LM06 · CORPORATE ISSUERS · CFA LEVEL I

Capital Structure

The mix of debt and equity that minimizes WACC and maximizes firm value

What This Reading Covers

An issuer funds its assets with a combination of debt and equity (plus, sometimes, preferred stock). LM06 answers three linked questions: (1) how do we **calculate** the blended cost — the Weighted-Average Cost of Capital; (2) what **factors** push that cost up or down; and (3) is there an **optimal** mix? You will meet the Modigliani–Miller propositions, static trade-off theory, pecking order, and market timing — the classical toolkit for thinking about capital structure.

Learning Outcome Statements

LOS a	Calculate and interpret the weighted-average cost of capital for a company
LOS b	Explain factors affecting capital structure and the weighted-average cost of capital
LOS c	Explain the Modigliani–Miller propositions regarding capital structure
LOS d	Describe optimal and target capital structures

Exam Tip: The WACC formula, the two Modigliani–Miller propositions (with and without taxes), and the static trade-off U-curve are tested heavily. Expect numerical WACC problems with *market-value* weights and an after-tax cost of debt.

LOS A · WEIGHTED-AVERAGE COST OF CAPITAL

The WACC Formula

The issuer's required rate of return is derived from its investors' required rates of return. Because debt has a priority claim and may be secured, it is *less risky* for investors and commands a *lower* required return than equity — which is residual. Therefore, for issuers: **cost of debt (r_d) < cost of equity (r_e)**. WACC is the weighted average of these two (plus preferred, if used).

$$\text{WACC} = w_d \cdot r_d \cdot (1 - t) + w_p \cdot r_p + w_e \cdot r_e$$

What the symbols mean

w_d, w_p, w_e	Weights of debt, preferred, equity in the capital structure (sum to 1)
r_d	Before-tax cost of debt — the required return on the firm's borrowings
r_p	Cost of preferred stock (dividends are *not* tax deductible)
r_e	Cost of equity — equity investors' required rate of return
t	Marginal tax rate — applied only to interest, because interest is tax-deductible in most jurisdictions

Why multiply r_d by (1 − t)?

Interest is tax-deductible in most jurisdictions, so every dollar of interest reduces taxes by t. The *effective* after-tax cost of debt is $r_d(1 - t)$. Preferred dividends and common dividends are *not* deductible — no tax adjustment.

WACC interpretations

- The overall cost (opportunity cost) of the firm's sources of capital.
- The appropriate discount rate for projects with risk similar to the firm.
- Also called the **marginal cost of capital (MCC)** — applied to the next dollar of funding.

Exam Tip: On exam day, always check whether the question gave you a *pre-tax* or *after-tax* cost of debt — and never multiply r_e or r_p by (1 − t).

LOS A · WEIGHTS & WORKED WACC

Market-Value vs Book-Value Weights

Weights can be drawn from either market values or book (target) values. Because investors' opportunity costs are based on market values, **market-value weights are the starting point**. Target weights, when disclosed, can be used instead — management often expresses targets in book-value terms because market values fluctuate.

Market-Value Weights (Preferred)

Use current market values of debt, preferred, and equity. Reflects investors' *opportunity cost*. Captures current market conditions.

Book / Target Weights

Use balance-sheet amounts (or management's stated target). Less common for WACC, but management often sets targets in book values because market values are volatile.

WORKED EXAMPLE

Issuer balance sheet: Bonds $400,000 | Common stock 40,000 shares at $600,000 book | Pre-tax r_d = 5% | r_e = 10% | t = 20%. Current price = $20/share.

BASIS	D	E	TOTAL	W_D	W_E
Book value	400,000	600,000	1,000,000	0.40	0.60
Market value @ $20	400,000	800,000	1,200,000	0.333	0.667

SOLUTION

Market-value WACC = 0.333 × 5%(1 − 0.20) + 0.667 × 10% = 1.333% + 6.667% = **8.00%**

If stock price rises to $25 \rightarrow E = 40,000 \times 25 = 1,000,000$, Total = 1,400,000, so w_d = 0.286, w_e = 0.714.

New WACC = 0.286 × 4% + 0.714 × 10% = 1.143% + 7.143% = **8.29%**. As share price rises, equity weight rises → WACC rises toward r_e.

Other capital sources

Preferred stock and non-controlling interests should also be included in WACC when present. The general form becomes WACC = $w_d r_d(1-t) + w_p r_p + w_e r_e$.

