} + \text{retained earnings} + \text{accumulated other comprehensive income (and other reserves)} - \text{treasury stock}$$

Exam convention: book value = share capital + additional paid-in capital + retained earnings – treasury stock. Current practice: stockholders' equity also contains **accumulated other comprehensive income (AOCI)** and other reserves, so they are added as in the formula above; the shorter version gives the same answer only when those items are zero. For instance, paid-in capital of 100, retained earnings of 0 and AOCI of +10 give a book value of 110.

$$\text{book value per share (BVPS)} = \frac{\text{book value of equity}}{\text{shares outstanding}}$$

Example. Common stock 400, additional paid-in capital 1,100, retained earnings 650, treasury stock (250) and noncontrolling interest 90 (all in millions). Book value = 400 + 1,100 + 650 – 250 = 1,900 (total equity of 1,990 less the 90 of noncontrolling interest). With 50 million shares, BVPS = 38.00.

Limits of book value

Assets may be tangible (equipment, inventory) or intangible (patents, copyrights, goodwill). Carrying values of tangible assets depend on when they were bought and on the depreciation method, and accounting choices differ across companies, which affects BVPS comparisons. Internally generated intangibles (brands, know-how) are usually expensed and never appear on the balance sheet; purchased intangibles are amortized over their useful lives or impairment-tested. **Goodwill** arises when an acquirer pays more than the fair value of the target's net identifiable assets. Book value is therefore most useful for companies with substantial tangible assets (e.g., manufacturers) and least useful for early-stage or asset-light companies and those whose value lies in intangibles.

Negative book value means liabilities exceed assets. It is common in financial distress, but it can also occur at profitable, valuable companies, such as those growing rapidly or running aggressive share repurchases, because treasury stock is deducted from equity. Negative book value alone does *not* mean the shares cannot provide value to investors.

Market capitalization = share price × shares outstanding. It reflects the fair value of the company as a **going concern**, including investors' expectations about future earnings. It does not measure what the assets would fetch if sold piecemeal. Because it depends on expectations, net income that disappoints investors can *lower* market capitalization even as it raises book value.

- Market cap > book value: the firm is creating **excess value**.
- Market cap < book value: a **value shortfall**; the analyst should investigate whether the stock is undervalued or the company is uncompetitive.

The **price-to-book ratio (P/B)** expresses the same comparison as a ratio, so a P/B above 1 corresponds to excess value and a P/B below 1 to a value shortfall:

KEY CONCEPT

$$P/B = \frac{\text{market price per share}}{\text{BVPS}} = \frac{\text{market capitalization}}{\text{book value of equity}}$$

Relative to a peer benchmark, a P/B well above (below) the benchmark suggests the stock is relatively overvalued (undervalued), absent a justifying reason. *Example:* at a price of 57 and BVPS of 38, $P/B = 1.5$.

Enterprise value (EV) measures the value of the whole firm, roughly what it would cost to acquire it:

KEY CONCEPT

$$EV = \text{market value of common and preferred stock} + \text{market value of debt} - \text{cash and short-term investments}$$

Net debt equals the market value of debt less cash and short-term investments; cash is subtracted because the acquirer takes over the target's liquid assets along with its debt. EV is useful for comparing companies with very different capital structures (convert to a common currency first for cross-border comparisons). It is usually divided by **EBITDA** (or EBIT, or revenue).

The balance sheet usually carries debt at book value, so its market value often has to be estimated. For long-term debt the analyst uses financial market data, such as current prices of the firm's bonds. Short-term debt can be taken at book value if the firm is not in financial distress, because a debt instrument's market value moves toward its face value as maturity approaches.

Example. A firm has equity market value 2,850, no preferred stock, cash 150 and EBITDA 425. Its long-term debt is valued at 520 from bond prices and its short-term debt is taken at its book value of 180, so the market value of debt is 700. Then $EV = 2,850 + 700 - 150 = 3,400$; $EV/EBITDA = 8.0\times$. If peers trade at $9\times$, the firm looks relatively undervalued.

Measure	Based on	Viewpoint
Book value of equity	Balance sheet carrying values	Equity holders, accounting
Market capitalization	Share price × shares	Equity holders, market expectations
Enterprise value	Market value of equity and debt, less cash	All capital providers

Common exam traps

- Additional paid-in capital and accumulated other comprehensive income are *part of* book value; treasury stock is *subtracted*; noncontrolling interest is *excluded*. In the example, keeping the 90 of noncontrolling interest gives a book value of 1,990 and a BVPS of 39.80 instead of 1,900 and 38.00.
- Do not forget to subtract cash when computing EV, or to include preferred stock. In the example, leaving out the 150 of cash gives an EV of 3,550 and an EV/EBITDA of 8.35× instead of 3,400 and 8.0×.

- P/B is price divided by BVPS; dividing BVPS by price inverts it. With a price of 57 and BVPS of 38, the inverted ratio is 0.67 instead of 1.5.

LOS 43.c — Categories of valuation models

Absolute valuation models use only company-specific information.

1. **Present value models (discounted cash flow models)** value a share as the present value of expected future cash flows. Inputs: forecast cash flows over a forecast period, a **terminal value**, and a discount rate.

Model	Cash flow	Discount rate	Best suited to
Dividend discount model	Dividends	Required return on equity	Mature firms with stable, predictable dividends
Free cash flow to equity (FCFE)	Cash available to shareholders after capital expenditures and working capital needs	Required return on equity	Non-dividend payers with stable capital structures
Free cash flow to the firm (FCFF)	Cash available to <i>both</i> debt and equity holders; gives firm value	Weighted average cost of capital (WACC)	Negative FCFE or unstable capital structure (heavy debt, big buybacks)
Residual income	Current book value + PV of future residual income (net income minus an equity charge on beginning book value)	Required return on equity	Non-payers or firms with negative free cash flow

2. **Asset-based models** estimate equity value as the fair value of assets minus liabilities and preferred stock (book values adjusted to fair values). They suit firms whose assets have readily available market values: mainly **tangible, short-term (liquid) assets**, resource companies with known reserves, real estate worth more than its cash flow potential, divisions being sold, and firms being liquidated. An asset-based model can give a **floor value** for the stock.

Relative valuation models (multiplier models) compare a ratio with peers:

- **Equity multiples:** the share price divided by a per-share measure such as EPS, sales, book value or cash flow. A **trailing P/E** uses the past year's EPS, a **leading P/E** uses next year's forecast EPS; P/E loses its usefulness when EPS is negative or very small, and reported earnings are usually adjusted for nonrecurring items.
- **Enterprise value multiples:** EV divided by EBITDA, EBIT or revenue. This second type of multiplier model looks at value from the viewpoint of both debt and equity holders.

Method of comparables example. A share trades at 45 with trailing EPS of 3.00, a P/E of 15; the peer average is 18, so the share is relatively undervalued (unless firm-specific factors justify the discount).

The table sets the three families side by side.

Equity valuation model families: advantages and disadvantages

Model family	Value is based on	Advantages	Disadvantages
Present value (discounted cash flow) models	PV of expected dividends, FCFE or FCFF; for residual income, current book value plus PV of future residual income	Grounded in finance theory; assumptions such as growth and margins can be changed to see their effect on value	Inputs must be estimated; the value is highly sensitive to them
Asset-based models	Fair value of assets minus liabilities and preferred stock	Give a floor value; useful for divisions being sold and firms being liquidated; most reliable when assets are mainly tangible and short-term or have ready market values; more practical as firms report fair values	Ignore the firm as a going concern (margins, efficient use of assets, competition); ignore taxes; unreliable when intangibles are significant
Multiplier (relative) models	Price or EV relative to earnings, sales, book value, cash flow or EBITDA	Compare the company directly with a peer benchmark	A multiple far from the benchmark may be justified by firm-specific factors; P/E loses its usefulness when EPS is negative or very small

Analysts usually apply more than one model, with several sets of inputs, and arrive at a range of values. Different models can give inconsistent results. The analyst reconciles them by checking that the assumptions behind each approach are consistent and can combine them in a weighted average that puts more weight on the models whose inputs they trust most.

Common exam traps

- FCFF is discounted at the WACC; dividends, FCFE and residual income are discounted at the required return on equity.
- Fair values of assets and liabilities are the inputs of an asset-based model. A present value model needs forecast cash flows, a terminal value and a discount rate.
- Liquidation, or assets that are mostly liquid and tangible, points to an asset-based model.

- An EV/EBITDA comparison is a multiplier (relative valuation) model even though EV includes debt. It is not a discounted cash flow model.

EXAM SHORTCUTS

- Pick the model from the facts given: stable, predictable dividends point to a dividend discount model, a non-payer with a stable capital structure to FCFE, negative FCFE or an unstable capital structure to FCFF, and liquidation or mostly liquid tangible assets to an asset-based model.

BOTTOM LINE

- Intrinsic value cannot be observed and is estimated with valuation models; a perceived value above the market price means the stock looks undervalued, below it overvalued, and equal to it fairly valued.
- Naïve or story-based valuation rests on a story unconnected to the company's finances, relative valuation compares multiples with a peer group, and absolute valuation uses only the company's own characteristics, such as the present value of expected cash flows.
- Exam convention: book value of equity = share capital + additional paid-in capital + retained earnings – treasury stock; current practice also adds AOCI and other reserves, so the two agree only when those items are zero, and noncontrolling interest is excluded in both.
- Book value is most useful for companies with substantial tangible assets and least useful for early-stage or asset-light companies and those whose value lies in intangibles, and a negative book value alone does not mean the shares cannot provide value to investors.
- Market capitalization (share price × shares outstanding) reflects the company's fair value as a going concern, so a P/B above 1 signals excess value and a P/B below 1 a value shortfall to investigate.
- Enterprise value is the market value of the common and preferred stock and of the debt, less cash and short-term investments, and it is usually divided by EBITDA, EBIT or revenue to compare companies with different capital structures.
- In present value models, dividends, FCFE and residual income are discounted at the required return on equity, while FCFF, the cash available to both debt and equity holders, is discounted at the WACC to give firm value.
- An asset-based model values equity at the fair value of assets minus liabilities and preferred stock and can give a floor value, whereas multiplier models compare equity multiples or EV multiples with peers.

QUICK CHECK

Question 1

Shares of Delvin Pharmacy trade at 14.0 times analysts' consensus forecast of next year's EPS, which is \$3.20. Last year Delvin earned \$2.90 per share. Using her own models, an analyst estimates the intrinsic value of a Delvin share at \$40.00. From her point of view, Delvin shares are:

- A undervalued by \$4.80.
- B overvalued by \$0.60.
- C overvalued by \$4.80.

Answer: C

The market price follows from the multiple and the earnings figure it is based on, here next year's forecast EPS. A stock whose market price is above the investor's estimate of intrinsic value is overvalued from that investor's point of view. The analyst's \$40.00 is below the \$44.80 price.

$$P_0 = 14.0 \times 3.20 = \$44.80$$

$$\text{intrinsic value} - \text{price} = 40.00 - 44.80 = -\$4.80$$

The shares are overvalued by \$4.80.

Why the other options are wrong

- **A.** The size of the gap is right, but the direction is reversed. Undervalued would require intrinsic value above the market price.
- **B.** \$0.60 applies the multiple to the EPS of the year just ended, $14.0 \times 2.90 = 40.60$. The multiple is stated on next year's forecast, so the price is 14.0×3.20 .

Key takeaway Intrinsic value above price means undervalued; below price means overvalued. Pair each multiple with the earnings figure it is based on.

Practice questions

Question 2

An analyst gathers the following market and financial data for Tamsin Ridge Appliances (amounts in millions except the share price).

Tamsin Ridge Appliances: selected data

Item	Value
Share price	\$28.50
Common shares outstanding	12.0 million
Market value of preferred stock	\$18 million
Market value of debt	\$95 million
Cash and short-term investments	\$31 million
EBITDA	\$52 million

Tamsin Ridge's EV/EBITDA multiple is *closest* to:

- A 7.8×
- B 8.2×
- C 8.8×

Question 3

An analyst compares Tolliver Freight's ratio of enterprise value to EBITDA with the average ratio for other trucking companies. The analyst is using which type of valuation model?

- A A multiplier model.
- B An asset-based model.
- C A discounted cash flow model.

Answers: 2. B · 3. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/introduction-to-equity-valuation/. The full bank has 19 questions on this reading.

EQUITIES · READING 44

Discounted Cash Flow (DCF) and Growth Models

What you'll learn

LOS 44.a Contrast the inputs of dividend, FCFE, FCFF and residual income models (and EBITDA as a proxy) and explain the five-step process for valuing equity with present value models.

LOS 44.b Calculate and interpret intrinsic value with constant growth and multistage present value models, including sustainable growth, implied growth, and FCFF discounted at the WACC.

LOS 44.c Explain the shortcomings of constant and multistage growth assumptions in present value models.

LOS 44.d Value non-callable, non-convertible preferred stock (finite and perpetual) and explain how callable, puttable and convertible features change its value.

MODULE 44.1

Cash Flow Metrics

This reading covers the cash flow measures used in present value models (dividends, FCFE, FCFF, EBITDA and residual income) and the steps of the valuation process. It shows how to value shares with constant growth and multistage models, how to estimate growth and the WACC, where growth assumptions fall short, and how to value preferred stock and judge the effect of call, put and conversion features.

LOS 44.a — Cash flow measures for present value models and the valuation process

A **present value model** (also called a **discounted cash flow (DCF) model**) values equity as the present value of the cash flows shareholders can expect. Unlike a fixed-coupon bond, a common share has no promised cash flows and no maturity date, so the analyst must (1) forecast a cash flow measure over a **forecast horizon** and (2) estimate a **terminal value** that captures everything beyond the horizon. Value today is the present value of both:

$$V_0 = \sum_{t=1}^n \frac{E(CF_t)}{(1+r)^t} + \frac{E(TV_n)}{(1+r)^n}$$

where n is the number of periods in the forecast horizon and r is the discount rate that matches the cash flow measure.

Five measures are used. Two of them, EBITDA and residual income, are not cash flows, yet the same discounting framework still applies to them.

KEY CONCEPT

Measure	What it represents	Perspective	Discount rate	Works best when
Dividends	Cash actually paid to shareholders	Minority shareholder (cannot set dividend policy)	Required rate of return on equity	Positive, stable/growing earnings; high, consistent payout; stable capital structure and share count

Measure	What it represents	Perspective	Discount rate	Works best when
Free cash flow to equity (FCFE)	Cash that <i>could</i> be paid to common shareholders: the firm's capacity to pay dividends	Controlling shareholder	Required rate of return on equity	Non-payers or firms whose payout differs from capacity; stable capital structure
Free cash flow to the firm (FCFF)	Cash from operations, before interest, left after the investment needed to sustain capacity; available to debt and equity holders	Whole firm / all capital providers (pre-leverage)	Weighted average cost of capital (WACC)	High capital spending (negative FCFE) or a volatile capital structure
EBITDA	Pre-tax, pre-leverage earnings	Pre-leverage	WACC, as for FCFF	Rough proxy only; needs adjusting to reach FCFF
Residual income	Earnings in excess of the cost of equity (economic profit)	Equity	Required rate of return on equity	FCFE and FCFF negative with no clear date for turning positive

Dividends

Dividend discount models (DDMs) use the dividends shareholders expect to receive. They are **theoretically justified** because dividends are the cash equity investors actually get. The model assumes earnings are either paid out or retained to fund growth; if the firm borrows to pay dividends or buy back stock (i.e., changes its capital structure), that assumption breaks and a DDM is a poor choice. DDMs suit mature payers and industries where high payouts are required by law or regulation (e.g., REITs, regulated utilities). Drawbacks: hard to apply to **non-dividend-paying** firms, and they reflect only a minority holder's view.

Free cash flow to equity

FCFE is the cash left for common shareholders after the firm pays its debt obligations and funds the working capital and capital expenditures needed to maintain existing assets and grow:

KEY CONCEPT

$$FCFE = \text{net income} + \text{depreciation} - WCInv - CapEx + \text{net borrowing}$$

$$FCFE = CFO - FCInv + \text{net borrowing}$$

WCInv is investment in working capital and CapEx is capital expenditure, which the second form calls fixed capital investment (FCInv). Net income plus depreciation minus WCInv approximates cash flow from operations (CFO), which gives the second form. **Net borrowing** = new debt borrowed – debt repaid; it is the part of capital

spending and working capital investment financed with debt. From the cash flow statement, FCFE can also be read as its uses: $FCFE = \Delta \text{cash} + \text{dividends} - \Delta \text{equity}$, where $\Delta \text{equity} = \text{shares issued} - \text{shares repurchased}$. In other words, FCFE can be used to add to cash, pay dividends or buy back shares.

If the firm keeps a **target debt-to-assets ratio (DR)**, it borrows DR of every dollar of **net investment**:

$$\text{net investment} = \text{CapEx} - \text{depreciation} + \text{WCInv}$$

$$FCFE = \text{net income} - \text{net investment} + \text{net borrowing}, \quad \text{net borrowing} = DR \times \text{net investment}$$

$$FCFE = \text{net income} - \text{net investment} + DR \times \text{net investment} = \text{net income} - (1 - DR)(\text{net investment})$$

Free cash flow to the firm

FCFE is less useful when heavy capital spending makes it negative or when the capital structure is volatile (future borrowing is hard to forecast). Then use **FCFF**, a **pre-leverage** cash flow:

$$FCFF = CFO - \text{CapEx} + \text{interest}(1 - t)$$

$$FCFF = FCFE + \text{interest}(1 - t) - \text{net borrowing}$$

Here t is the tax rate. Only *after-tax* interest is added back because interest reduces taxes. For a firm with no debt, $FCFF = FCFE$.

EBITDA

EBITDA differs from FCFF because it is **before tax**, ignores the **tax savings on depreciation**, and ignores investment in fixed and working capital:

$$FCFF = EBITDA(1 - t) + (\text{depreciation} \times t) - \text{FCInv} - \text{WCInv}$$

"Adjusted EBITDA" figures remove items management calls non-recurring; the adjustments are subjective and not an accounting-standard measure.

Residual income

Residual income = net income minus a charge for the cost of equity capital. Per share:

$$RI_t = EPS_t - r \times BVPS_{t-1}$$

It is discounted at the required return on equity. The model requires **clean surplus accounting**: book value of equity changes only through the income statement (retained earnings) and transactions with shareholders (dividends, issuance, buybacks). Items that bypass the income statement (e.g., foreign currency translation gains/losses) must be adjusted for.

The valuation process

1. Choose the cash flow measure.
2. Forecast it over a horizon suited to the company.

3. Choose the discount rate consistent with that measure.
4. Estimate a **terminal value** for the period beyond the horizon.
5. Compute the present values of the forecast cash flows and terminal value and add them.

WORKED EXAMPLE

Lindqvist Marine reports net income 80, depreciation 25, working capital investment 10, capital expenditures 45, net borrowing 12, interest expense 15, tax rate 30% (all in millions).

- $FCFE = 80 + 25 - 10 - 45 + 12 = 62$
- $FCFF = 62 + 15(1 - 0.30) - 12 = 60.5$

A share with EPS of 3.00 this year, beginning book value per share of 20.00 and a 10% required return earns $RI = 3.00 - 0.10 \times 20.00 = 1.00$ per share.

COMMON EXAM TRAPS

- Match measure and rate: the cost of equity is the rate for dividends, FCFE and residual income, and the WACC is the rate for FCFF. FCFE is never discounted at a cost of debt, nor residual income at the WACC.
- A DDM takes a minority-shareholder view; FCFE takes a controlling-shareholder view, while FCFF takes the whole-firm view. FCFE is the *capacity* to pay; dividends are what is *actually* paid.
- Net borrowing is *added* in FCFE and *subtracted* when moving from FCFE to FCFF. In the worked example, adding the 12 of net borrowing again when moving to FCFF gives 84.5 instead of 60.5.
- With a target DR, multiply net investment by $(1 - DR)$ rather than by DR.
- In the EBITDA bridge, the depreciation tax shield is *added*.
- Calculating the terminal value is step 4; summing present values is the final step.

EXAM SHORTCUTS

- For a firm with no debt, FCFF equals FCFE, so there is no interest or net borrowing adjustment to make.

BOTTOM LINE

- A present value model values equity as the present value of a cash flow measure forecast over a horizon plus the present value of a terminal value, using a discount rate that matches the measure.
- A DDM takes the minority shareholder's view and suits mature firms with high, consistent payouts, while FCFE, the capacity to pay dividends, takes a controlling shareholder's view; the discount rate for both is the required return on equity.
- $FCFE = \text{net income} + \text{depreciation} - WCInv - CapEx + \text{net borrowing}$, and with a target debt-to-assets ratio DR it becomes $\text{net income} - (1 - DR)(\text{net investment})$.
- FCFF is a pre-leverage cash flow, $FCFF = FCFE + \text{interest}(1 - t) - \text{net borrowing}$, discounted at the WACC and used when heavy capital spending makes FCFE negative or the capital structure is volatile.
- Residual income per share is $EPS_t - r \times BVPS_{t-1}$, discounted at the required return on equity, and the model requires clean surplus accounting.

- The valuation process chooses the cash flow measure, forecasts it, chooses a matching discount rate, estimates the terminal value and finally sums the present values.