LOS A · ESTIMATING R_D AND R_E

Estimating the Component Costs

Cost of Debt (r_d)

The interest rate on existing debt is a starting point, but the estimate should be **forward looking**. Use:

1. The **yield to maturity (YTM)** on the firm's outstanding debt (current market yield on bonds already issued).
2. The cost of **recent borrowing** by the company, or the cost of a **comparable new issue** from similar companies, if YTM on outstanding debt is stale.

Then convert to after-tax: $\mathbf{r_d(1 - t)}$, because interest is tax-deductible in most jurisdictions. Preferred dividends are not deductible — no tax adjustment for r_p.

Top-down decomposition: r_d = risk-free rate (sovereign yield) + spread (compensation for issuer-specific risks).

Cost of Equity (r_e)

No historical interest rate to observe — must be estimated. The source describes three methods:

CAPM

$$r_e = r_f + \beta \cdot ERP$$

The risk-free rate plus beta times the equity risk premium. Most common exam method.

DIVIDEND DISCOUNT MODEL

$$r_e = (D_1/P_0) + g$$

Next-year dividend over price, plus sustainable growth. Requires a reliable dividend stream.

BOND-YIELD-PLUS-RISK-PREMIUM

$$r_e = r_d + riskpremium$$

Add an equity-over-debt risk premium (often 3–5%) to the firm's own bond yield. Rough check.

Starting point: historical returns

For cost of equity, analysts typically start from **historical returns on equity** in general (a market index). These feed into r_f, ERP, and β inputs used in CAPM.

Exam Tip: Remember: debt investors receive contractual interest — so r_d is observable. Equity investors have a

residual claim — so r_e must be *modeled*.

LOS A · WORKED EXAMPLE

Worked Example — Compute WACC

WORKED EXAMPLE

Given (IFT example): A firm has capital structure of 20% debt, 10% preferred stock, 70% equity. Before-tax r_d = 6%, r_p = 8%, r_e = 12%, marginal tax rate = 30%. Calculate WACC.

SOLUTION

WACC = $w_d \cdot r_d \cdot (1 - t) + w_p \cdot r_p + w_e \cdot r_e$

$$= (0.20)(0.06)(1 - 0.30) + (0.10)(0.08) + (0.70)(0.12) \\ = (0.20)(0.06)(0.70) + 0.008 + 0.084 \\ = 0.0084 + 0.008 + 0.084 \\ = \mathbf{0.1004 = 10.04\%}$$

WORKED EXAMPLE

Primary example: Corporation financed with $40m debt, $60m equity. Pre-tax r_d = 4%, r_e = 10%, marginal tax = 23%.

SOLUTION

w_d = 40/100 = 0.40, w_e = 60/100 = 0.60

$$\text{WACC} = 0.40 \times 4$$

WORKED EXAMPLE

Tax-rate sensitivity: 30% debt, 70% equity, pre-tax r_d = 6%, r_e = 12%. Tax rate rises from 20% to 25%.

SCENARIO	AFTER-TAX R_D	WACC
t = 20%	6%(1 − 0.20) = 4.80%	(0.30)(4.80%) + (0.70)(12%) = **9.84%**
t = 25%	6%(1 − 0.25) = 4.50%	(0.30)(4.50%) + (0.70)(12%) = **9.75%**

Higher tax → larger tax shield on debt → WACC falls by **9 bps**.

Management's objectives in capital-structure decisions

1. **Minimize WACC** (because minimizing the required return maximizes NPV at a given return).
2. **Match liquidity/time horizon** with that of capital investments.

QUIZ 1 · WACC MECHANICS

Test Your Understanding: WACC Formula & Weights

Q1. A firm is financed 40% debt and 60% equity. Pre-tax cost of debt is 5%, cost of equity is 11%, marginal tax rate is 25%. What is the WACC?

Q2. Which weights are *preferred* when estimating WACC for current opportunity cost, per the curriculum?

Q3. A firm has 20% debt (pre-tax r_d = 7%), 10% preferred (r_p = 9%), 70% common (r_e = 13%), marginal tax rate 40%. Compute WACC.

Q4. The cost of equity in CAPM is written as:

LOS B · FACTORS AFFECTING CAPITAL STRUCTURE & WACC

Factors That Shape Capital Structure

Two families of factors drive both capital structure and WACC: the **amount and type of financing needed**, and the **costs of debt and equity**.