QUICK CHECK

Question 1

Which of the following statements *most accurately* contrasts a dividend discount model (DDM) with a free cash flow to equity (FCFE) model?

- A A DDM reflects the firm's capacity to pay dividends, while an FCFE model uses the cash shareholders actually receive.
- B A DDM takes the view of a minority shareholder, while an FCFE model takes the view of a controlling shareholder.
- C A DDM assumes a volatile capital structure, while an FCFE model assumes the firm borrows aggressively.

Answer: B

Dividends are what every shareholder receives and reflect the position of an investor who cannot influence dividend policy, which is a **minority shareholder** perspective. An FCFE valuation reflects a **controlling shareholder**, who can decide how much of the free cash flow is paid out.

Why the other options are wrong

- **A.** This reverses the two models: the DDM uses the cash actually received (dividends), while FCFE represents the firm's theoretical capacity to pay dividends.
- **C.** Neither model assumes a volatile capital structure or heavy borrowing; each is built on the premise that the firm's financing mix stays steady. When the mix is volatile, FCFF is the preferred measure.

Key takeaway A DDM takes the minority view of cash actually paid; FCFE takes the controlling view of cash that could be paid. Both assume a stable capital structure.

MODULE 44.2

Valuation Models

LOS 44.b — Constant growth and multistage present value models

Growth and the company life cycle

- **Start-up:** earnings negative and many firms fail, so cash flow models are unsuitable.
- **Growth:** earnings turn positive and grow rapidly; the analyst estimates how long this phase lasts.
- **Mature:** growth settles at a long-run rate in line with the overall economy (multinationals may exceed domestic growth). A constant growth assumption is most plausible here.
- **Decline:** obsolete products or technology.

The best candidates for a constant growth model are (1) **mature** firms (2) with **stable leverage** near the industry average and (3) a **high dividend payout ratio**. A constant rate is also used for the **terminal value** after a high-growth period.

Constant growth (Gordon growth) model

A share is worth the present value of all its future dividends. If the dividend grows at the same rate g every year and g is below the required return r , that endless sum collapses into one short fraction:

KEY CONCEPT

$$V_0 = \frac{D_1}{r - g} = \frac{D_0(1 + g)}{r - g}$$

The same form works for FCFE ($V_0 = FCFE_1/(r - g)$) and FCFF (firm value = $FCFF_1/(WACC - g)$). Conditions: $g < r$, and g should be less than the long-run growth rate of the economy. The first condition keeps the value finite. Each dividend's present value is the previous one's multiplied by $(1 + g)/(1 + r)$, so the present values shrink toward zero only when g is below r ; with $g \geq r$ they never shrink and the sum has no finite value.

- **Past vs expected dividend:** "just paid", "last paid" or "currently pays" means D_0 ; grow it one period. "Will pay next year" or "is expected to pay" means D_1 ; do not grow it.
- **Value at a future date:** $V_t = D_{t+1}/(r - g) = V_0(1 + g)^t$. The model always gives value **one period before** the dividend in the numerator.
- **Sensitivity:** value rises when r falls or g rises, because the spread $r - g$ in the denominator shrinks.
- **One-period model:** for a one-year holding, the terminal value is the expected price in one year, so $V_0 = (D_1 + P_1)/(1 + r)$. If the market price exceeds this value, the share is **overvalued**; if it is below, **undervalued**.

Implied growth rate. If the constant growth model fits the company, rearranging it with the market price gives the growth rate the market is pricing in (the same works with $FCFE_1$ in place of D_1):

$$g = r - \frac{D_1}{P_0}$$

Multistage (two-stage) models

Two types: (1) growth of g_S for n periods, then a perpetual rate g_L (usually $g_S > g_L$); (2) cash flows forecast individually for n periods (spreadsheet), then a constant-growth terminal value.

KEY CONCEPT

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

Steps: (1) forecast each high-growth dividend; (2) find the first constant-growth dividend D_{n+1} ; (3) compute the terminal value V_n ; (4) discount every dividend and V_n at r .

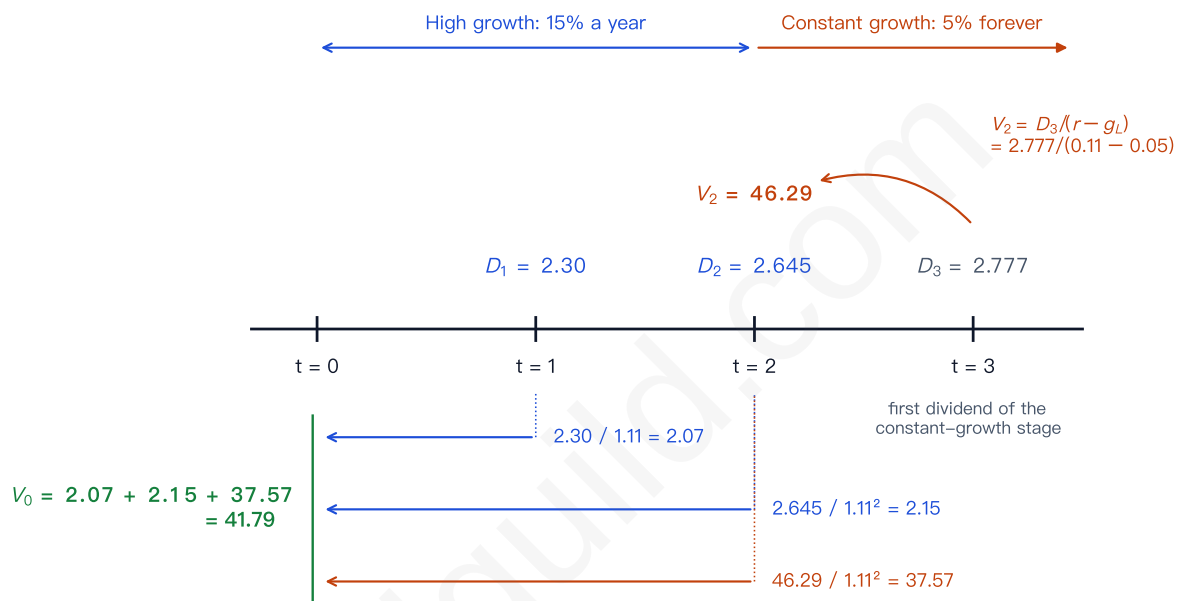
First dividend in the future: if the first dividend D_k arrives at the end of year k , the Gordon model gives $V_{k-1} = D_k / (r - g)$, which is discounted back $k - 1$ years.

Worked example. $D_0 = 2.00$; growth 15% for two years, then 5% forever; $r = 11\%$.

- $D_1 = 2.30$, $D_2 = 2.645$, $D_3 = 2.645 \times 1.05 = 2.777$
- $V_2 = 2.777 / (0.11 - 0.05) = 46.29$
- $V_0 = 2.30 / 1.11 + (2.645 + 46.29) / 1.11^2 = 2.07 + 39.72 = 41.79$

Calculator: CF0 = 0; C01 = 2.30; C02 = 48.93; [NPV] I = 11, [↓] [CPT] = 41.79.

The timeline shows the same cash flows and their present values.



Two-stage dividend discount model on a timeline (dividend just paid 2.00; 15% growth for two years, then 5%; required return 11%)

Estimating the constant growth rate

Either use **historical growth**, which is unreliable if capital structure, margins, competitive position or technology change, or estimate the **sustainable growth rate** from fundamentals, assuming constant ROE, constant payout and no new equity:

KEY CONCEPT

$$g = (1 - \text{dividend payout ratio}) \times ROE = b \times ROE$$

where the **retention ratio** $b = 1 - \text{payout ratio}$ and ROE is measured on beginning book value, so equivalently $g = (1 - \text{dividends/net income}) \times (\text{net income/beginning book value})$. The required return and beta are *not* inputs. Example: with ROE of 14% and a payout of 60%, $g = 0.40 \times 14\% = 5.6\%$. A result far above long-run economic growth should be questioned.

Putting the pieces together, each input of the constant growth model comes from a different place. The table uses one set of illustrative figures.

Where the inputs of the constant growth model come from (illustrative figures)

Input	How it is estimated	Illustration
Dividend just paid, D_0	Payout ratio $\times$ EPS	$0.50 \times 3.00 = 1.50$
Growth rate, g	Sustainable growth: retention ratio $\times$ ROE	$0.50 \times 10\% = 5\%$
Next dividend, D_1	$D_0(1 + g)$	$1.50 \times 1.05 = 1.575$
Required return, r	CAPM: $R_f + \beta[E(R_m) - R_f]$ (Reading 50)	$3\% + 1.2 \times 5\% = 9\%$
Value, V_0	$D_1/(r - g)$	$1.575/(0.09 - 0.05) = 39.38$

For FCFE and FCFF:

$$SGR_{FCFE} = \left(1 - \frac{FCFE}{\text{net income}}\right) \left(\frac{\text{net income}}{\text{beginning book value}}\right)$$

$$SGR_{FCFF} = \left(1 - \frac{FCFF}{NOPAT}\right) \left(\frac{NOPAT}{\text{beginning book value of total capital}}\right)$$

with **NOPAT** = operating income $\times$ $(1 - t)$. In theory all three rates agree; in practice they differ and the assumptions must be reconciled.

Weighted average cost of capital

FCFF goes to all capital providers, so its discount rate is the **weighted average cost of capital (WACC)**: the after-tax cost of debt and the cost of equity weighted by their market values.

$$WACC = \frac{MV_d}{MV_d + MV_e} r_d(1 - t) + \frac{MV_e}{MV_d + MV_e} r_e$$

Debt has priority, so $r_d < r_e$. Present value of FCFF = **firm value**; equity value = firm value – market value of debt; divide by shares outstanding for a per-share value.

COMMON EXAM TRAPS

- Using D_0 in the numerator instead of D_1 (or growing an already-expected D_1 again).
- Terminal value: built from the **next** period's cash flow (D_{n+1} , $FCFF_{n+1}$) and discounted n periods. In the worked example, building V_2 from D_2 gives $V_0 = 40.00$, and discounting V_2 three periods gives 38.06, against 41.79.

- Forgetting to discount the terminal value to today, or forgetting the last high-growth dividend. In the worked example, leaving out $D_2 = 2.645$ gives 39.64 instead of 41.79.
- Sustainable growth uses the retention ratio. Using the payout ratio is a common error. With ROE of 14% and a payout of 60%, the payout ratio gives 8.4% instead of 5.6%.
- Discounting FCFF at the cost of equity, or reporting firm value as equity value.

EXAM SHORTCUTS

- Under constant growth, $V_t = V_0(1 + g)^t$, so a value at a future date follows from today's value without forecasting the later dividend.

BOTTOM LINE

- The constant growth model $V_0 = D_1/(r - g) = D_0(1 + g)/(r - g)$ requires g below r and below the long-run growth rate of the economy, and it fits mature firms with stable leverage and a high payout ratio best.
- The constant growth model gives value one period before the cash flow in its numerator, and the same firm values FCFE at the cost of equity and FCFF at the WACC.
- In a two-stage model each high-growth dividend is discounted at r , and the terminal value $V_n = D_{n+1}/(r - g_L)$ is discounted n periods.
- If the constant growth model fits the company, the growth rate implied by the market price is $g = r - D_1/P_0$.
- Sustainable growth is $g = b \times ROE$, where b is the retention ratio, assuming constant ROE, constant payout and no new equity; the required return and beta are not inputs.
- The WACC weights the after-tax cost of debt and the cost of equity by market values, the present value of FCFF at the WACC is firm value, and equity value is firm value minus the market value of debt.

QUICK CHECK

Question 2

Colm Brennan projects that shares of Ardent Furnishings will trade at \$63.00 one year from now and that Ardent will pay a \$1.80 dividend per share at the end of the year. Brennan discounts Ardent's cash flows at 9%. Ardent currently trades at \$60.00. Based on Brennan's analysis, Ardent's shares are:

- A Overvalued.
- B Fairly priced.
- C Undervalued.

Answer: A

Compare the market price with the value implied by the analyst's forecasts. The one-period value is the present value of the year-end dividend plus the projected price.

$$V_0 = \frac{D_1 + P_1}{1 + r} = \frac{1.80 + 63.00}{1.09} = \frac{64.80}{1.09} = \$59.45$$

The market price of \$60.00 is above the estimated value of \$59.45, so the shares are overvalued.

Why the other options are wrong

- **B.** Fairly priced would require the market price to equal the \$59.45 value; it is \$0.55 higher.
- **C.** Undervalued would require the price to be below the estimated value. Comparing \$60.00 with the undiscounted \$64.80 might suggest this, but the cash flows arrive in one year and must be discounted.

Key takeaway A price above estimated value means the shares are overvalued; a price below it means they are undervalued.

MODULE 44.3

Model Limitations and Preferred Stock Valuation

LOS 44.c — Shortcomings of constant and multistage growth assumptions

A present value model is only as good as its inputs. The choice of cash flow measure, its size, the length of the **forecast horizon** and the **discount rate** are all estimated and can all be wrong.

Weak point	Why it matters
Discount rate	Both the cost of equity and the cost of debt depend on the risk-free rate , which fluctuates; small changes in r (especially in $r - g$) move value a lot
Historical growth rates	Past dividend growth is a poor guide for a firm whose competitive environment is deteriorating
DDMs and payout form	DDMs capture cash dividends only and ignore stock buybacks , now a major way of returning cash
Constant growth	Most plausible for mature firms; a rapidly growing firm needs a multistage model with a finite high-growth period
Time horizon	The length of the forecast horizon is itself an estimate and can be wrong

WORKED EXAMPLE: HOW FAR A CONSTANT GROWTH VALUE MOVES WITH R AND G

A mature company is expected to pay a dividend of \$2.16 per share next year, and the dividend is expected to grow at 5.0% a year forever. The required return on equity is 9.0%. Find the value per share, then the value if the required return is 10.0% with growth unchanged, and the value if growth is 4.0% with the required return unchanged at 9.0%.

Step 1. Base case: $V_0 = 2.16 / (0.09 - 0.05) = 2.16 / 0.04 = \54.00 .

Step 2. Required return of 10.0%: $V_0 = 2.16 / (0.10 - 0.05) = 2.16 / 0.05 = \43.20 , which is 20% below the base value.

Step 3. Growth of 4.0%: $V_0 = 2.16 / (0.09 - 0.04) = 2.16 / 0.05 = \43.20 , the same 20% fall.

Result. A one-percentage-point change in either r or g widens $r - g$ from 4 to 5 percentage points and lowers the value from \$54.00 to \$43.20, a fall of 20%.

Analysts should cross-check inputs against the firm's industry position, competitive advantages, technological change and the macroeconomic environment.

COMMON EXAM TRAPS

- A DDM does not require debt financing; it works for all-equity firms.
- Multistage models still need a terminal value.

LOS 44.d — Valuing preferred stock and the effect of contingency features

Preferred stock ranks ahead of common equity for dividends and in liquidation, so its required return is **lower** than that of common equity. It pays a fixed dividend, usually stated as a percentage of par (face) value: a 7% preferred with \$40 par pays \$2.80 a year. It may also have features such as **cumulative** dividends (missed dividends accumulate) or **participating** dividends (extra dividends when profits are high), and contingency features such as a call, a put or a conversion right.

Non-callable, non-convertible preferred

Finite-maturity preferred (economically a bond; often classified as debt):

$$V_0 = \sum_{t=1}^N \frac{D_p}{(1 + r_p)^t} + \frac{FV}{(1 + r_p)^N}$$

Perpetual preferred (the constant growth model with $g = 0$):

KEY CONCEPT

$$V_0 = \frac{D_p}{r_p}$$

The same zero-growth formula values a common share whose dividend is expected to stay constant forever. The required yield r_p can be quoted as a spread over (or under) another rate, e.g., a reference rate or the issuer's bond yield. Rearranged, $r_p = D_p/P_0$.

Worked examples.

- Perpetual: \$80 par and a 5% dividend give $D_p = 4.00$; with $r_p = 6.25\%$, $V_0 = 4.00/0.0625 = \$64.00$. Value is below par because the required yield exceeds the dividend rate.
- Finite: 3 years, \$100 face, \$6 dividend, $r_p = 7\%$. Calculator (END mode, $P/Y = C/Y = 1$): $N = 3$, $I/Y = 7$, $PMT = 6$, $FV = 100$, CPT PV = -97.38 (negative because it is the price paid).

Contingency features (embedded options)

Contingency features are **embedded options**: rights that the holder may exercise but need not. An option has non-negative value to its holder, so its value is **subtracted** from the option-free value when the **issuer** holds it and **added** when the **investor** holds it.

KEY CONCEPT

Type	Who holds the right	Value vs identical option-free preferred	Typical dividend
Callable preferred	Issuer (redeem at a fixed price)	Lower	Higher
Putable preferred	Investor (sell back at a fixed price)	Higher	Lower
Convertible preferred	Investor (convert into common at a set ratio)	Higher	—

A convertible preferred mixes debt-like traits (fixed dividend, priority) with an equity-like conversion option. Because required return and value move inversely, callable preferred carries a **higher required return** than putable or convertible preferred.

COMMON EXAM TRAPS

- Use the dividend in dollars: a "6% preferred, \$50 par" pays \$3.00.
- Do not grow a preferred dividend; $g = 0$.
- Value differs from par whenever r_p differs from the dividend rate.
- A finite-maturity preferred needs the PV of the face value as well as the dividends. In the 3-year example, discounting the dividends alone gives 15.75 instead of 97.38.
- A call right belongs to the issuer and lowers value; a put or conversion right belongs to the investor and raises value.

EXAM SHORTCUTS

- For a perpetual preferred, a required yield above the dividend rate means a value below par, so a price above par can be ruled out without calculation.

BOTTOM LINE

- The cash flow measure and its size, the length of the forecast horizon and the discount rate are all estimates in a present value model, and small changes in r , especially in $r - g$, move the value a lot.
- DDMs ignore stock buybacks, past dividend growth is a poor guide for a firm whose competitive environment is deteriorating, and a rapidly growing firm needs a multistage model with a finite high-growth period.
- Preferred stock ranks ahead of common equity for dividends and in liquidation, so its required return is lower than that of common equity, and its dividend is the stated rate times par.
- A perpetual preferred is worth D_p/r_p , the constant growth model with $g = 0$, while a finite-maturity preferred is valued like a bond as the present value of its dividends and its face value.
- An embedded option's value is subtracted when the issuer holds the right and added when the investor holds it, so a callable preferred is worth less and pays a higher dividend, while putable and convertible preferreds are worth more than identical option-free preferreds.

QUICK CHECK**Question 3**

Compared with an otherwise identical option-free preferred stock, a preferred stock with an embedded option *most likely* has a lower intrinsic value when the right to exercise the option is held by:

- A** the investor, as with a conversion feature.
- B** either party, because an embedded option always lowers value.
- C** the issuer, as with a call feature.

Answer: C

An embedded option is a right, not an obligation, so it has a non-negative value to the party that holds it. When the issuer holds the right, its value is subtracted from the option-free value of the preferred stock. A call feature lets the issuer redeem the shares at a predetermined price, so a callable preferred is worth less than a comparable non-callable preferred.

Why the other options are wrong

- **A.** When the investor holds the right, the option's value is added to the option-free value. A conversion feature lets the investor exchange the preferred for common shares at a set ratio, so a convertible preferred is worth more, not less.
- **B.** The effect depends on who holds the right. An option held by the issuer lowers the preferred's value; one held by the investor, such as a put or a conversion right, raises it.

Key takeaway Embedded option held by the issuer (call): subtract its value. Held by the investor (put, conversion): add its value.

Practice questions**Question 4**

Maren Solberg has concluded that both free cash flow measures for Halden Robotics are negative and are unlikely to turn positive for several years, so she will value the company's equity with a residual income model. Which condition must hold for her to use Halden's reported book value of equity without adjustment?

- A** The company follows clean surplus accounting.
- B** The company holds its debt-to-assets ratio constant.
- C** The company adjusts earnings for depreciation tax savings.

Question 5

Brookmere Clinics is expected to generate free cash flow to the firm (FCFF) of \$50 million in Year 1, \$62 million in Year 2 and \$80 million in Year 3. After Year 3, FCFF is expected to grow at 4% a year. Brookmere's weighted average cost of capital (WACC) is 8.5%. The value of the firm today is *closest* to:

- A \$1,609 million.
- B \$1,553 million.
- C \$1,495 million.

Answers: 4. A · 5. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/discounted-cash-flow-dcf-and-growth-models/. The full bank has 63 questions on this reading.

credguild.com

EQUITIES · READING 45

Relative Value Equity Valuation Approaches

What you'll learn

LOS 45.a Explain how the method of comparables and the method of forecasted fundamentals set a benchmark multiple, and how PEG ratios and regression reconcile them.

LOS 45.b Calculate and interpret price multiples (P/E, P/B, P/S, dividend yield, P/FCFE) and enterprise value multiples (EV/EBITDA, EV/FCFF, EV-to-book), and describe when each is appropriate.

LOS 45.c Determine a peer group using industry classification or statistical factor exposures, and recognize the limitations of each.

LOS 45.d Describe how multiples based on past, current and projected values are used, including historical comparisons and terminal values.

MODULE 45.1

Price Multiples and Equity Valuation

This reading compares the method of comparables with the method of forecasted fundamentals and shows how to calculate justified P/E and P/B ratios, the PEG ratio and regression-based multiples. It then covers the calculation and use of price, enterprise value and cash flow multiples, the choice of an industry-based or factor-based peer group, and multiples built on past or forecast values, including a terminal value from a justified multiple.

LOS 45.a — Comparables versus forecasted fundamentals

Relative valuation judges a stock by comparing what investors pay for it with some measure of value. Two families of ratios are used:

- **Price multiples** put the share price over a per-share measure: earnings (P/E), book value (P/B), sales (P/S), dividends or free cash flow to equity.
- **Enterprise value (EV) multiples** put EV over a firm-level measure that belongs to all capital providers: EBITDA, EBIT, free cash flow to the firm (FCFF) or revenue.

The timing of the denominator matters:

Label	Denominator	Example
Trailing multiple	value for the most recent past period	P_0/E_0
Leading multiple (also forward multiple)	forecast for the next period	P_0/E_1
Justified multiple	the multiple a fairly priced stock should carry, estimated by the analyst	from peers or from a DCF model

The multiple must make economic sense for the company. A P/E is meaningless when earnings are negative, and a dividend-based multiple does not work for a peer group that includes non-payers.

The decision rule for price multiples: a stock whose multiple is above the benchmark looks overvalued, and one whose multiple is below the benchmark looks undervalued.

Method of comparables

The **method of comparables** takes the benchmark from a **peer group**, usually the mean or median multiple of similar companies. Its economic rationale is the **law of one price**: similar assets should sell at similar multiples.

- Peers must genuinely be similar in competitive position, risk and earnings growth. Different accounting methods, nonrecurring items and different fiscal year-ends all weaken comparability.
- When the peers' multiples are skewed by a few extreme values (often caused by temporarily depressed earnings), the median is the better benchmark because outliers do not pull it. The alternative is to remove the outliers before computing the mean.

Applying the method:

1. Compute the benchmark multiple from the peer group.
2. Compare the subject company's multiple with the benchmark.
3. For a value estimate, multiply the benchmark by the subject company's own per-share measure for the same period: forecast EPS for a leading P/E, trailing EPS for a trailing P/E.

Example. Five peers trade at P/Es of 11, 13, 14, 15 and 37. The median is 14, while the single high multiple pulls the mean up to 18. The subject company earns \$2.50 per share and trades at \$40.00, a P/E of 16. Against the median it looks overvalued, with an implied value of $14 \times 2.50 = \$35.00$. Against the mean it would wrongly look undervalued, with an implied value of $18 \times 2.50 = \$45.00$.

Method of forecasted fundamentals

The **method of forecasted fundamentals** derives the benchmark from a **discounted cash flow model**, typically the constant growth (Gordon) model $P_0 = D_1 / (r - g)$. Dividing by next year's earnings gives the **justified leading P/E**:

KEY CONCEPT

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{r - g} = \frac{\text{payout ratio}}{r - g}$$

The trailing version multiplies by $(1 + g)$: $P_0/E_0 = \text{payout} \times (1 + g)/(r - g)$.

The justified P/E rises with the **earnings growth rate** (g) and falls as the **required rate of return** (r , which reflects the company's risk) rises. With r and g held constant, a higher payout ratio raises it.

Dividing the same model by book value per share, and substituting that growth relation, gives the **justified P/B ratio**:

KEY CONCEPT

$$\frac{P_0}{B_0} = \frac{ROE - g}{r - g}$$

The P/B therefore depends on the spread between ROE and the required rate of return on equity (the cost of equity). With $r > g$, the justified P/B is above 1.0 if ROE is above r , exactly 1.0 if ROE equals r , and below 1.0 if ROE is below r .

Example. A firm pays out 50% of earnings, $r = 12\%$ and $g = 7\%$. Its justified leading P/E is $0.50/0.05 = 10.0$. A second firm has ROE = 15%, $r = 10\%$ and $g = 6\%$, so its justified P/B is $(0.15 - 0.06)/(0.10 - 0.06) = 2.25$.

Reconciling the two methods

The two methods can disagree. A firm may deserve a P/E above its peer average because it grows faster, for example. Two tools adjust for fundamentals:

1. The **price/earnings-to-growth ratio (PEG)** adjusts for one fundamental, growth:

$$PEG = \frac{P/E}{g} \quad (g \text{ in whole percentage points})$$

A PEG higher than the peers' benchmark means the P/E is high relative to growth, so the stock looks overvalued. A lower PEG points to undervaluation. *Example.* A P/E of 18 and growth of 9% give a PEG of 2.0. Against a peer median of 1.6, the stock looks overvalued.

2. The **regression approach** adjusts for several fundamentals at once. The observed multiple (the dependent variable) is regressed on fundamentals such as ROE, growth, payout and risk (the independent variables) across the peer group. The fitted equation then gives the subject company's justified multiple:

$$\widehat{P/B}_i = b_0 + b_1 ROE_i + b_2 g_i$$

Example. With $b_0 = 0.60$, $b_1 = 8.0$, $b_2 = 5.0$, ROE = 10% and $g = 4\%$, the justified P/B is $0.60 + 0.80 + 0.20 = 1.60$. The intercept is part of the estimate, and the ROE input is the firm's actual ROE rather than its required return. At Level I, candidates interpret regression output; they are not asked to estimate the regression.

KEY CONCEPT

Tool	Controls for	Weakness
Peer mean/median	nothing (assumes peers are alike)	peers may differ, or be mispriced
PEG ratio	growth only	ignores risk, ROE and payout differences
Regression	several fundamentals simultaneously	needs a peer sample; relationships can change

Terminal values from multiples

A justified multiple estimated for the end of the forecast horizon can also supply the terminal value in a present value model. LOS 45.d gives the formula and an example.

COMMON EXAM TRAPS

- Using the mean of a skewed peer distribution instead of the median. In the example, the mean of 18 gives an implied value of \$45.00 instead of \$35.00 from the median of 14.

- Mixing up the rationales. The law of one price underlies comparables; a DCF model underlies forecasted fundamentals.
- Calculating PEG as $g/(P/E)$, or entering g as a decimal (0.12 instead of 12). In the PEG example, $g/(P/E)$ gives 0.5 and entering growth as 0.09 gives 200, instead of 2.0.
- Reading a low PEG as overvalued. For PEG, as for P/E, a value below the peers' signals undervaluation.
- In the justified leading P/E, using the retention ratio instead of the payout ratio, or dividing by r instead of $r - g$. In the example, dividing the 50% payout by $r = 12\%$ gives 4.17 instead of 10.0.
- Leaving out the intercept in a regression-based justified multiple. In the example, dropping $b_0 = 0.60$ gives 1.00 instead of 1.60.

EXAM SHORTCUTS

- With r above g , the justified P/B is above 1.0 exactly when ROE is above r , so the side of 1.0 can be read from ROE and r before any calculation.

BOTTOM LINE

- Price multiples put the share price over a per-share measure, EV multiples put EV over a firm-level measure belonging to all capital providers, a trailing multiple uses the most recent past period and a leading multiple uses next period's forecast.
- The method of comparables takes its benchmark from the mean or median multiple of a peer group and rests on the law of one price, and when a few extreme values skew the peers' multiples the median, or the mean after removing outliers, is the better benchmark.
- A stock whose price multiple is above the benchmark looks overvalued, and one whose multiple is below the benchmark looks undervalued.
- The justified leading P/E from the constant growth model is $\text{payout ratio}/(r - g)$, the trailing version multiplies it by $(1 + g)$, and it rises with g , falls as r rises and, with r and g constant, rises with the payout ratio.
- The justified P/B is $(ROE - g)/(r - g)$, so with r above g it is above 1.0 if ROE exceeds r , equal to 1.0 if ROE equals r and below 1.0 if ROE is below r .
- The PEG ratio, $(P/E)/g$ with g in whole percentage points, adjusts for growth only and a PEG above the peers' benchmark looks overvalued, while the regression approach adjusts for several fundamentals at once and its fitted equation, intercept included, gives the justified multiple.

QUICK CHECK

Question 1

Beatriz Almeida is valuing Penhallow Instruments with the method of comparables. The leading P/E ratios of the five companies in her peer group are 13.5, 14.5, 16.0, 20.0 and 48.0. The 48.0 multiple belongs to a peer whose earnings next year are expected to be temporarily depressed by a plant refit. Penhallow earned \$2.60 per share over the last 12 months, and the consensus forecast of its EPS for next year is \$2.95. Almeida's estimate of Penhallow's value per share is *closest* to:

- A \$41.60.
- B \$47.20.

C \$66.08.

Answer: B

The method of comparables values a stock at the benchmark multiple of its peer group, applied to the stock's own value driver. One peer's multiple is inflated by temporarily depressed earnings, so the median, which a single extreme value does not pull, is the appropriate benchmark. A leading P/E has next year's forecast EPS in its denominator, so the benchmark is applied to Penhallow's forecast EPS of \$2.95. Its trailing EPS would pair with a trailing multiple.

Sort the peers' leading P/Es: 13.5, 14.5, 16.0, 20.0, 48.0. With five values, the median is the third one:

$$\text{median leading } P/E = 16.0$$

Apply the benchmark to next year's EPS:

$$V_0 = \text{benchmark } \frac{P_0}{E_1} \times E_1 = 16.0 \times \$2.95 = \$47.20$$

Dropping the 48.0 outlier and averaging the other four peers gives the same benchmark: $(13.5 + 14.5 + 16.0 + 20.0)/4 = 64.0/4 = 16.0$. The mean of all five, $(13.5 + 14.5 + 16.0 + 20.0 + 48.0)/5 = 112.0/5 = 22.4$, is higher than four of the five peers because of the single 48.0 value.

Why the other options are wrong

- **A.** $16.0 \times \$2.60 = \41.60 applies a leading multiple to trailing EPS. The peer multiple and the subject's earnings must cover the same period, so a leading P/E is paired with forecast EPS.
- **C.** $22.4 \times \$2.95 = \66.08 uses the mean leading P/E of all five peers. The 48.0 multiple reflects one peer's temporarily depressed earnings and drags the mean well above the typical peer, so the median is the better benchmark.

Key takeaway Comparables-based value = benchmark multiple $\times$ the subject company's own value driver. Match the timing (a leading multiple with forecast EPS, a trailing multiple with trailing EPS), and use the median when a few extreme multiples skew the peer group.

MODULE 45.2

Price and Enterprise Value Multiples

LOS 45.b — Price and enterprise value multiples: calculation, interpretation and uses

Value = assets in place + growth opportunities

A share's value can be split into the **value of assets in place** (next year's earnings as a no-growth perpetuity, E_1/r) and the **present value of growth opportunities (PVGO)**:

KEY CONCEPT

$$P_0 = \frac{E_1}{r} + PVGO \quad \Rightarrow \quad \frac{PVGO}{P_0} = 1 - \frac{E_1/P_0}{r}$$

The **earnings yield** is E/P , the inverse of the P/E. E_1/P_0 is the **forward earnings yield**, the reciprocal of the leading P/E, so the same split can be written $E_1/P_0 = r(1 - PVGO/P_0)$. A negative PVGO suggests management is investing in negative-NPV projects and should pay out more of its earnings.

Example. With $P_0 = 50$, $E_1 = 3.00$ and $r = 8\%$, assets in place are worth 37.50 and PVGO is 12.50, which is 25% of the price.

Earnings-based multiples: core and normalized earnings

A P/E built on earnings that contain large one-off items is misleading, so analysts use **core earnings** (also called persistent or continuing earnings). Core earnings strip out nonrecurring items, for example discontinued operations, write-downs, gains or losses on asset sales, changes in accounting estimates and provisions for future losses. EPS should also reflect dilution from options, warrants and convertible bonds.

For cyclical firms, analysts estimate **normalized earnings**, the EPS expected in the middle of the business cycle:

KEY CONCEPT

Method	Normalized EPS	Comment
Method of historical average EPS	average EPS over the most recent business cycle	ignores growth in firm size
Average ROE method	average ROE over the cycle × current book value per share	captures changes in firm size better

Example. EPS over a four-year cycle of 2.10, 2.50, 1.70 and 2.90 gives a historical average of 2.30. An average ROE of 11% times current BVPS of 22.00 gives 2.42.

Price-to-sales (P/S)

The **price-to-sales (P/S)** multiple is used when earnings are negative or not comparable across firms. It suits mature and cyclical firms with similar revenue recognition. Sales belong to both debt and equity holders while price is an equity measure, so P/S fits firms with little or no leverage. For more leveraged firms, an EV multiple may be more appropriate.

$$\frac{P_0}{S_0} = \frac{P_0}{E_0} \times \frac{E_0}{S_0} = \frac{\text{payout} \times (1 + g)}{r - g} \times \text{profit margin}$$

Example. With a payout of 50%, $g = 4\%$, $r = 9\%$ and a margin of 6%, the trailing P/E is $0.52/0.05 = 10.4$ and the justified P/S is $10.4 \times 0.06 = 0.624$.

Enterprise value multiples

$$EV = \text{market value of common and preferred stock} + \text{market value of debt} - \text{cash and short-term investments}$$

Firm value is the same figure without subtracting cash. EBIT, EBITDA and FCFF belong to all capital providers, so they are paired with EV.

$$EV = \frac{FCFF_1}{WACC - g}, \quad FCFF = EBITDA(1 - t) + Dep \times t - CapEx - WCInv$$

The justified **EV/EBITDA** multiple is this EV divided by EBITDA. It rises with g and falls with WACC. It is popular in capital-intensive industries with large depreciation.

Example. EBITDA is 500, depreciation 100, CapEx 150, working capital investment 30, $t = 25\%$, WACC 8% and $g = 3\%$. FCFF is $375 + 25 - 150 - 30 = 220$, EV is $220/0.05 = 4,400$, and EV/EBITDA is $8.8x$.

Balance-sheet multiples

- **P/B** is most useful when the firms compared hold mainly tangible assets and have similar accounting methods, leverage and asset mix. Banks are often valued on **price-to-tangible book value**, which excludes intangible assets such as goodwill from book value.
- The **value-to-book multiple** is (market value of equity + market value of debt) / (book value of equity + book value of debt). It is useful when leverage differs or book equity is negative.
- The **enterprise value-to-book ratio** subtracts cash from both numerator and denominator. It can be written in terms of fundamentals. **Return on capital (ROC)** is $EBIT(1 - t)/\text{book value of capital}$. **Reinvestment** is the spending on fixed capital (net of depreciation) and working capital, the part of EBIT that is not available to debt and equity holders. Exam convention: the **reinvestment rate** is reinvestment as a proportion of EBIT, and $FCFF = EBIT(1 - t)(1 - \text{reinvestment rate})$. Current practice: that FCFF identity holds exactly only when the rate is measured against after-tax EBIT, (capital expenditures – depreciation + working capital investment) / $[EBIT(1 - t)]$. When a question states the reinvestment rate, use it as given. Then:

$$\frac{EV}{BV \text{ of capital}} = \frac{ROC \times (1 - \text{reinvestment rate})}{WACC - g}$$

Example. With ROC of 8% , a reinvestment rate of 50% , WACC of 9% and g of 4% , the justified ratio is $0.08(1 - 0.50)/(0.09 - 0.04) = 0.8x$. The growth rate matches the reinvestment: $0.50 \times 8\% = 4\%$.

Cash-flow multiples and yields

- The **price-to-dividend multiple** is P_0/D , and its reciprocal is the **dividend yield**. A **trailing dividend yield** uses the dividend paid over the past year. A **leading dividend yield** divides the dividend expected over the next year by the current price.
- The **justified dividend yield** can be computed two ways:

$$\frac{D_0}{P_0} = \frac{D_0}{E_0} \times \frac{E_0}{P_0} \quad (\text{payout} \times \text{earnings yield}) \quad \text{or} \quad \frac{D_0}{P_0} = \frac{r - g}{1 + g}$$

Example. A payout of 60% and a justified trailing P/E of 15 give an earnings yield of 6.67% and a dividend yield of 4.0%. For a different firm with $r = 9\%$ and $g = 3\%$, the second formula gives $0.06/1.03 = 5.83\%$.

- Yields work in reverse. An actual yield higher than the justified yield signals an undervalued stock; a lower one signals an overvalued stock. As with multiples, a yield is compared with peers only after allowing for differences in fundamentals such as growth and the required return on equity.
- Justified $P_0/FCFE_1 = 1/(r - g)$ and $EV/FCFF_1 = 1/(WACC - g)$. **FCFE** matches price (equity) and **FCFF** matches EV (all capital). Cash flow from operations can also serve as a denominator, but FCFE measures the cash actually available to shareholders more accurately. The main concern with free-cash-flow multiples is that capital expenditures and working capital investment are cyclical, so free cash flow can swing over the cycle.
- Industry-specific multiples (e.g., EV per unit of reserves in mining or oil) cannot be compared across industries and can let a whole industry become mispriced.

Which multiple when?

KEY CONCEPT

Situation	Preferred measure
Negative or non-comparable earnings, mature/cyclical, low leverage	P/S
Capital-intensive, leverage differs across peers	EV/EBITDA
Mostly tangible assets, similar accounting and leverage; banks	P/B; price-to-tangible book for banks
Book equity negative or leverage differs	value-to-book or EV-to-book
Peer group includes non-dividend payers	avoid dividend-based multiples

COMMON EXAM TRAPS

- For the PVGO share, subtract assets in place from price and then divide by price. E_1/P_0 is the earnings yield, a different quantity. In the example, E_1/P_0 is 6%, while the PVGO share is 25%.
- In FCFF, add the depreciation tax shield $\text{Dep} \times t$. EV/EBIT is a different multiple from EV/EBITDA. In the example, leaving out the 25 shield gives FCFF of 195, EV of 3,900 and EV/EBITDA of 7.8x instead of 220, 4,400 and 8.8x.
- The justified P/S uses the trailing P/E, which includes $1 + g$. In the example, the leading P/E of 10.0 gives 0.60 instead of 0.624.
- The average ROE method multiplies by current BVPS. Next year's EPS plays no part.
- For dividend and earnings yields, a value above the justified level means undervalued.

EXAM SHORTCUTS

- Match the multiple to the situation: negative or non-comparable earnings point to P/S, a capital-intensive industry with different leverage across peers to EV/EBITDA, negative book equity to value-to-book or EV-to-book, and a peer group with non-payers rules out dividend-based multiples.

BOTTOM LINE

- A share's value is $P_0 = E_1/r + PVGO$, so the PVGO share of the price is $1 - (E_1/P_0)/r$, and a negative PVGO suggests management is investing in negative-NPV projects.
- Core earnings strip out nonrecurring items, and for cyclical firms normalized EPS is either the average EPS over the most recent cycle, which ignores growth in firm size, or the average ROE over the cycle times current BVPS, which captures it better.
- P/S is used when earnings are negative or not comparable, suits mature and cyclical firms with similar revenue recognition and little or no leverage, and its justified value is the justified trailing P/E times the profit margin.
- EBIT, EBITDA and FCFF belong to all capital providers and are paired with EV; the justified EV/EBITDA is $FCFF_1/(WACC - g)$ divided by EBITDA, rising with g and falling with WACC.
- P/B works best for firms with mainly tangible assets and similar accounting, leverage and asset mix, banks are often valued on price-to-tangible book, and value-to-book or EV-to-book helps when leverage differs or book equity is negative.
- The justified dividend yield is $(r - g)/(1 + g)$ or payout times earnings yield, and for yields the rule is reversed: an actual yield above the justified yield signals an undervalued stock.

QUICK CHECK**Question 2**

Over its most recent business cycle, Dunmore Engineering earned an average return on equity of 16%. Its current book value per share is \$31.50, its expected EPS for next year is \$4.80, and its EPS averaged \$4.35 over the same cycle. Using the average ROE method, Dunmore's normalized EPS is *closest* to:

- A \$4.35.
- B \$4.80.
- C \$5.04.

Answer: C

Normalized earnings estimate mid-cycle EPS for a cyclical company. Under the average ROE method, normalized EPS equals the average ROE over the most recent cycle multiplied by the current book value per share.

$$\text{Normalized EPS} = \overline{ROE} \times BVPS_{\text{current}} = 0.16 \times 31.50 = \$5.04$$

Why the other options are wrong

- **A.** \$4.35 is normalized EPS under the method of historical average EPS. That method does not reflect changes in firm size as well as the average ROE method does.
- **B.** \$4.80 is simply next year's expected EPS, which is not adjusted for where the firm is in the business cycle.

Key takeaway Average ROE method uses current BVPS, so it captures growth in the firm's size; historical average EPS does not.

MODULE 45.3

Peer Groups and Multiples-Based Valuation

LOS 45.c — Choosing a peer group

Comparables-based valuation benchmarks a company against the mean or median multiple of a peer group. There are two ways to form that group.

Industry-based peer group

An **industry-based peer group** contains firms in the same principal business activity. Because they face much the same competitive forces, supply chains and technology, their cash flows should behave similarly. Industry classification systems are the usual starting point. Good peers should also match on cyclicity, life cycle stage and market structure, and the analyst still has to check fundamentals such as leverage.

Industry peers are hard to find for:

- unique firms with few or no genuinely similar companies;
- industries whose members are at widely different life cycle stages (start-ups next to mature incumbents);
- firms exposed to different tax or regulatory jurisdictions;
- **multi-industry companies** (conglomerates), whose blend of businesses, markets and fundamental factors (risk, growth, leverage) may leave them with no close peers at all.