FAMILY	DRIVERS
Amount & type needed	Business model (capital intensive vs capital light); stage in life cycle (start-up / growth / mature)
Cost of debt & equity	Top-down / macro factors (financial markets, industry); issuer-specific factors (sales risk, operating leverage, financial leverage, collateral)

Business Model

Capital Intensive

e.g. utilities, transportation, real estate

- High CAPEX-to-sales, high working-capital-to-sales, low asset turnover
- Assets often leased (cheaper implicit rate; asset = collateral)
- Regulated industries (banks, utilities): regulator may dictate structure (e.g., minimum % equity → generally raises WACC)
- High leverage used *irrespective of life-cycle stage*

Capital Light

e.g. technology, service businesses

- Low capital needs; high fixed-asset turnover
- Operate networks for others (Uber, Airbnb)
- Upfront payments → *negative* cash conversion cycle
- Employee comp often in stock → less cash need
- Very little debt used in capital structure

Top-Down (Macro) Factors

Debt investors' required return = risk-free rate + spread. Macroeconomic conditions (real growth, inflation, monetary policy, FX) move both R_F and spreads:

- Increase in recession risk → spreads widen → r_d ↑; lower stock prices → r_e ↑. Cost of debt and cost of equity move together because they are claims on the same cash flows.
- Bigger impact on **cyclical** sectors than non-cyclical.
- Industry-specific factors matter (e.g., oil price helps oil producers but hurts airlines).

Issuer-Specific Factors

FACTOR	DIRECTION OF EFFECT
Sales risk	Stable / predictable / growing revenue → lower risk → lower cost of financing (e.g., subscription telecoms < construction)
Operating leverage	Higher proportion of *fixed costs* → higher operating leverage → larger profit swing for a given revenue swing → higher risk
Financial leverage & interest coverage	Higher debt levels → higher financial leverage → higher risk. Interest coverage = EBIT / interest expense
Collateral / asset type	Strong collateral, cash-generating, fungible/liquid assets (real estate, aircraft, receivables) → support more debt

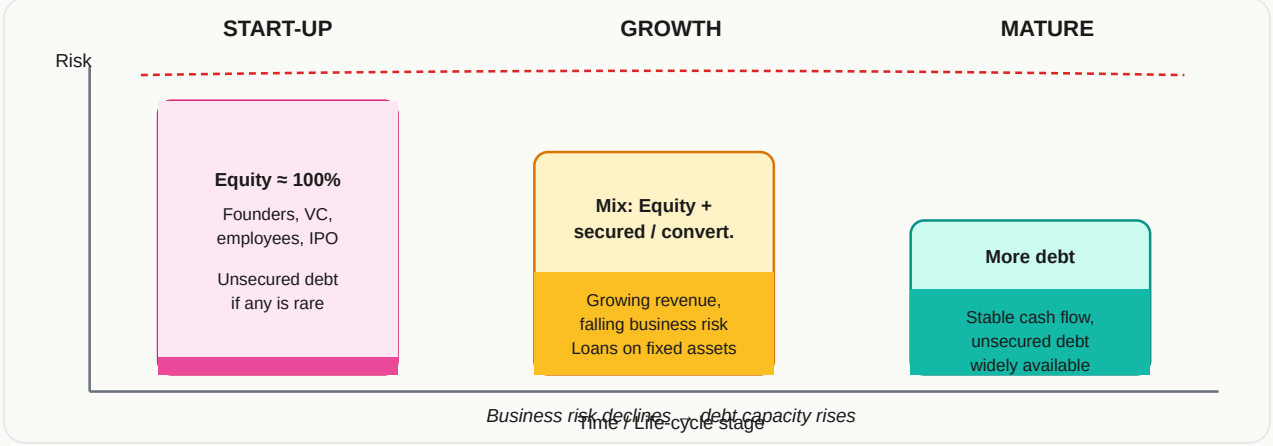
Cost of capital is highest when:

Revenue is *unstable*, operating leverage is *high*, and interest coverage is *low*.

LOS B · LIFE-CYCLE PATTERNS

Capital Structure Through the Life Cycle

As a company matures from start-up → growth → maturity, business risk typically decreases and operating cash flows turn positive and more predictable. This enables greater use of leverage at more favorable terms.



Start-up

Financed **almost exclusively with equity** (founders, VCs, IPO). Unsecured debt is rare. High-growth firms with rising stock prices may issue *convertible debt*.

Growth

Rising revenue and cash flow, declining business risk → investors willing to lend, often **secured by fixed assets or receivables**. Mix of equity and debt.