Statistical factor-based peer group

A **statistical factor-based peer group** groups companies whose exposures to risk-return factors are the same or close, regardless of industry. The **CAPM** is a single-factor model that measures only systematic risk (beta).

Multifactor models are the usual tool for finding factor-based peers.

- The advantage is independence from industry labels, which helps with firms that industry lists handle badly.
- The disadvantage is that the statistical relationships are estimated from past data and may not persist, so the model can be misspecified going forward.

KEY CONCEPT

Feature	Industry-based	Statistical factor-based
Grouping criterion	same business activity	similar factor exposures
Typical tool	industry classification system	multifactor model

Feature	Industry-based	Statistical factor-based
Main weakness	conglomerates, unique firms, mixed life cycles, jurisdictions	historical relationships may not hold in future

LOS 45.d — Multiples based on past, current and future values

Weaknesses of current-value comparables

1. Mispriced peers. If the whole peer group is overvalued or undervalued, a stock that looks cheap or expensive relative to its peers may not be cheap or expensive in absolute terms.
2. Distorted current figures. Multiples built on current, unadjusted numbers can be skewed by accounting choices, nonrecurring items or cyclicity. The remedies are core or normalized earnings, or a comparison with multiples from past periods (below), which span different points in the cycle.

Using historical values

- **Historical values of the subject company's multiples:** today's multiple is compared with the company's own past multiples. Changes can be linked to changes in its fundamentals, and the analysis does not rely on the current pricing of peers.
- **Historical averages of peer group multiples:** the company is compared with its peers over a whole period, such as a business cycle. This reduces the risk of benchmarking against a peer group that is mispriced at the moment.

Fundamental differences such as growth and required return still have to be controlled for. Historical data do not remove that need.

Using projected future values

A **forecast multiple** can be applied to a forecast metric to estimate a **terminal value** for a present value model:

KEY CONCEPT

$$TV_n = \text{justified leading } P/E_n \times E_{n+1}, \quad \text{justified leading } P/E_n = \frac{\text{payout}}{r - g}$$

Example. EPS in year 5 is expected to be 4.00, after which growth settles at 3% with a 60% payout and $r = 9\%$. The justified leading P/E is $0.60/0.06 = 10.0$ and $E_6 = 4.00 \times 1.03 = 4.12$, so $TV_5 = 41.20$. The justified trailing P/E of 10.3 applied to E_5 gives the same value.

COMMON EXAM TRAPS

- The problem with a conglomerate is the lack of close industry peers. A factor-based peer group built with a multifactor model can still be formed.
- Factor-based peers usually come from multifactor models. Industry codes describe industry-based peers, and the single-factor CAPM captures beta only.
- A mispriced peer group is handled with historical multiples (the company's own or peer averages). Forecasts built on current peer prices carry the same mispricing.

- A leading P/E is applied to next-period earnings (E_{n+1}). In the example, applying 10.0 to $E_5 = 4.00$ gives 40.00 instead of 41.20.

EXAM SHORTCUTS

- When next-period earnings are $E_n(1 + g)$, the justified trailing P/E applied to E_n gives the same terminal value as the justified leading P/E applied to E_{n+1} , so either pairing can be used.

BOTTOM LINE

- An industry-based peer group holds firms with the same principal business activity, and suitable peers are hard to find for unique firms, industries with members at widely different life cycle stages, firms in different tax or regulatory jurisdictions and conglomerates.
- A statistical factor-based peer group, usually formed with a multifactor model, holds firms with the same or close exposures to risk-return factors regardless of industry, but its relationships are estimated from past data and may not persist.
- Comparables can mislead when the whole peer group is overvalued or undervalued, and multiples built on current unadjusted figures can be distorted by accounting choices, nonrecurring items or cyclicity.
- Comparing a stock with its own past multiples or with peer averages over a whole business cycle reduces the risk of benchmarking against a currently mispriced peer group, though differences in growth and required return still have to be controlled for.
- A terminal value can be estimated as $TV_n = \text{justified leading P/E}_n \times E_{n+1}$, with the justified leading P/E equal to $\text{payout}/(r - g)$.

QUICK CHECK

Question 3

Which of the following is *most likely* a limitation of relying on an industry-based peer group?

- A** Industry peers are assumed to carry the same financial leverage.
- B** Some companies operate across several distinct industries and markets.
- C** The law of one price requires factor models for firms operating abroad.

Answer: B

Multi-industry companies are a recognized problem for industry-based peer groups. A conglomerate's mix of businesses gives it a blended risk and growth profile, and a single set of industry peers is unlikely to match that profile.

Why the other options are wrong

- **A.** Industry-based peer groups make no automatic assumption that all members have identical leverage. Analysts are told to check leverage differences among industry peers.
- **C.** The law of one price is the rationale for comparables. It does not require factor models for firms with international operations.

Key takeaway Industry-peer problems: unique firms, mixed life cycle stages, different tax/regulatory jurisdictions, and multi-industry companies.

Practice questions

Question 4

Carys Morgan forecasts that Norrland Timber will earn \$6.00 per share in Year 7. From then on she expects earnings and dividends to grow at 5% a year indefinitely, with 40% of earnings paid out, and she requires a 10% return. Using a justified leading P/E ratio, Norrland's terminal value per share at the end of Year 7 is *closest* to:

- A \$48.00.
- B \$50.40.
- C \$75.60.

Answers: 4. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/relative-value-equity-valuation-approaches/. The full bank has 34 questions on this reading.

EQUITIES · READING 46

Financial Statement Forecasting in Equity Valuation

What you'll learn

LOS 46.a Explain why and how analysts forecast revenues, expenses, assets and financing needs in a disaggregated (financial statement) valuation model.

LOS 46.b Evaluate how a company's life-cycle stage (start-up, growth, mature, decline) shapes the construction of its equity valuation model.

LOS 46.c Estimate and interpret the value of an equity security from the outputs of a financial statement forecast model.

MODULE 46.1

Financial Statement Forecast Models

This reading explains how analysts build a disaggregated financial statement forecast from revenue, expense, asset and financing models, including top-down revenue growth and financing needs. It then matches the valuation approach to the company's life-cycle stage, with venture capital pre-money and post-money values, growth-stage terminal values and probability-weighted values in decline, and values equity from the model's FCFF and FCFE.

LOS 46.a — Why and how analysts build financial statement forecast models

Single-stage and multistage present value models compress a company's future into one or a few growth rates. A **disaggregated valuation model** instead forecasts full financial statements line by line. Revenues, expenses, assets and financing can then each follow their own assumptions, and the analyst can bring in industry projections, the competitive environment and company-specific information. The model improves the estimate of future cash flows. It does not change how the discount rate is estimated, and it still needs a terminal value.

A financial statement forecast has four building blocks: **revenue modeling**, **expense modeling** (or profit modeling), **asset modeling** and **financing modeling**.

Revenue modeling

KEY CONCEPT

Approach	Starting point	Best suited to	Typical inputs
Historical approach	The company's own past revenue growth (total or by operating segment)	Mature firms with long records and stable business models	Past growth rates, segment disclosures
Bottom-up approach	Company-specific business drivers	Firms whose revenue can be built from units, prices, capacity or outlets	Unit volumes × average selling prices; same-store sales growth plus planned new store openings; capacity (e.g., available seat kilometers) × utilization × price per unit of capacity

Approach	Starting point	Best suited to	Typical inputs
Top-down approach	A macroeconomic variable, usually expected nominal GDP growth	Firms whose sales track the economy or an industry	GDP growth and the expected relationship between it and company sales; industry sales growth and market share

Two common top-down calculations:

- Growth relative to GDP. When company revenue is expected to grow $x\%$ faster than nominal GDP, with the premium stated as a percentage of GDP growth, the company's growth rate is $g_{GDP}(1 + x)$. A premium stated in percentage points (for example, "2 percentage points above GDP growth") is added instead.
- Market growth and market share. Start from the forecast growth of industry sales, then apply the company's expected market share. Company revenue growth is market growth plus the proportional change in market share:

KEY CONCEPT

$$g_{revenue} = g_{market} + \left(\frac{\text{new share}}{\text{old share}} - 1 \right)$$

Example. An industry is expected to grow 4%, and a firm's share rises from 20% to 22%. Forecast revenue growth is $4\% + (22/20 - 1) = 4\% + 10\% = 14\%$. If the firm's current sales are \$30 million, industry sales are $30/0.20 = \$150$ million now and $150 \times 1.04 = \$156$ million next year, and firm sales are $0.22 \times 156 = \$34.32$ million, growth of 14.4%.

Exam convention: the market growth and market share method adds market growth to the proportional change in share, which gives 14% here; use this figure when a question asks for the forecast growth. Current practice: computing next year's sales in levels gives the exact growth, 14.4% here. The gap is the product of the two changes ($4\% \times 10\% = 0.4\%$), so it matters only when both changes are large.

Expense (profit) modeling

- **Historical approach.** Each expense is linked to revenue using past data, often with a regression that separates fixed and variable components:

$$\Delta \text{Expense} = b_0 + b_1 \times \Delta \text{Revenue}$$

The intercept b_0 captures the fixed component and the slope b_1 the variable component. Regressions need a minimum sample size to be reliable, so this approach can be used only for established companies with enough historical data.

- **Itemizing expenses.** Economically significant line items are forecast one by one. This is the approach to use when new information must be reflected, such as a new wage agreement, new supplier terms or a new lease.
- **Direct profit margin approach.** A margin is assumed directly without disaggregating costs. It works well where COGS dominates total cost and moves with revenue:

$$\text{COGS} = \text{forecast revenue} \times (1 - \text{gross margin})$$

Margins are hard to forecast when there are one-off charges such as restructuring costs or impairments. Some items, such as interest expense and interest income, tend not to vary directly with revenues, so they are usually forecast separately.

Example. A regression gives $b_0 = 0.03$ and $b_1 = 0.70$ for the change in SG&A. If revenue grows 8%, SG&A grows $0.03 + 0.70 \times 0.08 = 8.6\%$. In a separate case, a firm has revenue of \$80 million, expected to grow 6%, and a 30% gross margin. Next year's revenue is 84.8, gross profit is $0.30 \times 84.8 = 25.44$, and COGS is $84.8 - 25.44 = \$59.36$ million.

Asset modeling

- A **constant growth rate model** assumes that assets and revenue grow at one common rate, so **total asset turnover** stays constant.
- Alternatively, individual asset categories are forecast separately, possibly with a regression like the one for expenses. Regressions are limited by the timing of capital expenditures, because fixed assets must be in place before they generate revenue.
- Only assets and liabilities with cash flow implications belong in the model. A **goodwill impairment** is a non-cash accounting charge and is left out. Purchases of equipment and changes in inventory involve cash and are included.

Financing modeling

KEY CONCEPT

$$\text{financing needs} = \Delta \text{operating assets} - \Delta \text{non-debt liabilities} - \Delta \text{retained earnings}$$

- **Operating assets** here means all assets other than cash.
- **Non-debt liabilities** are liabilities that carry no interest, for example accounts payable and accrued expenses.
- The change in retained earnings is net income minus dividends.

If $\Delta \text{operating assets} - \Delta \text{non-debt liabilities}$ is positive, the company has a funding need. It can be met from existing cash, retained earnings, borrowing or issuing stock. If the difference is negative, the company has a **surplus** that can fund dividends or share buybacks, reduce debt or add to cash. With retained earnings included in the formula, a positive result is the amount of new financing needed and a negative result is the size of the surplus.

The financing assumptions need reasonableness checks. The forecast debt ratio should stay within the company's normal range, so a sudden unexplained drop in leverage is a warning sign. Stock issuance or repurchases should be assumed only if the company's history supports them. Cash should be neither implausibly high nor below the company's minimum or target level.

Example. Operating assets rise \$50,000, non-debt liabilities rise \$18,000, net income is \$20,000 and dividends are \$5,000. Financing needs are $50,000 - 18,000 - (20,000 - 5,000) = \$17,000$.

COMMON EXAM TRAPS

- Adding the change in market share in percentage points to market growth, instead of the proportional change in share. In the example, adding the 2-point share gain to 4% market growth gives 6% instead of 14%.
- Adding a premium to GDP growth when the premium is stated as a percentage of GDP growth.
- Reporting gross profit, or this year's COGS, when next year's COGS is asked; applying the gross margin itself as the COGS ratio. In the example, gross profit is \$25.44 million and this year's COGS is \$56.00 million, while next year's COGS is \$59.36 million.
- In financing needs: using the level of retained earnings instead of the change, including the change in cash, or adding the change in non-debt liabilities. In the example, adding the \$18,000 rise in non-debt liabilities gives \$53,000 instead of \$17,000.
- Confusing bottom-up (prices × volumes, outlets) with top-down (GDP, industry growth and share).
- Thinking a constant growth asset model makes asset turnover grow. Turnover stays constant.

EXAM SHORTCUTS

- The exam-convention market-share growth differs from the exact growth computed in levels only by the product of the two changes, so the two answers are close unless both changes are large.

BOTTOM LINE

- A disaggregated valuation model forecasts full financial statements through revenue, expense, asset and financing modeling; it improves the estimate of future cash flows but does not change how the discount rate is estimated and still needs a terminal value.
- Revenue can be forecast with the historical approach (the company's own past growth, for mature firms with stable business models), the bottom-up approach (company drivers such as units × prices, same-store sales plus new stores, or capacity × utilization × price) or the top-down approach (nominal GDP growth, or industry growth and market share).
- A revenue premium stated as a percentage of GDP growth gives growth of $g_{GDP}(1 + x)$, while a premium stated in percentage points is added to GDP growth.
- Exam convention: forecast revenue growth is market growth plus the proportional change in market share, $g_{market} + (\text{new share}/\text{old share} - 1)$; current practice: computing next year's sales in levels gives the exact growth.
- Expenses can be linked to revenue by a regression $\Delta \text{Expense} = b_0 + b_1 \times \Delta \text{Revenue}$ for established companies with enough data, itemized when new information must be reflected, or set by a direct margin, with $\text{COGS} = \text{forecast revenue} \times (1 - \text{gross margin})$.
- A constant growth asset model keeps total asset turnover constant, and financing needs equal the change in operating assets minus the change in non-debt liabilities minus the change in retained earnings, a positive result being new financing needed and a negative one a surplus.

QUICK CHECK

Question 1

Compared with a present value model that applies one or two growth rates to a single cash flow measure, the *main* benefit of a disaggregated valuation model built on forecast financial statements is that it:

- A eliminates the need to estimate a terminal value.
- B lets each statement component follow its own growth path.
- C produces a more precise estimate of the discount rate.

Answer: B

A disaggregated model forecasts revenues, expenses, assets and financing separately, each with its own assumptions. That flexibility lets the analyst reflect industry projections, competition and company-specific information, which improves the cash flow forecast.

Why the other options are wrong

- **A.** A forecast model still covers only a finite horizon, so a terminal value is still needed to capture value beyond it.
- **C.** The model refines the cash flow estimates. The required return is estimated separately.

Key takeaway Disaggregated models improve the numerator (cash flows). They leave the denominator (discount rate) to be estimated separately, and they still need a terminal value.

MODULE 46.2

Models Based on Company Characteristics

LOS 46.b — Matching the valuation model to the company's life-cycle stage

The right model depends on where the company is in its life cycle.

KEY CONCEPT

Stage	Typical characteristics	Typical valuation approach
Start-up stage	Low or no revenue, negative earnings and cash flow, little or no debt (so equity value = firm value), little operating history, high chance of failure, funded by venture capital (VC)	A multiple of anticipated future sales (a price-to-sales (P/S) multiple), discounted with the VC investor's ROI multiple
Growth stage	Some historical data; cash flows fund growth objectives; sales scale up and profit margins improve	Forecast margins and growth; most value comes from the terminal value , usually an earnings (P/E) multiple on forecast net income

Stage	Typical characteristics	Typical valuation approach
Mature stage	Stable growth in earnings and cash flow , ample historical data	Constant growth model (e.g., Gordon growth DDM or constant growth FCFF/FCFE)
Decline stage	Declining profit margins, focus on returning capital, possible financial distress	Adjusted historical data, higher discount rates, probability-weighted value of going-concern and distress outcomes

Start-up stage: venture capital arithmetic

VC investors require very high returns because start-ups have a **high likelihood of business failure**. The required return is expressed as an **ROI multiple** over the investment horizon:

$$\text{ROI multiple} = (1 + r)^n \implies r = (\text{ROI multiple})^{1/n} - 1$$

where n = years to the VC investor's exit and r = the annual **required rate of return**. An ROI multiple of 3x means a total profit of 200%.

KEY CONCEPT

$$\text{post-money value} = \frac{\text{expected revenue} \times (P/S)}{\text{ROI multiple}}$$

$$\text{pre-money value} = \text{post-money value} - \text{VC investment}$$

$$f = \frac{\text{VC investment}}{\text{post-money value}}$$

The **post-money value** is the firm's value immediately after the VC investment, and the **pre-money value** is its value before the investment. f is the VC investor's **fractional ownership**.

Example. A start-up needs \$5 million. In six years it expects revenue of \$40 million and a P/S of 3x, and the VC investor requires a 10x ROI multiple. The post-money value is $40 \times 3/10 = \$12$ million, the pre-money value is $12 - 5 = \$7$ million, and $f = 5/12 = 41.7\%$. The implied annual return is $10^{1/6} - 1 = 46.8\%$.

Growth stage

Forecast revenue, costs and margins to the end of the high-growth period, estimate net income in that year, and apply an earnings multiple to get the **terminal value**. Discount it to today at the required return, or divide it by the target ROI multiple if the required return is stated as a multiple.

$$TV_n = NI_n \times P/E, \quad V_0 = \frac{TV_n}{(1 + r)^n} \quad \text{or} \quad V_0 = \frac{TV_n}{\text{ROI multiple}}$$

With no debt, $NI = \text{revenue} \times \text{operating margin} \times (1 - t)$. If revenue and costs grow at different rates, grow each separately before computing profit.

Example. Year-5 revenue is \$25 million and the net margin 16%, so $NI_5 = \$4.0$ million. A P/E of 15 gives $TV_5 = \$60$ million, and at 12% $V_0 = 60/1.12^5 = \$34.05$ million.

Mature stage

Stable growth in earnings and cash flow makes a **constant growth model** appropriate: $V_0 = CF_1/(r - g)$.

Decline stage

Financial distress is the inability to meet financial obligations as they fall due. Analysts adjust historical data for the deteriorating business, and use **higher discount rates** because both debt and equity investors face more risk. Terminal values based on multiples of healthy, stable peers are likely to overvalue a declining firm. When the **going-concern assumption** is in doubt:

$$\text{value} = P(\text{going concern}) \times \text{going-concern value} + P(\text{distress}) \times \text{distress sale value}$$

When equity is being valued, the distress value is what shareholders recover: sale proceeds net of all creditor claims and liquidation costs. If distress means the assets pass to creditors, the equity's distress value is zero.

Example. Going-concern equity value is \$20 million. There is a 40% probability of distress, in which case shareholders would recover \$5 million after creditors are paid. Value = $0.60 \times 20 + 0.40 \times 5 = \14 million.

Enterprise value and EV multiples

$$EV = \text{market value of common and preferred stock} + \text{market value of debt} - \text{cash and short-term investments}$$

Enterprise value (EV) multiples divide EV by an operating income measure such as **EBITDA** (or by revenue or FCFF). Operating income belongs to all capital providers and is unaffected by capital structure, and EBITDA is less often negative than net income. Common equity value can be backed out as EV less net debt (debt minus cash and short-term investments) and less preferred stock.

COMMON EXAM TRAPS

- Using revenue (instead of post-money value) as the denominator of fractional ownership; switching the P/S and ROI multiples; reporting post-money when pre-money is asked (or adding the investment). In the example, dividing the \$5 million by revenue gives 12.5% instead of 41.7%, and the post-money value of \$12 million is not the \$7 million pre-money value.
- Converting an ROI multiple to an annual return by simple division, or treating 3x as a 300% profit.
- Treating a target ROI multiple (e.g., 8x) as a percentage discount rate (8%).
- Forgetting to discount the terminal value, or discounting it for only one year. In the example, leaving the \$60 million undiscounted, or discounting it one year to \$53.57 million, overstates the \$34.05 million value.

- In a probability-weighted value: ignoring the distress value, or swapping the probabilities. In the example, ignoring the distress value gives \$12 million and swapping the probabilities gives \$11 million instead of \$14 million.

LOS 46.c — Valuing equity from forecast model outputs

Valuation tools from earlier readings are applied here to the outputs of a forecast model.

- **Free cash flow to the firm (FCFF):** $FCFF = NOPAT - \text{net investment}$, with $NOPAT = EBIT(1 - t)$. Firm value = $FCFF_1 / (WACC - g)$; equity value = firm value – market value of debt.
- **Free cash flow to equity (FCFE):** $FCFE = NI - \text{investment in net long-term assets} - \text{increase in working capital} + \text{net borrowing}$. Equity value = $FCFE_1 / (r - g)$; divide by shares outstanding and compare with the market price. Intrinsic value below the price means the stock is overvalued.
- **Sustainable growth rate based on FCFF:**

KEY CONCEPT

$$SGR_{FCFF} = \left(1 - \frac{FCFF}{NOPAT}\right) \left(\frac{NOPAT}{\text{beginning book value of total capital}}\right)$$

where the **beginning book value of total capital** = book value of debt + book value of equity. This gives the **sustainable growth rate** of FCFF. The first term is the reinvestment rate and the second is the return on capital.

- **Reading the assumptions.** If revenue is forecast to grow faster than expenses, margins are expected to rise. If most operating expenses are forecast to grow faster than revenue, the **operating profit margin** is expected to fall; the effect on gross and net margins needs more information. A forecast rise in **interest expense** signals more borrowing, so the funding shortfall is at least partly financed with debt.
- Revenue inputs often come from the top-down calculations of LOS 46.a.

Example. EBIT is \$90 million and the tax rate 25%, so $NOPAT = 67.5$. Net investment is 22.5, so $FCFF = 45$. With a beginning book value of capital of 750, $SGR = (1 - 45/67.5)(67.5/750) = 0.333 \times 0.09 = 3.0\%$. If next year's FCFF is 45, WACC 8.5% and $g = 3\%$, firm value = $45/0.055 = 818.2$; with debt of 200, equity = 618.2.

COMMON EXAM TRAPS

- Forgetting to subtract debt from firm value, or valuing FCFF with an extra year of growth when it is already a next-year forecast. In the example, reporting firm value gives 818.2 instead of equity of 618.2, and growing the 45 one more year gives equity of 642.7.
- Using $FCFF/NOPAT$ instead of $1 - FCFF/NOPAT$ as the reinvestment rate, or dividing NOPAT by the market value of debt instead of by total book capital. In the example, 0.667×0.09 gives 6.0% instead of 3.0%.
- In FCFE, forgetting (or adding back) the increase in working capital, or ignoring net borrowing.

EXAM SHORTCUTS

- Read margins from the growth assumptions: revenue forecast to grow faster than expenses means rising margins, and most operating expenses growing faster than revenue means a falling operating profit margin, though the effect on gross and net margins needs more information.

BOTTOM LINE

- A start-up is valued with a P/S multiple of anticipated sales discounted by the VC investor's ROI multiple, a growth-stage firm mainly through a terminal value from a P/E on forecast net income, a mature firm with a constant growth model, and a declining firm with adjusted historical data, higher discount rates and a probability-weighted value.
- ROI multiple = $(1 + r)^n$, post-money value is expected revenue $\times$ P/S divided by the ROI multiple, pre-money value is post-money value minus the VC investment, and the VC's fractional ownership is the investment divided by post-money value.
- A growth-stage terminal value is $TV_n = NI_n \times P/E$, discounted at r for n years or divided by the target ROI multiple when the required return is stated as a multiple.
- When the going-concern assumption is in doubt, value is the probability-weighted average of the going-concern value and the distress sale value, where the equity's distress value is what shareholders recover after creditor claims and liquidation costs.
- From a forecast model, $FCFF = NOPAT - \text{net investment}$ gives firm value $FCFF_1 / (WACC - g)$, and equity value is firm value minus the market value of debt.
- The sustainable growth rate of FCFF is the reinvestment rate $1 - FCFF / NOPAT$ times the return on capital, NOPAT divided by the beginning book value of total capital (debt plus equity).

QUICK CHECK**Question 2**

A venture capital fund targets an ROI multiple of 5x on a start-up investment that it expects to exit after six years. The annual required rate of return implied by this target is *closest* to:

- A 30.8%.
- B 34.8%.
- C 66.7%.

Answer: A

The ROI multiple compounds the annual required return over the investment horizon: ROI multiple = $(1 + r)^n$. Solve for r .

$$5 = (1 + r)^6 \Rightarrow r = 5^{1/6} - 1 = 1.3077 - 1 = 30.8\%$$

Calculator: 5 [y^x] 6 [1/x] [=] gives 1.3077.

Why the other options are wrong

- **B.** 34.8% treats a 5x multiple as a 500% profit, i.e., a multiple of 6x: $6^{1/6} - 1$. A 5x multiple is a 400% profit.
- **C.** 66.7% divides the 400% total profit by six years $((5 - 1)/6)$, ignoring compounding.

Key takeaway $r = (\text{ROI multiple})^{1/n} - 1$. A multiple of M means a total profit of $M - 1$.

Practice questions

Question 3

Tomasz Wilk is building a forecast for Halvorsen Aluminum. Halvorsen has just signed a four-year energy supply contract that fixes the electricity price for its smelters at a level well above what it paid in the past. Wilk wants his expense forecast to reflect the new contract terms. Which approach to forecasting expenses is *most* appropriate?

- A** Itemizing expenses.
- B** A historical approach.
- C** A direct profit margin approach.

Question 4

An investor estimates that Wexcombe Textiles has an 85% probability of surviving as a going concern, in which case its equity would be worth \$46 million. If it does not survive, the investor expects a distress sale to leave shareholders \$10 million after all creditor claims and sale costs are paid. The value of Wexcombe's equity is *closest* to:

- A** \$46.0 million.
- B** \$40.6 million.
- C** \$15.4 million.

Question 5

An analyst's forecast for Carrow Retail assumes that revenue will grow 3% a year, while most of Carrow's operating expenses, including SG&A and depreciation, will grow 5% to 6% a year. Based only on this information, which of the following is *most likely*?

- A** The gross profit margin is expected to remain steady.
- B** The net profit margin is expected to increase.
- C** The operating profit margin is expected to decrease.

Answers: 3. A · 4. B · 5. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/financial-statement-forecasting-in-equity-valuation/. The full bank has 54 questions on this reading.

EQUITIES · READING 47

Industry and Competitive Analysis

What you'll learn

LOS 47.a Describe the five steps of industry and competitive analysis: define, survey, analyze structure, examine external influences, analyze competitive strategies.

LOS 47.b Describe commercial classification systems (GICS, ICB, TRBC) and their limitations, and grouping by geography and business cycle sensitivity (defensive, cyclical, growth).

LOS 47.c Estimate industry size (top-down vs. bottom-up), judge growth, measure profitability (operating margin, ROIC) and market share and concentration (HHI).

LOS 47.d Analyze industry structure with Porter's five forces and external influences with PESTLE, including the innovation matrix.

MODULE 47.1

Industry Analysis Framework

This reading sets out the five steps of industry and competitive analysis and the ways companies are grouped into industries. It shows how to survey an industry's size, growth, profitability (operating margin and ROIC) and concentration (market share and the HHI), and how to analyze industry structure with Porter's five forces and external influences with PESTLE and the innovation matrix.

LOS 47.a — The five steps of industry and competitive analysis

Industry and competitive analysis studies the environment a company operates in. For this purpose an **industry** is a group of firms offering comparable products or services. Understanding what drives an industry's size and profits lets the analyst justify the inputs of a valuation model and explain the narrative behind them. Being able to do so also helps show that a recommendation has a reasonable basis.

KEY CONCEPT

Step	What the analyst does	Typical content
1. Define the industry	Set the scope of the industry	Which products and which geographic regions belong; how to treat companies active in several industries; third-party classification systems
2. Survey the industry	Measure the industry	Size, historical growth and growth drivers, profitability, main participants and market share trends
3. Analyze the industry structure	Judge how competitive the industry is	Porter's five forces , giving the degree of competitive rivalry and the key drivers of profitability
4. Examine external influences	Look at forces outside the industry	PESTLE framework: political, economic, social, technological, legal, environmental

Step	What the analyst does	Typical content
5. Analyze competitive strategies	Look at each company in the industry	How each firm positions itself and what competitive advantages it has

COMMON EXAM TRAPS

- PESTLE belongs to step 4 (external influences); Porter's five forces belongs to step 3 (industry structure).
- Deciding which regions or products fall inside the industry is part of defining it. Measuring past growth rates is part of surveying it.
- Reviewing a company's financial statements and estimating its intrinsic value are company analysis and valuation tasks. They are not among the five steps.

LOS 47.b — Grouping companies into industries

Defining the industry comes first. Firms in one industry face the same competitive forces and value drivers, so the classification tells the analyst where to find comparable companies.

Commercial (third-party) classification systems

Global providers classify companies by the **products and services** they offer (their principal business activity) into hierarchical taxonomies. The company sits in the lowest tier; higher tiers aggregate groups.

System	Developer	Coverage	Tiers (broad → narrow)
Global Industry Classification Standard (GICS)	S&P Dow Jones Indices and MSCI	Public companies	Sector → industry group → industry → subindustry
Industry Classification Benchmark (ICB)	FTSE Russell	Public companies	Industry → supersector → sector → subsector
The Refinitiv Business Classification (TRBC)	Refinitiv	Public and private companies, not-for-profits, government entities	Economic sector → business sector → industry group → industry → activity

Regional systems include **NAICS** (North America) and **NACE** (Europe). Providers review classifications at least once a year. Data vendors (Bloomberg, FactSet, S&P Capital IQ and others) and exchanges such as Nasdaq either adopt one of these systems or build a similar taxonomy of their own.

The main advantage of a commercial system is consistency. Its groups can still be too broad or too narrow, so the analyst has to apply judgment. Specific limitations:

- groups may contain companies with different business models or with substitute products;
- a company operating in several industries is often placed according to the product that brings in the most revenue, which can hide a significant other business, and the systems do not all follow the same rules, so the same company can land in different groups;

- industries that serve only local or national markets (e.g., insurance, health care) do not fit global taxonomies well;
- groupings change over time through reclassifications, new entrants and delistings, so historical data may need restating.

Other ways to group companies

- **Geography**, usually the country of domicile or listing (developed, emerging, frontier). It may not match where the revenue is earned or where the assets are.
- **Business cycle sensitivity**:

KEY CONCEPT

Type	Demand / earnings pattern	Typical sectors
Defensive	Relatively stable demand through expansions and contractions	Health care, utilities, telecommunications, consumer staples
Cyclical	Earnings depend heavily on the stage of the business cycle; volatile earnings, usually high operating leverage	Basic materials, consumer discretionary, energy, financial services, industrials and producer durables
Growth	Strong revenue growth through all phases of the cycle; may or may not be profitable yet, depending on its life-cycle phase	Emerging technology, biotechnology

Cyclical products tend to have long lives or high unit values, so purchases can be postponed until the economy improves (cars, appliances, equipment). Cyclical firms also buy inputs, such as commodities, whose demand moves with the cycle, and the combination of swinging revenue and high fixed costs makes their operating profit volatile. For a growth company the analyst estimates how long above-trend growth can last and what profit levels will look like once growth levels off. Geography and cycle sensitivity can be combined when countries are at different points in their cycles.

COMMON EXAM TRAPS

- Commercial systems group companies by products and services. Geography and business cycle sensitivity are other ways analysts can group companies.
- "Cyclical versus defensive" describes how sensitive earnings and demand are to the business cycle. Stock price volatility is a different matter.
- A growth company's revenue growth is largely independent of the cycle, which distinguishes it from a cyclical company in an expansion.

LOS 47.c — Surveying the industry: size, growth, profitability, market share

Industry size

Industry size means one year's total sales of the product or service being analyzed. It can differ from the total sales of the companies in the industry. For a multi-product company, only the relevant part of its sales counts.

Approach	How it works	Advantage	Limitations
Top-down approach	Estimates total industry revenue from government agency or third-party data	Works for industries with many private or small firms that do not publish results	Data may not be granular enough for niche analysis
Bottom-up approach	Adds up the revenues of each company that produces the good or service	Direct and precise when large listed companies dominate	Hard to isolate revenue of multi-product companies; inconsistent segment reporting; poor fit when many firms are private

Growth

Compare industry growth with the economy (life-cycle stage) and across the business cycle (sensitivity).

- **Growth industries** typically grow faster than the economy whatever the phase of the cycle, because they have not yet reached their total addressable market. Estimating when their growth will peak is harder when it rests on an emerging technology.
- **Mature industries** have little or no growth potential left. All industries together grow at the economy's rate, so mature industries grow near or below that rate. Analysts watch for disruptors and signs of decline.
- Industries sensitive to interest rates, discretionary spending or capital goods have more volatile revenue over the cycle; structural shocks (e.g., the pandemic) can also shift demand.

Profitability

$$\text{operating profit margin} = \frac{\text{operating income}}{\text{total revenue}}$$

$$\text{ROIC} = \frac{\text{NOPAT}_t}{\text{average invested capital}}$$

where **NOPAT** = net operating profit after taxes and average invested capital = average of long-term liabilities plus equity over the period. **Return on invested capital (ROIC)** reflects returns to all capital providers and is compared with the **weighted average cost of capital (WACC)**. ROIC above WACC means value is being created. For private companies, analysts use listed peers' returns or government/third-party data.

Example. NOPAT = \$84 million and average invested capital = \$700 million give ROIC = 84/700 = 12%, above a 9% WACC.

Market share and concentration

$$\text{market share} = \frac{\text{company sales}}{\text{industry size}}$$

Because industry size is hard to pin down, market share is best expressed as a range. Rising share suggests customers favor the firm's products, and a trend of falling shares among incumbents can reveal competition from new entrants. Consolidation can lift a company's share, so the analyst checks share **net of acquisitions**.

The **Herfindahl-Hirschman Index (HHI)** is the sum of the squared market shares (in percent) of all participants:

KEY CONCEPT

$$HHI = \sum_{i=1}^N (\text{market share}_i)^2$$

Example. Shares of 40%, 30%, 20% and 10% give $HHI = 1,600 + 900 + 400 + 100 = 3,000$. The maximum is $100^2 = 10,000$ (a monopoly). An HHI above 1,800 is often read as high concentration. Unless the industry is segmented or highly differentiated, higher concentration means less competition, so firms tend to have more pricing power and higher profitability.

COMMON EXAM TRAPS

- Square the shares in percent (e.g., $40^2 = 1,600$); using decimals gives a number between 0 and 1. In the example, decimal shares give 0.30 instead of 3,000.
- The top-down approach suits many-private-firm industries; its weakness is lack of granularity. The bottom-up approach sums company revenues; its weakness is separating multi-product revenue.
- ROIC uses after-tax operating profit over average invested capital (long-term liabilities plus equity). It measures the return to all capital providers, which ROE and gross margin do not.

BOTTOM LINE

- Industry and competitive analysis has five steps: define the industry, survey it, analyze its structure with Porter's five forces, examine external influences with PESTLE, and analyze the competitive strategies of its companies.
- Commercial classification systems such as GICS, ICB and TRBC group companies by the products and services they offer into hierarchical tiers; they are consistent, but groups can be too broad or too narrow, and a company in several industries is often placed by the product that earns the most revenue.
- Defensive industries have relatively stable demand through expansions and contractions, cyclical industries have earnings that depend heavily on the stage of the cycle and usually high operating leverage, and growth industries grow revenue strongly through all phases of the cycle.
- Industry size is one year's total sales of the product or service; the top-down approach uses government or third-party data and suits industries with many private or small firms, while the bottom-up approach adds up company revenues and works best when large listed companies dominate.
- ROIC is NOPAT divided by average invested capital (long-term liabilities plus equity), a return to all capital providers, and ROIC above WACC means value is being created.
- The HHI is the sum of squared market shares in percent, with a maximum of 10,000 and a reading above 1,800 often taken as high concentration; unless the industry is segmented or highly differentiated, higher concentration means less competition and more pricing power.

QUICK CHECK**Question 1**

Kalinda Osei is studying how carbon-pricing rules, changing attitudes toward home exercise, and higher interest rates could affect the fitness-equipment industry. She organizes these factors using the PESTLE framework. In the industry and competitive analysis process, this work is best described as:

- A** examining external influences.
- B** analyzing the industry structure.
- C** defining the industry.

Answer: A

The PESTLE framework groups the political, economic, social, technological, legal and environmental factors that act on an industry from outside. Using it is the fourth step of industry and competitive analysis: examining external influences.

Why the other options are wrong

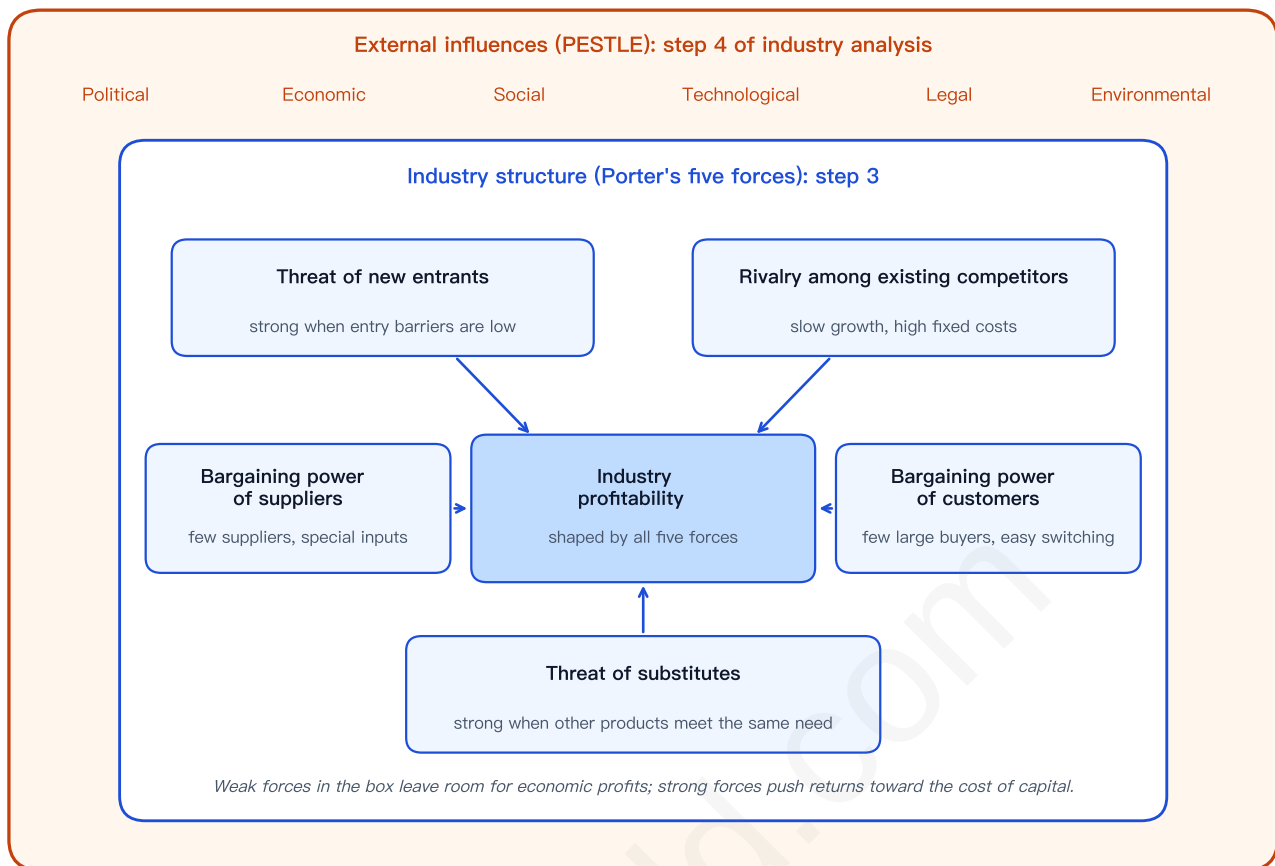
- **B.** Analyzing the industry structure (step 3) uses a framework such as Porter's five forces to judge competitive rivalry and profitability drivers. PESTLE belongs to a later step.
- **C.** Defining the industry (step 1) sets its scope: which products, regions and companies belong in it.

Key takeaway Porter's five forces serve step 3 (industry structure); PESTLE serves step 4 (external influences).

MODULE 47.2

Porter's Five Forces and PESTLE Analysis**LOS 47.d — Industry structure (Porter's five forces) and external influences (PESTLE)****Porter's five forces**

The two frameworks of this LOS fit together. The five forces describe the industry's structure: the pressures from rivals, would-be entrants, substitutes, suppliers and customers. PESTLE collects the influences that act on the whole industry from outside.



Porter's five forces inside the industry, PESTLE influences around it

Michael Porter's framework explains the competitive forces that determine an industry's long-run profitability. When the forces are strong, industry returns on capital are unlikely to exceed the cost of capital. An **economic moat** is a durable competitive advantage that protects profits from competitors. Its sources include cost advantages, efficient scale, proprietary intangible assets, network effects and high **switching costs**. The longer the advantage lasts, the wider the moat and the longer profits stay above the cost of capital. Where only a handful of firms compete (an oligopoly, for example), wide moats are typical. Where competition is intense, few firms have one, and most earn less than their cost of capital.