Mature

Lower business risk and high, stable cash flow → **debt financing, including unsecured debt, widely available at relatively low cost**.

Two exceptions to the pattern

- **Capital-intensive** businesses use high leverage irrespective of maturity stage.
- **Capital-light** businesses use very little debt even when mature.

Exam Tip: Cyclical industries: more capital-structure pressure from the macro cycle. Non-cyclical / subscription-based firms can sustain higher debt.

LOS C · MODIGLIANI–MILLER (NO TAXES)

Modigliani–Miller: The No-Tax World

Franco Modigliani and Merton Miller (1958) showed that under *certain assumptions*, a company's choice of capital structure is **irrelevant** in determining its value.

The five MM assumptions

1. **Homogeneous expectations** — all investors agree on future cash flows.
2. **Perfect capital markets** — no transaction costs, no taxes, no bankruptcy costs, same information for everyone.
3. **Risk-free rate exists** — everyone can borrow and lend at the risk-free rate.
4. **No agency costs** — managers always act to maximize shareholder wealth.
5. **Independent decisions** — financing and investment decisions are independent.

These assumptions are extremely restrictive — as they are relaxed, factors that do impact value emerge.

MM Proposition I (no taxes) — Capital Structure Irrelevance

$$V_L = V_U$$

The value of the *levered* firm equals the value of the *unlevered* firm. Intuition:

1. If $V_L \neq V_U$, arbitrage would drive them back to equality: sell the overvalued, buy the undervalued.
2. Firm value is determined solely by **expected future cash flows**, not by how those cash flows are split between debt and equity.
3. If shareholders want leverage, they can create it *themselves* by borrowing (homemade leverage).

MM Proposition II (no taxes) — Cost of Equity Rises Linearly

$$r_e = r_0 + (r_0 - r_d) \cdot (\mathrm{D/E})$$

As cheaper debt is added, financial risk increases and r_e rises linearly with D/E. The increase in r_e exactly offsets the lower-cost debt, so **WACC is constant**.

r_0	Cost of capital for an all-equity-financed company (zero debt)
$(r_0 - r_d)$	Spread between unlevered cost and cost of debt

D/E	Debt-to-equity ratio — the leverage multiplier

WORKED EXAMPLE

Worked (no-tax): All-equity firm with WACC = 10%, perpetual cash flow €5,000. Issues €15,000 debt at r_d = 5%, uses proceeds to buy back shares.

SOLUTION

V_U = 5,000 / 0.10 = €50,000. Post-buyback V_L = €50,000 (Prop I).

New equity = 50,000 − 15,000 = €35,000.

$$r_e = 10$$

Check WACC: (15,000/50,000)(5%) + (35,000/50,000)(12.143%) = 1.5% + 8.5% = **10% (unchanged)**.

LOS C · MODIGLIANI–MILLER (WITH TAXES)

Modigliani–Miller: Adding Taxes

Relax the no-tax assumption. Interest is tax-deductible in most jurisdictions — dividends are not. Debt generates a **tax shield** worth $t \cdot D$.

MM Proposition I (with taxes)

$$V_L = V_U + t \cdot \mathrm{D}$$

The value of a levered firm exceeds the value of an unlevered firm by the present value of the tax shield, t·D. Interest payments save cash taxes equal to t per unit of interest.

MM Proposition II (with taxes)

$$r_e = r_0 + (r_0 - r_d)(1 - t) \cdot (\mathrm{D}/\mathrm{E})$$

Cost of equity still increases with leverage, but at a *slower* rate than in the no-tax case because of the (1 − t) damping. The result: **WACC falls monotonically as leverage rises**, and the "optimal" capital structure under these assumptions is implausibly *100% debt* — unless we also recognize costs of financial distress.

Why 100% debt is not really optimal

MM with taxes ignores the **costs of financial distress**:

- **Indirect** — loss of suppliers, customers, employees; foregone investments.
- **Direct** — legal and administrative bankruptcy costs.

These costs grow as leverage rises and eventually overwhelm the tax-shield benefit — motivating the static trade-off theory.

WORKED EXAMPLE

Worked (with taxes): Same firm as before, but now corporate tax rate t = 25%. Perpetual after-tax cash flow is 5,000(1 − 0.25) = €3,750. $WACC_U$ = 10%, r_d = 5%. Firm issues €15,000 debt to buy back equity.