KEY CONCEPT

Force	Stronger (worse for industry profits) when...
Threat of new entrants	Barriers to entry are low: little capital needed, no scale advantages, no licensing or patent protection, weak customer loyalty, low switching costs
Threat of substitutes	Products from other industries meet the same need; this raises the elasticity of demand and caps prices. Differentiated products with high switching costs face a low threat
Bargaining power of suppliers	Few suppliers, scarce or customized inputs, high switching costs, proprietary technology or organized/licensed labor. Weak when many small suppliers sell commodity inputs

Force	Stronger (worse for industry profits) when...
Bargaining power of customers	Buyers are large and concentrated, products are commodity-like, switching costs are low
Rivalry among existing competitors	Slow growth, high fixed costs (firms cut prices to run at full capacity), difficulty exiting or cutting capacity, low concentration (many similar-sized firms), little differentiation

When judging the threat of entry, the analyst looks at both how many firms have entered over time and how much they affected the industry. Ways incumbents defend themselves: partnering with or acquiring entrants, lobbying for protective regulation, subsidies or restrictive licensing, patents, building customer loyalty, raising switching costs (price, opportunity cost, transition risk and lost upgrades from the current provider), network effects, and cost advantages from scale or **economies of scope** (producing a combination of goods and services costs less than producing each separately). In mature industries selling commoditized products with inelastic demand, firms must operate at efficient scale; because a newcomer would push returns below the cost of capital, that scale requirement itself deters entry. To counter supplier or customer power, a firm may pursue **vertical integration**, either **backward integration** (upstream, toward suppliers) or **forward integration** (downstream, toward customers). It may also use joint ventures or exclusive supply agreements, or cut out intermediaries. Against strong customers, firms reward loyalty, bundle services or differentiate their products.

Economic profits are most likely when all the forces are weak: high barriers to entry, few substitutes, weak supplier and customer power, and mild rivalry.

Example. A regional cement industry has high entry barriers (plants are costly, transport limits imports), few substitutes, and powerful energy suppliers; rivalry is intense in downturns because plants have high fixed costs and are hard to close. Profits are therefore strongly cyclical despite the entry barriers.

PESTLE — external influences

KEY CONCEPT

Influence	Examples
Political	Taxes, subsidies, reimbursements; indirect channels (changes in monetary policy, regulation, geopolitics); direct channels (government purchases). Energy, health care and defense are highly exposed
Economic	Cyclical trends in output; structural factors (competitiveness, stage of development); exchange rates (a weaker currency helps exporters, a stronger one makes imports cheaper). Industry forecasts should be consistent with the economic forecast, adjusted for the industry's position in the cycle
Social	How people work, spend and live, which matters most for industries selling to individuals; shift to branded goods as incomes rise; demand for ethical sourcing
Technological	New products that make old ones redundant; drives total factor productivity
Legal	New laws and regulations creating risks (e.g., tobacco restrictions) or opportunities (newly legalized products)

Influence**Examples****Environmental**

Climate change and sustainability, often linked to political, social and legal influences; the **energy transition**, a government-driven structural shift toward lower greenhouse gas emissions through policy, taxes and subsidies

The innovation matrix

Innovations are classified by their **domain** (the products, segments or processes affected) and the **problem** they solve:

KEY CONCEPT

	Indistinct domain	Distinct domain
Distinct problem	Breakthrough innovation — a new product, service or business model with a large impact across many industries (e.g., a new battery technology)	Sustaining innovation — improves existing products for existing customers (feature enhancements)
Indistinct problem	Basic research — deepens scientific understanding with no specific commercial objective	Disruptive innovation — creates new markets or redefines existing ones (e.g., streaming replacing cable)

When a market is disrupted, incumbents either change their business model or lose market share.

COMMON EXAM TRAPS

- The five forces are rivalry among existing competitors, the threat of new entrants, the threat of substitutes, and the bargaining power of suppliers and of customers. "Power of regulators" and "rivalry among suppliers" are distractors; regulation is a PESTLE item.
- Specialized inputs give suppliers power; concentrated buyers give customers power.
- Monetary policy and regulation are indirect political influences in PESTLE.
- Sustaining innovation is a better version of an existing product. Breakthrough innovation (distinct problem, indistinct domain) has a large impact across many industries. Disruptive innovation (indistinct problem, distinct domain) creates new markets or redefines existing ones within its domain.

BOTTOM LINE

- Porter's five forces are the threat of new entrants, the threat of substitutes, the bargaining power of suppliers, the bargaining power of customers and rivalry among existing competitors; when they are strong, industry returns on capital are unlikely to exceed the cost of capital.
- An economic moat is a durable competitive advantage, from sources such as cost advantages, efficient scale, proprietary intangible assets, network effects and high switching costs, and the longer it lasts the longer profits stay above the cost of capital.
- The threat of entry is stronger when barriers are low, and rivalry is stronger with slow growth, high fixed costs, difficulty exiting, many similar-sized firms and little differentiation.

- Suppliers have power when they are few, when inputs are scarce or customized, or when they hold proprietary technology, customers have power when they are large and concentrated and products are commodity-like, and firms may respond with backward or forward vertical integration.
- PESTLE covers political, economic, social, technological, legal and environmental influences on an industry, and monetary policy and regulation are indirect political channels.
- In the innovation matrix, breakthrough innovation solves a distinct problem in an indistinct domain, sustaining innovation a distinct problem in a distinct domain, disruptive innovation an indistinct problem in a distinct domain, and basic research has no specific commercial objective.

QUICK CHECK

Question 2

Fennick Labs is exploring home diagnostics within the clearly defined medical-testing domain. The exact customer problem is not yet distinct, but its new testing model could create a new market or redefine the existing diagnostics market. This strategy is most characteristic of:

- A disruptive innovation.
- B breakthrough innovation.
- C sustaining innovation.

Answer: A

Disruptive innovation addresses an indistinct problem within a distinct domain and creates a new market or redefines an existing one. The domain here is medical testing, the exact problem is not yet distinct, and the model could reshape that market.

Why the other options are wrong

- **B.** Breakthrough innovation addresses a distinct problem across an indistinct domain and can affect many industries. This scenario stays within the distinct domain of medical testing.
- **C.** Sustaining innovation addresses a distinct problem within a distinct domain and improves existing products without redefining the market. Here the problem is indistinct and the market could be redefined.

Key takeaway Disruptive innovation = indistinct problem, distinct domain, and creation or redefinition of a market.

Practice questions

Question 3

Rosalind Achebe wants to size the market for gluten-free infant cereal. She plans to use a national statistics agency's revenue figures for the packaged-food industry. The main drawback of this approach is *most likely* that:

- A it is unsuitable when an industry contains many private firms.
- B the data may not be detailed enough for a narrow product niche.
- C revenue is hard to isolate for companies with several product lines.

Question 4

The residential elevator industry in a country has five manufacturers with market shares of 50%, 20%, 15%, 10% and 5%. Based on its Herfindahl-Hirschman Index (HHI), the industry's concentration is best described as:

- A low.
- B moderate.
- C high.

Answers: 3. B · 4. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/industry-and-competitive-analysis/. The full bank has 34 questions on this reading.

EQUITIES · READING 48

Company Analysis: Past, Present, and Future

What you'll learn

LOS 48.a Explain a company's competitive strategy and industry position: business model, intentional vs unintentional strategy, life-cycle stages, market potential (TAM, serviceable, obtainable) and Porter's generic strategies.

LOS 48.b Evaluate revenue drivers (bottom-up vs top-down), operating profitability (EBITDA, EBIT, net income), pricing power and operating leverage.

LOS 48.c Evaluate working capital (cash conversion cycle), capital investments (net capex, ROIC, FCFE) and capital structure (debt vs equity, degree of financial leverage).

MODULE 48.1

Corporate Strategy and Industry Position

This reading moves from industry analysis to the individual company: its business model, competitive strategy, life-cycle stage, market potential and Porter's generic strategies. It then links strategy to the financial statements through revenue drivers, operating margins, pricing power and operating leverage, and through FCFE, the cash conversion cycle, net capital expenditure, ROIC and financial leverage.

LOS 48.a — Competitive strategy and position within an industry

Where company analysis fits

Industry and competitive analysis ends with a look at the individual company. After studying the industry (for example, with **Porter's five forces** and a **PESTLE analysis**), the analyst turns to the firm itself and evaluates its **competitive strategy**: its **competitive advantage**, its **position within its industry**, and the **resources and capabilities** it brings. The goal is to find what drives the company's value creation and then to check those drivers against its financial statements.

Business model versus competitive strategy

- A **business model** explains how a company defines and creates value: whom it serves (existing and potential customers), what it sells (products and services), how it prioritizes resources (key assets, supplier network) and how it protects itself from competitors.
- A **competitive strategy** is one part of the business model: how the firm wins against rivals. Every company has one, whether it chose it deliberately or not.

KEY CONCEPT

	Intentional competitive strategy	Unintentional competitive strategy
Approach	Proactive	Reactive
Direction	Clear, measurable goals, shared with staff and investors	Little clear direction; managers follow their own agendas, keep the status quo or copy industry norms

	Intentional competitive strategy	Unintentional competitive strategy
Process	Performance is monitored; the model is refined through repeated execute-and-evaluate cycles	No formal process for improvement
Long-term value creation	More likely	Less likely

Good strategies are easiest to spot in hindsight, once they have produced consistent positive economic profits. To judge a strategy looking forward, the analyst asks three questions:

1. Can the strategy respond to the threats found with Porter's five forces?
2. Is it neutral to, or helped by, the external influences in the PESTLE analysis?
3. Can the company actually execute it, given its resources, its stage of development and the industry's stage?

Strategy and the company life cycle

KEY CONCEPT

Stage	Revenue and cash flow	Primary strategic focus	Key challenges
Start-up	Little or no revenue; negative cash flow	Innovative product and business-model development; forming partnerships; raising capital for research	Few assets; no operating history; vulnerable to setbacks
Growth	Strong revenue growth; cash flow turns from negative to positive but stays below revenue because of reinvestment	Growth through sales innovation; identifying demand drivers	Operational constraints; regulatory hurdles; competitive challenges
Mature (established)	Revenue growth slows, then plateaus; cash flow rises more slowly or flattens	Efficiency; defending market share; product evolution	Market saturation; risk of a "stuck in the middle" strategy
Decline	Revenue falls or grows more slowly than nominal GDP or rivals; cash flow flattens, then falls	Cost management; restructuring; reinvention; downsizing or exiting	Lower demand; new substitutes; excess industry capacity; technological obsolescence

Changes in consumer preferences and technology breakthroughs can lift a start-up or growth firm to above-trend growth, but the same forces can push a firm that loses market share into decline.

Market potential for start-up and growth companies

For young firms entering established markets, the analyst estimates how big the opportunity is, product by product:

- The **total addressable market (TAM)** is the largest possible market for the goods or services.
- The **serviceable market** is the part of the TAM the company can reach, given its focus, technology or geographic footprint.
- The **obtainable market** is the share of the serviceable market that the company can realistically win given its current scale and strategy, for example as limited by production capacity.

KEY CONCEPT

$$\text{Serviceable market} = \text{TAM} \times \text{technical fit (\%)} \times \text{geographic reach (\%)}$$

Example. A maker of hospital sterilization robots faces a TAM of \$6.0 billion a year. Its machines meet the safety certification used in 40% of that market, and it is licensed in countries representing 75% of the certified segment. Its serviceable market is $6.0 \times 0.40 \times 0.75 = \1.8 billion. If its factory can support only \$0.5 billion of sales, its obtainable market is \$0.5 billion.

Porter's generic competitive strategies (mature companies)

Michael Porter argued that a firm must pick one of three strategies. A firm with no clear advantage is "**stuck in the middle**".

- **Cost leadership** (low-cost strategy): the lowest production costs in the industry, the lowest prices, and enough volume to earn a superior return. Common in mature or commoditized industries. It may serve a defensive purpose (holding on to market share) or an offensive one (e.g., aggressive price cuts to win share). Customers focus on cost; managerial incentives reward operating efficiency (scale, utilization, vertical integration).
- **Differentiation strategy**: products or services that are distinctive in type, quality or positioning and earn a price premium. It must create an **economic moat** (patents, brand, customer engagement) that rivals find hard to copy.
- **Focus strategy**: targeting a **niche**, such as a narrow group of customers, a region or a product stage. It is a hybrid that can combine elements of both cost leadership and differentiation.

	Cost leadership	Differentiation	Focus
Typical forms	Economies of scale and scope; supply-chain access; cost controls; aggressive pricing; low-cost distribution	Quality/features; brand and advertising; service and distribution; intellectual property; customer experience; premium pricing; bundling	Cost or differentiation elements aimed at one group or product
Five forces it counters	Threat of new entrants; customer bargaining power; industry rivalry	Threat of new entrants; threat of substitutes; customer bargaining power; industry rivalry	Threat of new entrants; threat of substitutes; customer bargaining power

	Cost leadership	Differentiation	Focus
Industry fit	Capital intensity; price-conscious customers; little product differentiation; limited industry innovation	Less price-conscious customers; customers who value product uniqueness; industry innovation with changing product features	Rivals find it hard to serve the specific customers, regions or products
Risks	Cost inflation, lack of discipline; technological change affecting costs or market share; customers wanting higher quality (premiumization)	Imitation; more sophisticated buyers; an excessive price premium; exclusivity that prevents market share growth	Large competitors outcompeting on price; narrowing differences among groups; more sophisticated buyers

COMMON EXAM TRAPS

- The business model is the broad description (customers, products, resources, suppliers). The competitive strategy is only the part about beating rivals.
- Keeping the status quo, following industry norms and managers pursuing their own incentives describe an **unintentional** strategy.
- Raising capital and forming partnerships belong to the start-up stage, defending market share to the mature stage, and cost management and restructuring to the decline stage.
- Cash flow may still be negative in the growth stage, but a growth firm has strong revenue growth; a start-up has little or no revenue.
- A focus strategy targets a narrow customer group and may mix cost and differentiation features. "Customers willing to pay more for perceived value" points to differentiation.
- Price-conscious customers plus slow innovation point to cost leadership; customers who value uniqueness point to differentiation.
- Threat of entry and power of buyers are industry-level forces; after industry analysis, the next company-level item is the competitive strategy.

EXAM SHORTCUTS

- Read the strategy from the customer and industry clues: price-conscious customers with little product differentiation and limited innovation point to cost leadership, customers who value uniqueness point to differentiation, and a narrow customer group, region or product points to focus.

BOTTOM LINE

- A business model explains how a company defines and creates value (its customers, products and services, key resources and protection from rivals), while the competitive strategy is only the part about how it wins against rivals.
- An intentional competitive strategy is proactive, with clear measurable goals and monitored performance, and is more likely to create long-term value than an unintentional one, which is reactive and may simply keep the status quo or copy industry norms.

- Looking forward, a strategy is judged by whether it can respond to the threats found with Porter's five forces, whether it is neutral to or helped by the PESTLE influences, and whether the company can execute it.
- A start-up focuses on product and business-model development, partnerships and raising capital, a growth company on sales growth, a mature company on efficiency and defending market share, and a declining company on cost management, restructuring, reinvention or exit.
- The serviceable market is the part of the total addressable market the company can reach, $TAM \times \text{technical fit} \times \text{geographic reach}$, and the obtainable market is the share of it the company can realistically win given its scale and strategy.
- Porter's generic strategies are cost leadership (lowest costs and prices with enough volume), differentiation (distinctive products earning a price premium behind an economic moat) and focus (a niche, possibly mixing both), and a firm with no clear advantage is stuck in the middle.

QUICK CHECK

Question 1

Having finished her assessment of the competitive forces in the packaged-foods industry, an analyst now turns to one particular company in that industry. Which of the following is she *most likely* to examine next?

- A The threat of substitute products.
- B The bargaining power of suppliers.
- C The company's competitive strategy.

Answer: C

The last step of industry and competitive analysis is to evaluate the individual company's competitive strategy: its competitive advantage, position within its industry, and resources and capabilities. Company analysis therefore adds the firm's own strategy (e.g., cost leadership or differentiation), along with its products and financial condition, to the industry picture.

Why the other options are wrong

- **A.** The threat of substitutes is one of Porter's five forces and is assessed during industry analysis, which the analyst has already completed.
- **B.** The bargaining power of suppliers is also an industry-level competitive force, already covered by the industry analysis.

Key takeaway The five forces belong to industry analysis; competitive strategy belongs to company analysis.

MODULE 48.2

Revenue, Profitability, and Capital

LOS 48.b — Revenue drivers, operating profitability and pricing power

Revenue drivers

Linking performance to strategy starts with revenue on the income statement. Revenue can be broken into **revenue drivers** in two ways:

	Bottom-up analysis	Top-down analysis
Drivers	Company-specific: price and volume, business segments, geography	Macroeconomic and industry variables: economic growth (GDP), industry performance, market share
Starting point	The company's own lines of business	The economy and the industry

Best practice is to use both. Analysts track the level of drivers and how they change (recurring vs. episodic revenue), how they evolve over time (product mix, share of the obtainable market), and expected changes relative to other industry participants.

Operating profitability

$$\text{EBITDA} = \text{revenue} - \text{COGS} - \text{operating expenses (excluding D\&A)}$$

$$\text{EBIT} = \text{EBITDA} - \text{depreciation and amortization}$$

$$\text{Net income} = \text{EBIT} - \text{interest expense} - \text{taxes}$$

Dividing each by revenue gives the **EBITDA margin**, the **EBIT margin** (operating margin) and the **net margin**.

KEY CONCEPT

Metric	What it is	Strengths	Weaknesses
Net income	Total earnings after all expenses, interest and taxes	Most comprehensive (operating, financing, investing activities and taxes); useful in growth, mature and decline stages	Volatile; hard to compare across companies and to assess a company over time; distorted by changes in capital structure, expenditures or nonrecurring items; less useful for start-ups and highly cyclical industries
EBIT (operating income)	Earnings before interest, taxes and nonrecurring items	Removes financing and tax effects, so it improves comparability across firms in a period and for one firm over time	Distorted by depreciation/amortization (capex) policies: firms that invest heavily show lower operating margins than firms that underinvest

Metric	What it is	Strengths	Weaknesses
EBITDA	EBIT plus depreciation and amortization	Compares firms with different investment policies, leverage and taxes	Not recognized by GAAP/IFRS; ignores the cost of replacing assets; adjustments may not be standard

Because EBITDA sits above interest, a jump in interest expense (e.g., after a shift from equity to debt financing) can push the net margin down even while the EBITDA margin rises. Analysts also compare the parts of the cost structure over time and against peers.

Pricing power

Pricing power is a company's ability to change the economic terms of its offer (mainly price) in its favor without hurting sales. It depends on price elasticity, market structure and competitive position.

- **Price elasticity** measures how much quantity demanded changes when price changes. It is the basic gauge of pricing power.
- **Inelastic demand** means high pricing power: buyers barely react to price (necessities such as health care, products with no substitutes).
- **Elastic demand** means little pricing power: buyers react strongly (luxuries and discretionary items such as leisure travel).
- Pricing power grows with product differentiation, switching costs, brand loyalty, barriers to entry and a lack of substitutes. Relative market share can matter more than absolute share.
- Less competitive structures (monopoly, oligopoly, monopolistic competition) allow more pricing power. In highly competitive markets with identical products, firms are **price takers**. In the long run price is driven to marginal cost and returns on capital to the cost of capital. A very low-cost producer can still keep its margins when price is set by the world market.

Operating leverage

KEY CONCEPT

$$\text{Operating profit} = Q \times (P - VC) - FC$$

where Q = units sold, P = price per unit, VC = variable cost per unit (materials, direct labor), FC = total fixed costs (rent, management salaries, insurance).

Operating leverage comes from fixed operating costs. The larger the share of fixed costs, the faster operating profit rises when volume rises, and the faster it falls when volume falls.

Example. A firm sells 20,000 units at \$15 with variable cost of \$9 per unit and fixed costs of \$80,000. Each unit sold adds $15 - 9 = \$6$ toward fixed costs and profit, so operating profit is $20,000 \times 6 - 80,000 = \$40,000$. The table shows the same firm after a 10% fall and after a 10% rise in volume. Its interest and net income rows are used for financial leverage under LOS 48.c.

Operating profit and net income at three sales volumes (\$)

Item	Volume down 10%	Base case	Volume up 10%
Units sold	18,000	20,000	22,000
Revenue (\$15 per unit)	270,000	300,000	330,000
Variable costs (\$9 per unit)	162,000	180,000	198,000
Fixed operating costs	80,000	80,000	80,000
Operating profit	28,000 (–30%)	40,000	52,000 (+30%)
Interest expense	10,000	10,000	10,000
Net income (no taxes)	18,000 (–40%)	30,000	42,000 (+40%)

A 2,000-unit change in volume moves operating profit by $2,000 \times 6 = \$12,000$, which is 30% of \$40,000 and three times the 10% change in volume.

Regressing expenses on revenue helps separate fixed costs (low sensitivity) from variable costs (high sensitivity); this assumes the cost structure has not changed over the sample period.

COMMON EXAM TRAPS (48.B)

- Bottom-up analysis uses company-specific drivers (segments, geography, price $\times$ volume); top-down analysis uses GDP, industry performance and market share.
- Net income is less useful for start-ups and highly cyclical industries. It is a GAAP/IFRS measure; EBITDA is the non-GAAP one.
- A price rise followed by a large fall in volume signals elastic demand and low pricing power. A price rise with volume nearly unchanged signals inelastic demand.
- High operating leverage means the percentage change in operating profit is larger than the percentage change in revenue, in both directions.

LOS 48.c — Working capital, capital investments and capital structure

Free cash flow to equity

$$\text{FCFE} = \text{NI} + \text{D\&A} - \text{capital expenditures} - \Delta \text{working capital} + \text{net borrowing}$$

where:

- **Capital expenditures** are the gross cash investment in long-term (fixed) assets, before depreciation. D&A is added back because it is a noncash charge. When the data give the increase in net (book value) long-term assets instead, depreciation has already been netted out and D&A is not added back: $\text{FCFE} = \text{NI} - \text{net investment in long-term assets} - \Delta \text{working capital} + \text{net borrowing}$.
- $\Delta \text{working capital}$ is the increase in **operating (noncash) working capital**: current assets excluding cash and marketable securities, minus current liabilities excluding short-term debt and the current portion of long-term debt. Those debt items belong in net borrowing, and the change in cash is what FCFE measures.

- **Net borrowing (net debt issued)** = new borrowing – debt repaid.

Positive terms are sources of cash; negative terms are uses. Exam convention: the formula is written $FCFE = NI + D\&A - \Delta \text{working capital} - \Delta LT \text{ assets} + \Delta \text{debt}$, with $\Delta \text{working capital} = \Delta \text{current assets} - \Delta \text{current liabilities}$. Current practice: the D&A add-back is correct only if ΔLT assets is the gross investment in long-term assets, and the working capital change leaves out cash and short-term debt, as defined above.

Example. NI is \$120 million, D&A \$35 million, the increase in noncash working capital \$15 million, capital expenditures \$70 million, new borrowing \$40 million and repayments \$25 million. FCFE is $120 + 35 - 15 - 70 + (40 - 25) = \85 million.

FCFE is often negative for start-ups and growth firms (heavy investment, no stable debt capacity) and typically positive for mature firms.

Working capital management

Working capital management is how a company uses current assets and current liabilities to run the business efficiently (working capital = current assets – current liabilities). The **operating cycle** (from receiving materials to collecting cash) is measured with efficiency ratios such as days of inventory on hand, days sales outstanding, days payables outstanding and receivables turnover. The **cash conversion cycle** narrows this to the cash gap (from paying for materials to collecting cash):

KEY CONCEPT

$$CCC = DOH + DSO - DPO$$

Example. With DOH of 45, DSO of 30 and DPO of 50, the CCC is $45 + 30 - 50 = 25$ days.

- A longer CCC means a greater need to finance working capital. A shorter CCC reduces financing needs and improves market position and returns.
- A negative CCC means operations fund the company, because suppliers are paid after customers pay.
- Industry examples: retailers use high turnover and bargaining power with suppliers; manufacturers are capital-intensive (production problems can swell inventory); service and software firms need little working capital; some brewers use long payables periods to run negative working capital, which works best while revenue grows and suppliers stay financially sound. Makers of long-lived products such as heavy equipment may measure inventory with **program accounting**, which looks at the profitability of the whole program rather than at unit costs.

Capital investments

Long-lived assets are capitalized and expensed through depreciation and amortization. **Net capital expenditure** shows whether a firm is keeping or expanding its productive capacity and future earnings growth:

$$\text{Net capital expenditure} = \text{total capital expenditure} - D\&A$$

Software and licensing businesses hold mostly intangible (amortized) assets; manufacturers expanding capacity buy tangible, depreciated assets.

Return on invested capital (ROIC) measures whether the company has created economic value from investors' capital:

$$\text{ROIC} = \frac{\text{NOPAT}}{\text{average invested capital}}, \quad \text{invested capital} \approx \text{total long-term liabilities} + \text{total equity}$$

Average invested capital = (beginning + ending) / 2. The long-term liabilities plus equity measure is an approximation; a fuller definition is total debt plus total equity minus cash and equivalents. Value is created when ROIC exceeds WACC. *Example.* NOPAT is \$15 million, and invested capital is \$140 million at the start of the year and \$160 million at the end, so ROIC is $15/150 = 10\%$. With a WACC of 8.5%, the firm created value. Judging a single project against the WACC is capital budgeting, a different use of the WACC.

Capital structure

A firm's capital structure reflects its business model, its stage in the life cycle and its asset conversion cycle.

- Firms in the early or growth stage whose cash flow is still negative rely mainly on **equity capital**.
- Mature firms with stable, predictable cash flows use more **debt** (e.g., public or private bonds).
- Capital-intensive industries (manufacturing, utilities) use more long-term debt; service and retail firms use more short-term debt.

The **degree of financial leverage (DFL)** shows how sensitive net income is to operating income:

$$\text{DFL} = \frac{\% \Delta \text{ net income}}{\% \Delta \text{ operating income}}$$

When judging debt, the analyst looks at loans outstanding, the type and maturity of the company's bonds, and its capacity to borrow more. Borrowing adds interest expense and raises DFL. Profits are magnified in good years and losses compounded in bad ones, and the risk of financial distress rises. When strategy changes (an acquisition, a restructuring, a large new investment), disaggregated financial models help confirm that cash will be there to service and repay debt. Other ratios: debt ratio = debt/assets and interest coverage = EBITDA/interest expense.

Example. The bottom rows of the operating leverage table (LOS 48.b) add \$10,000 of interest and no taxes. When volume rises 10%, net income goes from \$30,000 to \$42,000 (+40%) while operating profit rises 30%, so $\text{DFL} = 40\%/30\% = 1.33$. When volume falls 10%, net income drops by the same 40%, to \$18,000.

COMMON EXAM TRAPS (48.C)

- DFL uses percentage changes, with net income on top. Dividing the dollar changes, or flipping the ratio, gives the wrong answer. In the example, dividing the \$12,000 change in net income by the \$12,000 change in operating profit gives 1.0, and flipping the ratio gives 0.75, instead of 1.33.
- Operating leverage links the change in operating income to the change in sales; the degree of financial leverage links the change in net income to the change in operating income.
- In FCFE, subtract an increase in noncash working capital, and use net borrowing (borrowing – repayments). In the example, using the \$40 million of new borrowing instead of net borrowing gives \$110 million, and adding the \$15 million working capital increase gives \$115 million, instead of \$85 million.

- Net capital expenditure indicates productive capacity and growth, ROIC indicates economic value creation, and the CCC indicates working capital efficiency and financing needs.
- Issuing long-term debt to pay for fixed assets raises financial leverage. Once the proceeds are spent on those assets, net working capital is unchanged, and the extra interest reduces net income and so the addition to retained earnings.

EXAM SHORTCUTS

- With price, variable cost per unit and fixed costs unchanged, a change in units sold moves operating profit by the change in units times $P - VC$, so the whole profit figure need not be recomputed.

BOTTOM LINE

- Net income is the most comprehensive earnings measure but is volatile and less useful for start-ups and highly cyclical industries; EBIT removes financing and tax effects but is distorted by depreciation policies; EBITDA allows comparison across differing investment policies, leverage and taxes but is not a GAAP/IFRS measure and ignores the cost of replacing assets.
- Pricing power, the ability to change the terms of an offer in the company's favor without hurting sales, is high when demand is inelastic and grows with differentiation, switching costs, brand loyalty, barriers to entry and a lack of substitutes.
- Operating profit is $Q(P - VC) - FC$, and the larger the share of fixed costs, the more operating profit changes in percentage terms relative to a change in volume, in both directions.
- Exam convention: $FCFE = NI + D\&A - \Delta \text{working capital} - \Delta \text{LT assets} + \Delta \text{debt}$; current practice: the D&A add-back is correct only when the long-term asset change is gross investment, and working capital excludes cash and short-term debt.
- The cash conversion cycle is $DOH + DSO - DPO$; a longer CCC means a greater need to finance working capital, and a negative CCC means operations fund the company.
- Value is created when ROIC, NOPAT over average invested capital, exceeds the WACC, and the degree of financial leverage, $\% \Delta \text{ net income} / \% \Delta \text{ operating income}$, rises when borrowing adds interest expense.

QUICK CHECK

Question 2

An analyst is deciding whether to rely on net income when assessing a company's operating profitability. Which statement about net income is *most accurate*?

- A** It can be difficult to use for tracking a company's profitability over time.
- B** It is well suited to start-ups and to companies in highly cyclical industries.
- C** It is not recognized as a profitability measure under US GAAP or IFRS.

Answer: A

Net income is often volatile because it is affected by nonrecurring items, changes in capital structure and changing expenditures or tax rates. That makes it hard to compare across companies and to assess one company's profitability over time.

Why the other options are wrong

- **B.** Net income is less useful for start-ups and highly cyclical industries, which are often loss-making or swing widely; it is most useful in the growth, mature and decline stages.
- **C.** Net income is a standard GAAP/IFRS measure. EBITDA is the metric not recognized by these accounting standards.

Key takeaway Net income: most comprehensive but volatile and distorted by capital structure; EBITDA: not a GAAP/IFRS metric.

Practice questions

Question 3

Fennwick Pumps makes solar-powered irrigation pumps. Across its home continent, annual demand for such pumps (the total addressable market) is estimated at \$2.4 billion. Fennwick's pumps are certified only for the voltage standard used in 70% of that demand, and within the certified segment it holds sales licenses in countries representing 55% of that segment's demand. Its factory can supply at most \$300 million of pumps a year. Fennwick's serviceable market is *closest* to:

- A** \$924 million.
- B** \$1,320 million.
- C** \$1,680 million.

Question 4

An analyst gathers the data in the exhibit for Pellworth Logistics.

Pellworth Logistics: selected data for the year (\$ millions)

Item	Amount (\$ millions)
Net income	54
Depreciation and amortization	18
Increase in noncash working capital	9
Capital expenditures (gross investment in long-term assets)	40
New long-term borrowing	25
Repayment of existing debt	10

Pellworth's free cash flow to equity (FCFE) for the year is *closest* to:

- A \$56 million.
- B \$48 million.
- C \$38 million.

Question 5

A long-established, capital-intensive electric utility with steady, predictable cash flows is *most likely* to finance its operations mainly by issuing:

- A common stock.
- B preferred stock.
- C public bonds.

Answers: 3. A · 4. C · 5. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/company-analysis-past-present-and-future/. The full bank has 40 questions on this reading.

EQUITIES · READING 49

Equity Analyst Research Reports

What you'll learn

LOS 49.a Describe the sections of an initial company research report and the items in subsequent reports, including the rough buy/hold/sell guideline.

LOS 49.b Compare sell-side and buy-side research (producer, objective, format, audience, valuation methods, regulation), including screening and activist short selling.

LOS 49.c Explain why analysts using the same model reach different values: revenue and cost assumptions, capital investment, terminal value, financing.

MODULE 49.1

Equity Analyst Research Reports

This reading describes what an initiating-coverage report and a subsequent report contain and how a recommendation follows from the price target. It compares sell-side and buy-side research, and explains why analysts using the same model reach different values, including how to back an assumption out of a price target.

LOS 49.a — What a company research report contains

A **company research report** sets out the analyst's valuation and investment recommendation, based on the company's current and forecast performance and position. The first external report, **initiating coverage**, is thorough because it introduces the company to readers who may know little about it. Later **subsequent reports** are shorter updates, often triggered by expected events such as earnings releases or mergers.

Initial report: typical sections

KEY CONCEPT

Section	Content
Front page	Appears first but is written last : recommendation (buy/hold/sell), price target, investment thesis , company name, ticker, sector/industry, market cap and float, recent developments, summary financials
Business model	How the company creates value: revenue drivers (products, pricing, key customers) and expense drivers (suppliers, distribution)
Industry overview and competitive positioning	Introduce the industry (do not assume reader expertise); the analyst identifies and names peers even if the company does not; quantitative comparisons plus only the relevant parts of PESTLE and Porter's five forces
Financial analysis and valuation	Only the measures and ratios that support the price target , with no line-by-line commentary; forecasts draw on past results, company, industry and economic factors and any short- or long-term catalysts; several valuation techniques estimate intrinsic value, which sets the target; target is absolute or relative to a benchmark, a point or a range, usually over one to two years

Section	Content
Investment risks	Detail on key company, industry and macro risks, including the sensitivity of the valuation to the analyst's assumptions
ESG factors	Content depends on industry and country; crucial where environmental issues matter (e.g., air travel, data storage)
Recommendation	A clear trading action: buy/hold/sell (or overweight/neutral/underweight)

A rough recommendation guide: buy if the stock is expected to rise by at least about 10%–15% (in absolute terms or relative to a benchmark), sell if it is expected to fall by at least about 10%–15%, and hold in between. It is a guideline, not a rule.

Subsequent report: typical items

A subsequent report has condensed front matter; the recommendation with the **rationale for any change**; analysis of new information, such as updated financial statements and **variance analysis** of expected versus actual results; changes to the valuation and the reasons for them; and changes in risks.

Every report should **distinguish facts from opinions**, disclose potential conflicts of interest, and explain the risks investors face.

COMMON EXAM TRAPS

- Business-model and industry sections belong to the initial report. Updates focus on what is new.
- The investment-risks section discusses sensitivity to assumptions. Reasons for a rating change go with the recommendation in an update.
- An expected gain (or outperformance) below the rough 10%–15% zone does not automatically mean "buy". It usually points to a hold.

LOS 49.b — Sell-side versus buy-side research

"Sell-side" and "buy-side" describe who produces the report. They say nothing about the recommendation it gives.

KEY CONCEPT

Feature	Sell-side research	Buy-side research
Producer	Investment banks/brokers, for their clients	Firms that invest (asset managers), for internal use
Objective	Provide information and recommendations to clients; support bank relationships (underwriting, trading volume, advisory)	Support internal investment decisions and monitoring
Detail and format	Wide range of industries and stocks for a diverse audience; standardized format	Customized , in-depth, focused

Feature	Sell-side research	Buy-side research
Audience	External investors and traders	Internal investment teams, portfolio managers
Valuation methods	DCF, multiples and other common models, with a focus on future earnings	Internal proprietary models plus traditional methods
Regulation	Constraints on conflicts of interest (e.g., underwriting relationships, no access to material nonpublic information held elsewhere in the bank, limits around IPOs/secondary offerings, research paid for separately from trade execution)	Mostly unregulated because it is not published

Each sell-side analyst usually specializes in one industry and follows selected companies in it. For **sell-side** firms, research is a cost unless it is sold, so coverage is limited and tilted toward stocks that generate trading volume. Coverage can add credibility and liquidity to a stock. Recommendations are mostly buy or hold and usually **in line with the consensus**, because a contrary view needs high conviction. Analysts may also avoid sell ratings to protect banking relationships.

Buy-side research is usually confidential and serves the firm's investment committee. Buy-side analysts read sell-side reports but reach their own conclusions. Because they do not need to generate commissions, they have more scope to cover smaller stocks. They narrow the universe with **stock screening**, increasingly with software and data platforms: they start from a universe (e.g., an index), apply quantitative criteria and refine them. Any arbitrary cutoff may exclude an attractive stock.

Activist short selling is a branch of buy-side research. Small teams look for stocks likely to fall sharply because of misinformation or undiscovered fraud. They often publish their research after sharing it with their own investors.

COMMON EXAM TRAPS

- Reading "sell-side" as "issues sell ratings": both sides give buy, hold and sell views.
- Placing activist short sellers on the sell side because they publish: they are a branch of buy-side research.
- Giving the sell side the small-stock coverage: its need for trading volume tilts coverage toward larger stocks, so the buy side has more room for small caps.

LOS 49.c — Why analysts using the same model reach different values

Valuation models need many forecasts, so two analysts using the same approach can reach opposite recommendations. This is not a flaw: differing views support **price discovery** and market efficiency. Stocks with widely dispersed estimates are **hard-to-value stocks**. Location can matter too; a foreign analyst, for example, may place a value on market access.

Two-stage FCFE valuation

An analyst's assumption can be backed out of a price target. The target is treated as the DCF value, and the equation is solved for the missing input, such as long-term growth.

With one year of explicit forecast and constant growth g from year 2, the value of equity is

$$V_0 = \frac{FCFE_1}{1+r} + \frac{FCFE_2/(r-g)}{1+r}$$

so, given the target value V_0 , r and the two forecasts, the equation can be solved for g .

Example. The price target is \$20.00, there are 40 million shares, FCFE is \$40 million next year and \$42 million the year after, and the required return is 10%:

$$800 = \frac{40}{1.10} + \frac{42/(0.10 - g)}{1.10} \Rightarrow 880 - 40 = \frac{42}{0.10 - g} \Rightarrow 0.10 - g = 0.05 \Rightarrow g = 5\%$$

Main drivers of differences

- **Revenue and profitability.** Faster revenue growth usually goes with higher free cash flow and a higher value, but revenue growth alone can mislead, because what matters is how costs move. *Example.* Revenue is \$20 million and costs are \$14 million, a 30% margin, and revenue grows 5%. If costs also grow 5%, the margin stays at 30%. If costs grow 6%, it falls to 29.3%. If costs grow 3% because of economies of scale, it rises to 31.3%.
- **Capital investment.** Exam convention: if investment growth matches net-income growth, there is no overall change in free cash flow. Current practice: with other components held constant, equal dollar increases in investment and income leave free cash flow unchanged; equal percentage growth makes their difference grow at that rate. Free cash flow as a whole grows at that rate only if its other components are zero or grow at the same rate too.
 - When investment is smaller than income and grows more slowly, its dollar increase is also smaller, so free cash flow rises. The analyst should then ask whether that growth is sustainable without more investment.
 - When investment rises without income growth, free cash flow falls and the long-run return on capital declines.
 - Capital spending does not affect the operating margin directly.

Example. Income of \$200 and investment of \$80 give free cash flow of \$120. If both rise by \$10, free cash flow is $210 - 90 = 120$, unchanged. If both rise 5%, it is $210 - 84 = 126$, also up 5%. If the firm also has other net cash items of \$20 that stay flat, free cash flow starts at \$140 and reaches only $210 - 84 + 20 = 146$ when income and investment grow 5%, a rise of 4.3%.

- **Terminal value.** In models such as FCFE, a large part of value comes from the **terminal value**, so the horizon and the long-term growth assumption matter a great deal.
- **Financing.** Financing choices matter less than operating and strategic decisions. A valuation driven mainly by financing deserves skepticism.

COMMON EXAM TRAPS

- Equating the same revenue forecast with the same margin: with revenue fixed, faster cost growth lowers the margin and slower cost growth raises it. In the example, keeping the 30% margin when costs grow 6% overstates the 29.3% that results.

- Comparing growth rates alone: slower investment growth raises FCFE only if the dollar increase in investment is smaller than the dollar increase in income, as it is when investment starts below income.
- The terminal value is discounted from the period in which it is measured; a value at $t = 1$ is discounted one period. In the price-target example, discounting the terminal value of 840 two periods gives a total of 730.58, or \$18.26 per share, instead of 800 and \$20.00.

EXAM SHORTCUTS

- "Sell-side" and "buy-side" say who produces a report and nothing about its recommendation, so an answer that links sell-side research to sell ratings can be eliminated.

BOTTOM LINE

- An initiating-coverage report is thorough because readers may know little about the company, while subsequent reports are shorter updates often triggered by expected events such as earnings releases, and the front page is written last.
- The financial analysis and valuation section shows only the measures that support the price target, which is set by intrinsic value from several valuation techniques and can be absolute or relative, a point or a range, usually over one to two years.
- As a rough guideline, a stock expected to rise by at least about 10%–15% (in absolute terms or relative to a benchmark) is a buy, one expected to fall by at least that much is a sell, and one in between is a hold.
- A subsequent report gives the recommendation with the rationale for any change, variance analysis of expected versus actual results, and changes to the valuation and risks, and every report should distinguish facts from opinions and disclose potential conflicts of interest.
- Sell-side research is produced by investment banks and brokers for clients in a standardized format under conflict-of-interest constraints, whereas buy-side research is produced by investing firms for internal use, is customized and is mostly unregulated because it is not published.
- Sell-side coverage tilts toward stocks that generate trading volume and its recommendations are mostly buy or hold and in line with the consensus, while the buy side has more scope to cover smaller stocks and includes activist short selling.
- Analysts using the same model can reach different values through their assumptions on revenue and costs, capital investment, the terminal value and financing, and a valuation driven mainly by financing deserves skepticism.
- Exam convention: when investment grows at the same rate as net income, free cash flow shows no overall change; current practice: equal dollar increases leave free cash flow unchanged, while equal percentage growth makes their difference grow at that rate.

QUICK CHECK

Question 1

Which of the following statements about the front page of a report initiating coverage of a company is *most accurate*?

- A** It is written last, even though it is the first page investors read.

- B** It leaves out the recommendation so readers study the analysis first.
- C** It contains the full financial statement analysis behind the target.

Answer: A

Although it appears first, the front page is written last because it summarizes the whole report: the buy/hold/sell recommendation and price target, the investment thesis, the company's name, ticker, sector, market capitalization and float, recent developments, and summary financial data. Each of these is covered in more detail later in the report.

Why the other options are wrong

- **B.** The recommendation and price target are the main items the front page shows.
- **C.** The front page carries only a summary of recent and forecast financial data; the detailed analysis is in the financial analysis and valuation section.

Key takeaway The front page summarizes the recommendation, target, thesis and key data. It is the first page read and the last written.

Practice questions

Question 2

Compared with a report initiating coverage, a subsequent company research report is *most likely* to emphasize:

- A** variance analysis comparing forecast and actual results.
- B** a full introduction to the company's revenue and expense drivers.
- C** a detailed overview of the industry and competitive positioning.

Question 3

Which of the following is more characteristic of sell-side analysts than of buy-side analysts? Sell-side analysts tend to:

- A** keep their final investment conclusions confidential.
- B** specialize in activist short-selling strategies.
- C** issue recommendations in line with the market consensus.

Question 4

Selin Arslan covers a company with revenue of \$48 million and operating costs of \$30 million, an operating profit margin of 37.5%. She forecasts revenue growth of 4% for next year and assumes the company will benefit from economies of scale. The operating profit margin Arslan forecasts for next year will *most likely*:

- A** stay at 37.5%, because operating costs are expected to grow in line with revenue.
- B** decline, because new capital investment will be charged immediately against operating profit.
- C** increase, because operating costs are expected to grow more slowly than revenue.

Answers: 2. A · 3. C · 4. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/equity-analyst-research-reports/. The full bank has 24 questions on this reading.

credguild.com

EQUITIES · READING 50

The Capital Asset Pricing Model, Market Model, and Other Factor-Based Equity Models

What you'll learn

LOS 50.a Explain how the CAPM, the market model, adjusted and comparables-based betas, market risk premium estimates and country risk premiums are used to estimate a company's required return on equity.

LOS 50.b Describe arbitrage pricing theory and multifactor models such as the four-factor model, and interpret factor betas.

MODULE 50.1

Estimating the Cost of Equity With the Market Model and CAPM

This reading shows how to estimate the required return on equity with the CAPM: estimating and adjusting beta, unlevering and relevering a peer beta, estimating the market risk premium and adding a country risk premium. It then covers arbitrage pricing theory and the four-factor model, including how to calculate an expected return from factor betas and premiums and how to read their signs.

LOS 50.a — Estimating the required return on equity with the CAPM and the market model

The **required rate of return** (cost of equity) is the discount rate in equity valuation models, so it must reflect the risk of the investment.

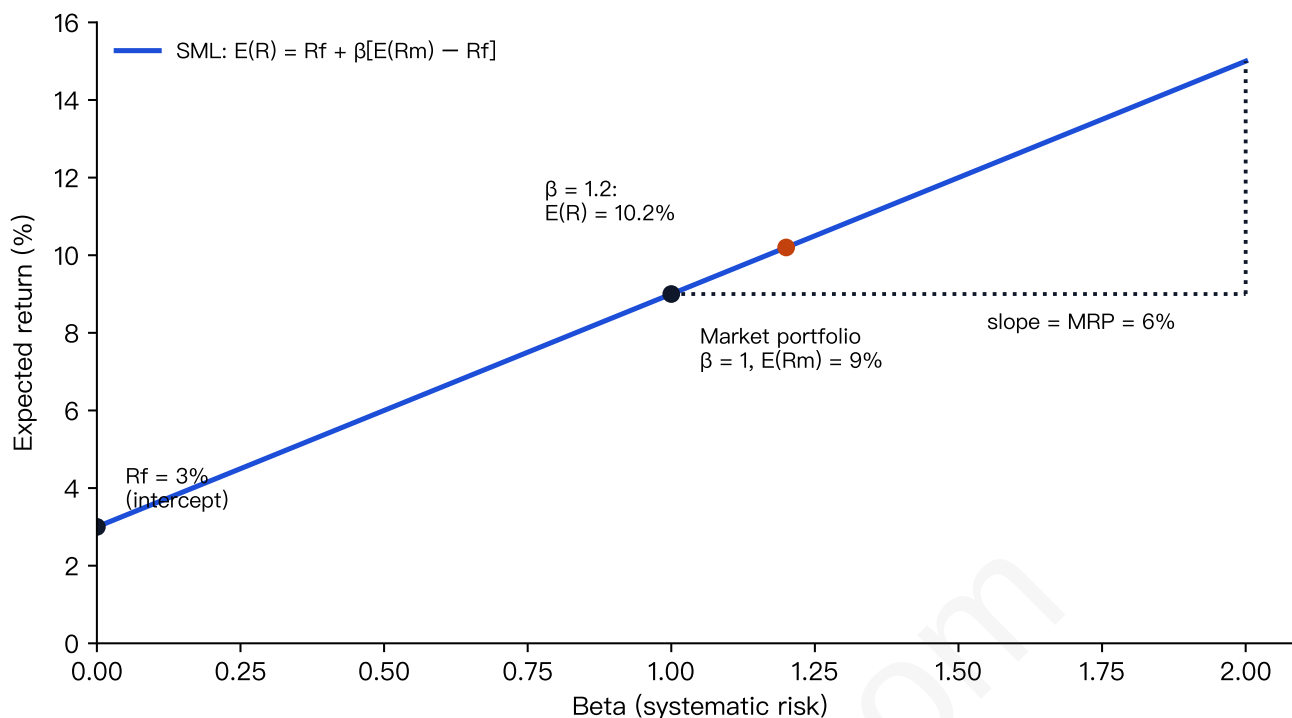
CAPM and the security market line

The **capital asset pricing model (CAPM)** is a single-factor model. Only **systematic risk (beta)** is priced:

KEY CONCEPT

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

$E(R_m) - R_f$ is the **market risk premium (MRP)**. Plotted against beta, the CAPM is the **security market line (SML)**. Its intercept is the risk-free rate and its **slope is the market risk premium**. The SML shifts over time as the risk-free rate and return expectations change.



The security market line with $R_f = 3\%$ and $E(R_m) = 9\%$

Beta can be computed from correlation and volatilities: $\beta_i = \rho_{i,m} \sigma_i / \sigma_m$. *Example.* With $\sigma_i = 30\%$, $\rho = 0.60$ and $\sigma_m = 15\%$, beta is 1.20. If $R_f = 3\%$ and $E(R_m) = 9\%$, then $E(R_i) = 3\% + 1.2(6\%) = 10.2\%$.

Estimating beta: excess-return regression and market model

Beta is estimated by regressing the stock's returns on a market proxy (e.g., a broad index) over a **lookback period** (e.g., five years of monthly data):

- Excess-return form: $(R_{i,t} - R_{f,t}) = \alpha + \beta_i(R_{m,t} - R_{f,t}) + \varepsilon_t$
- Market model** (actual returns): $R_{i,t} = \alpha + \beta_i R_{m,t} + \varepsilon_t$, which gives similar beta estimates.

Reading the output: the **standard error of beta** measures statistical noise, and a higher standard error means a less reliable estimate. R^2 measures explanatory power. Exam convention: $\sqrt{R^2}$ is described as the stock-index correlation. Current practice: $\sqrt{R^2}$ gives the correlation's magnitude; the sign follows beta (positive beta: positive correlation; negative beta: negative correlation).

The length of the lookback period involves a trade-off. A longer sample lowers the standard error. If it reaches back to a time when the company's business or capital structure was different, however, the beta describes a risk profile that no longer applies.

Adjusted beta (mean reversion)

Beta is estimated from past data, but the cost of equity it produces is used to discount future cash flows. Market model betas tend to revert toward 1.0. An **adjusted beta** is a weighted average of the raw beta and 1.0:

$$\text{adjusted beta} = \omega \times \text{raw beta} + (1 - \omega) \times 1.0, \quad \omega \text{ commonly } 2/3$$

Example. A raw beta of 1.45 gives $(2/3)(1.45) + 1/3 = 1.30$. A raw beta above 1 is adjusted down, and a raw beta below 1 is adjusted up. With the common fixed weight of 2/3, the adjustment does not depend on the length of the lookback period.

Beta from comparables (pure-play approach)

For private companies (no price history) or firms whose capital structure has changed significantly, analysts use peer betas. Estimating beta for an equally weighted portfolio of peers also reduces statistical noise and captures the industry's business risk. A company's beta reflects both business risk and financial risk, so it is a **levered beta**. Remove the peers' leverage, then add back the subject company's leverage:

KEY CONCEPT

$$\beta_U = \frac{\beta_{L,\text{peers}}}{1 + (1 - t_{\text{peers}}) \frac{D}{E}_{\text{peers}}} \quad \beta_{L,\text{subject}} = \beta_U \left[1 + (1 - t_{\text{subject}}) \frac{D}{E}_{\text{subject}} \right]$$

(D/E = debt to market value of equity.) The peers' average tax rate is used to unlever and the subject company's tax rate to relever. When all firms share one tax rate, the same t appears in both steps. *Example.* Peers have a beta of 1.25 and a D/E of 0.50, and $t = 20\%$, so $\beta_U = 1.25/1.40 = 0.893$. With a subject D/E of 0.25, $\beta_L = 0.893 \times 1.20 = 1.07$. Lower leverage than the peers means a lower levered beta.

Estimating the market risk premium

Approach	How	Watch out for
Historical	average past excess return of an index over the risk-free rate (arithmetic or geometric mean)	assumes the past is an unbiased guide. A boom sample overstates the MRP, which leads to lower valuations. The geometric mean is below the arithmetic mean.
Forward-looking	implied by current prices, via the constant growth model	high current prices produce a lower estimate

Because of these biases, the historical and forward-looking estimates can conflict, and the analyst should revisit the assumptions behind each one.

Choice of risk-free rate: short-term rates are normally lower than long-term rates, so a short-term rate produces a higher MRP. Because equity valuation is long-term, a long-term government rate is more appropriate.

Forward-looking (implied) estimate:

$$E(R_m) = \frac{D_1}{P_0} + g, \quad MRP = \frac{D_1}{P_0} + g - R_f$$

Example. A dividend yield of 1.8% and growth of 6.0% give $E(R_m) = 7.8\%$. With $R_f = 3.8\%$, the MRP is 4.0%.

Emerging markets: country risk premium

For stocks in developing markets, add a **country risk premium (CRP)**, stated in a reserve currency (e.g., USD or EUR), to the market risk premium inside the beta term:

KEY CONCEPT

$$CRP = \text{sovereign bond yield spread} \times \frac{\sigma_{\text{equity index}}}{\sigma_{\text{sovereign debt}}} \quad E(R_i) = R_f + \beta_i (MRP + CRP)$$

The sovereign yield spread is the country's reserve-currency bond yield minus the reserve-currency benchmark yield. The risk-free rate R_f is the benchmark (reserve-currency) yield. The emerging-market sovereign yield already contains the spread and is not used as R_f . *Example.* A spread of 3.0% with $\sigma_E = 21\%$ and $\sigma_D = 14\%$ gives a CRP of 4.5%. With $R_f = 3\%$, $\beta = 0.8$ and an MRP of 5%, $E(R) = 3\% + 0.8(9.5\%) = 10.6\%$.

COMMON EXAM TRAPS

- Adjusted beta: weight 2/3 on the raw beta, 1/3 on 1.0. Do not swap the weights or forget the 1/3 term. For the raw beta of 1.45, swapping the weights gives 1.15 and leaving out the 1/3 term gives 0.97, instead of 1.30.
- Unlever with the peers' D/E and tax rate, then relever with the subject's D/E and tax rate. The $(1 - t)$ adjustment appears in both steps. In the example, leaving out $(1 - t)$ in both steps gives an unlevered beta of 0.833 and a levered beta of 1.04, instead of 0.893 and 1.07.
- CRP: multiply the spread by σ_E/σ_D (equity volatility in the numerator), and put CRP inside the bracket multiplied by beta. In the example, inverting the volatility ratio gives a CRP of 2.0% and $E(R) = 8.6\%$, and adding the CRP outside the beta term gives 11.5%, instead of 10.6%.
- Forward MRP: subtract R_f . Dividend yield plus growth alone is the expected market return. In the example, stopping at the dividend yield plus growth gives 7.8% instead of an MRP of 4.0%.

EXAM SHORTCUTS

- Adjusted beta is a weighted average of the raw beta and 1.0, so it lies between them: a raw beta above 1 is adjusted down and one below 1 is adjusted up, and any answer outside that range can be ruled out.
- When the subject and its peers share one tax rate, a subject with lower leverage than the peers has a lower levered beta than theirs, and one with higher leverage a higher beta.

BOTTOM LINE

- The CAPM, $E(R_i) = R_f + \beta_i[E(R_m) - R_f]$, prices only systematic risk, and its security market line has the risk-free rate as intercept and the market risk premium as slope.
- Beta equals $\rho_{i,m}\sigma_i/\sigma_m$ and is estimated by regressing the stock's returns on a market proxy over a lookback period, where a longer sample lowers the standard error but may describe a business or capital structure that no longer applies.
- Exam convention: the square root of R^2 is described as the stock-index correlation; current practice: it gives the correlation's magnitude, and the sign follows the sign of beta.
- Adjusted beta is $\omega \times \text{raw beta} + (1 - \omega) \times 1.0$, with ω commonly 2/3, because market model betas tend to revert toward 1.0.

- In the pure-play approach the peers' levered beta is unlevered with the peers' D/E and tax rate and relevered with the subject company's D/E and tax rate, the $(1 - t)$ term appearing in both steps.
- The forward-looking market risk premium is $D_1/P_0 + g - R_f$, a long-term government rate is the more appropriate risk-free rate, and for emerging markets the country risk premium, the sovereign yield spread times $\sigma_{\text{equity index}}/\sigma_{\text{sovereign debt}}$, is added to the MRP inside the beta term.

QUICK CHECK

Question 1

Eighteen months ago, Galloway Industries sold its stable consumer division and financed a large acquisition mostly with new debt. An analyst estimating Galloway's beta with the market model decides to lengthen the lookback period from 2 years to 8 years. This change will *most likely*:

- A make the beta more reliable, because a larger sample lowers statistical noise.
- B increase the amount of mean reversion built into the adjusted beta.
- C produce a beta that reflects a risk profile Galloway no longer has.

Answer: C

A longer lookback period gives a larger sample and a lower standard error of beta. However, most of the extra data now come from before Galloway's restructuring, when its business mix and leverage were different. The estimate will therefore describe past conditions rather than the company's future systematic risk.

Why the other options are wrong

- **A.** The standard error does fall with more observations, but a beta built largely on data from an obsolete business model and capital structure is a poorer guide to future risk.
- **B.** The mean-reversion adjustment is applied separately to the raw beta. With the usual fixed two-thirds weight on the raw beta, it does not change with the length of the lookback period.

Key takeaway A longer lookback period means less statistical noise but more stale data. After a major change in the business or capital structure, the stale data dominate, and a peer (pure-play) beta is usually the better choice.

MODULE 50.2

Arbitrage Pricing Theory

LOS 50.b — Arbitrage pricing theory and multifactor models

Why go beyond the CAPM?

Empirical studies show that a single market factor does not adequately explain why returns differ across stocks. This motivates models with several priced risk factors.

Arbitrage pricing theory (APT)

Arbitrage pricing theory (APT) is a framework for estimating expected equity returns with a **multifactor model**:

KEY CONCEPT

$$E(R_i) = R_f + \beta_{1i}f_1 + \beta_{2i}f_2 + \cdots + \beta_{ki}f_k$$

where β_{ki} is the beta of stock i to the kth risk factor and f_k is the risk premium for the kth risk factor.

APT is a **statistical factor model**: the theory leaves the choice of factors to the analyst, and researchers have tried both macroeconomic factors and company-specific (style or characteristic) factors. The table contrasts it with the CAPM.

KEY CONCEPT

	CAPM	APT
Number of factors	one	not specified
Identity of factors	the market portfolio (priced through the market risk premium)	not specified (macroeconomic, style or other company-specific factors)

The four-factor model

A widely used specification adds size, value and momentum factors to the market factor:

$$E(R_i) = R_f + \beta_{mkt} [E(R_m) - R_f] + \beta_{SMB} E(SMB) + \beta_{HML} E(HML) + \beta_{UMD} E(UMD)$$

Each nonmarket factor is the return on a **zero-cost, long-short portfolio** (equal amounts long and short):

KEY CONCEPT

Factor	Long	Short	Positive beta means...	Negative beta means...
Size (SMB, small minus big)	small-cap stocks	large-cap stocks	behaves like a small-cap stock	behaves like a large-cap stock
Value (HML, high-value minus low-value; high minus low book-to-market)	value stocks	growth stocks	value stock	growth stock
Momentum (UMD, up minus down)	recent winners	recent losers	benefits when recent winners keep outperforming	suffers when recent winners outperform

The betas on these long-short factors are expected to average about zero across stocks, so individual betas are often negative. The market beta, by contrast, averages 1.0, and a market beta of 1.0 means average market risk. Betas are estimated with a multiple regression on historical data.

The sign of a factor beta shows how the stock moves with that factor's long-short return. A stock with a negative beta on a factor tends to underperform when that factor's long side beats its short side. If a factor beta is not given, nothing can be concluded about how the stock responds to that factor.

Example. $R_f = 3\%$. Betas and premiums are market $0.9 \times 6\%$, size $0.5 \times 2\%$, value $-0.3 \times 4\%$, momentum $0.2 \times 5\%$.

$$E(R) = 3\% + 5.4\% + 1.0\% - 1.2\% + 1.0\% = 9.2\%$$

The stock behaves like a small-cap growth stock (size beta positive, value beta negative) with a mild momentum tilt.

Why multifactor models matter in equity investing

- *Estimating the cost of equity.* A multifactor expected return adds a premium for each factor exposure, so two stocks with the same market beta can have different required returns if one tilts toward small caps or value.
- *Describing a stock or portfolio.* The signs and sizes of the factor betas summarize its style (large or small, value or growth, momentum or contrarian) without looking at its holdings.
- *Choosing peers.* Firms with similar factor betas form a **statistical factor-based peer group** for multiples-based valuation (Reading 45). The caveat is that betas estimated from past data may not persist.

COMMON EXAM TRAPS

- Saying APT uses only macroeconomic factors, or that it specifies the factors. It specifies neither the number nor the identity.
- Expecting nonmarket factor betas to average 1 (that is the market beta), or confusing the risk-free rate with a beta.
- Mixing up the legs: size means long small caps, short large caps; value means long value stocks, short growth stocks; momentum means long recent winners, short recent losers.
- Dropping the sign of a negative factor beta when computing expected return. In the example, treating the value term as $+1.2\%$ gives 11.6% instead of 9.2% .

BOTTOM LINE

- A single market factor does not adequately explain why returns differ across stocks, which motivates multifactor models such as arbitrage pricing theory, $E(R_i) = R_f + \beta_{1i}f_1 + \dots + \beta_{ki}f_k$.
- APT is a statistical factor model that specifies neither the number nor the identity of its factors, whereas the CAPM has one factor, the market portfolio.
- The four-factor model adds size (SMB), value (HML) and momentum (UMD) factors to the market factor, and each of these three is measured by a zero-cost portfolio holding equal amounts long and short.
- A positive SMB beta means the stock behaves like a small-cap stock and a positive HML beta like a value stock, while negative betas point to large-cap and growth behavior, and a negative factor beta must keep its sign in the expected return.

- Betas on the long-short factors average about zero across stocks, so individual betas are often negative, while the market beta averages 1.0.
- Multifactor models are used to estimate the cost of equity (two stocks with the same market beta can have different required returns), to describe a stock's or portfolio's style, and to form statistical factor-based peer groups, although betas estimated from past data may not persist.

QUICK CHECK

Question 2

An analyst estimates the following four-factor model betas for Tidewater Logistics:

Four-factor model betas for Tidewater Logistics

Factor	Beta
Market	0.90
Size (SMB)	-0.30
Value (HML)	0.42
Momentum (UMD)	-0.15

Based on these betas, Tidewater is *most appropriately* characterized as a:

- A small-cap value stock.
- B large-cap growth stock.
- C large-cap value stock.

Answer: C

In the four-factor model the size factor (SMB) is the return on a zero-cost portfolio that buys small-cap stocks and shorts large-cap stocks. Tidewater's negative size beta (-0.30) means it tends to move inversely with small caps, which marks it as a large-cap stock. The value factor is long high book-to-market (value) stocks and short low book-to-market (growth) stocks; Tidewater's positive value beta (0.42) means it moves with value stocks. Together the two signs describe a large-cap value stock. The market beta (0.90) and momentum beta (-0.15) do not bear on the size or style classification.

Why the other options are wrong

- **A.** A small-cap stock would show a positive beta to the size factor, because it would move with the small-cap long side of that portfolio. Tidewater's size beta is negative (-0.30), so it behaves like a large-cap stock, even though its positive value beta does point to value.
- **B.** A growth stock would show a negative beta to the value factor, because it would move with the short (low book-to-market) side of that portfolio. Tidewater's value beta is positive (0.42), so the growth label is wrong, even though the large-cap part is right.

Key takeaway Size beta sign: + small, – large. Value beta sign: + value, – growth.

Practice questions

Question 3

A broad equity index currently offers a dividend yield of 2.2%, and its earnings and dividends are expected to grow at 5.5% a year over the long term. The risk-free rate is 3.1%. A forward-looking estimate of the market risk premium is *closest* to:

- A 4.6%.
- B 7.7%.
- C 10.8%.

Answers: 3. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/equities/the-capital-asset-pricing-model-market-model-and-other-factor-based-equity-models/. The full bank has 14 questions on this reading.

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The notes are the start. These are free on the site and do what a PDF cannot:

- **Diagnostic test:** 36 questions weighted like the exam, a score in each topic and the topics to start with.
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- **Practice questions:** 398 free questions with full explanations, scored as you answer. A free account answers any question in the bank, up to 50 new questions a day. credguild.com/cfa/level-1/practice/
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- **Mock exam:** 180 questions in two sessions, on the 2027 topic weights; the first one is free with an account.
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