SOLUTION

V_U = 3,750 / 0.10 = €37,500

$V_L = V_U + t \cdot D = 37{,}500 + 0.25 \times 15{,}000 =$ **€41,250** (tax shield adds €3,750)

Equity after buyback = 41,250 − 15,000 = €26,250

$$r_e = 10$$

$$\text{WACC} = (15{,}000/41{,}250) \times 5$$

WACC falls from 10% (all-equity) to 9.09% once the tax shield is captured.

LOS D · STATIC TRADE-OFF & OPTIMAL STRUCTURE

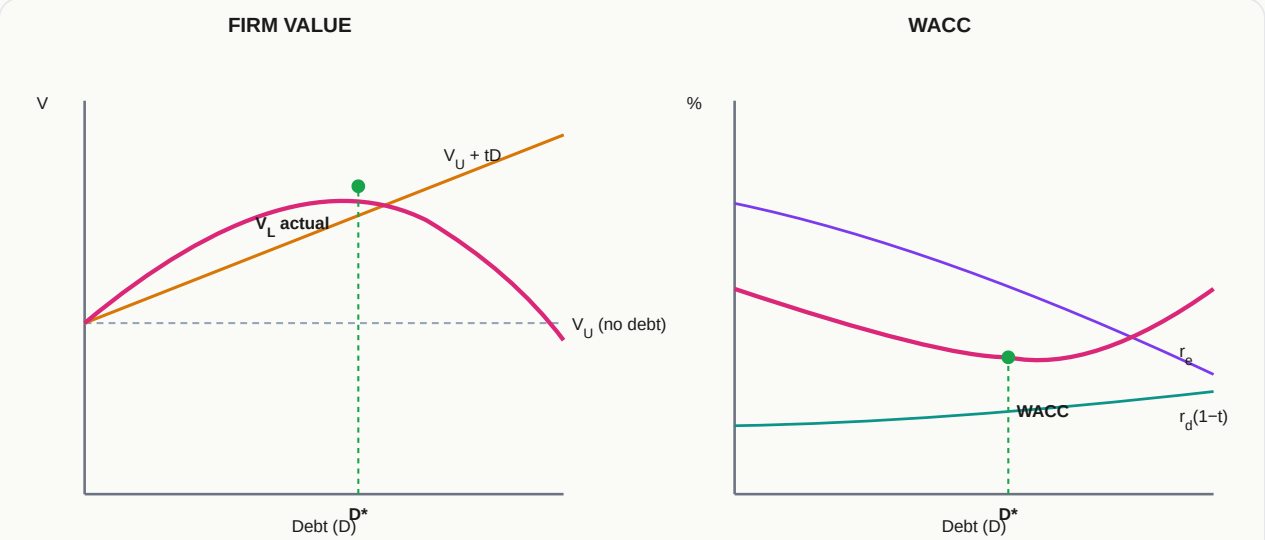
Static Trade-Off Theory & the Optimal Structure

The static trade-off theory balances the **value of the tax shield** against the **present value of costs of financial distress**:

$$V_L = V_U + t \cdot \mathrm{D} - \mathrm{PV}(costsoffinancialdistress)$$

At low debt levels, the marginal tax benefit exceeds the marginal increase in distress costs — firm value rises as D rises. At high debt levels, the increase in distress costs dominates — firm value falls. The **optimal level of debt (D*)** is where these marginal effects balance.

WACC U-CURVE AND FIRM VALUE — STATIC TRADE-OFF



At low levels of debt

Tax-shield benefit of adding debt > increase in PV(distress costs). Firm value rises, WACC falls.

At high levels of debt

Increase in PV(distress costs) > tax-shield benefit. Firm value falls, WACC rises.

D* — the optimal level of debt

Maximizes firm value and **minimizes WACC**. At D*, the incremental tax benefit is exactly offset by the incremental cost of financial distress. Finding D* requires estimating both the tax shield and PV(distress) — not directly observable, so firms generally operate within a *range* around D*.

Exam Tip: Optimal structure depends on the firm's business risk, tax rate, corporate governance, industry influences, and other factors — not a universal number.

QUIZ 2 · MM & TRADE-OFF

Test Your Understanding: MM Propositions & Optimal Structure

Q5. Under MM Proposition I *without taxes*, what happens to firm value as a company substitutes debt for equity?

Q6. A firm has unlevered cost of capital r_0 = 10%, pre-tax r_d = 5.5%, D/E = 0.75. Under MM Prop II *without taxes*, the cost of equity is:

Q7. Same firm as Q6 but now t = 25%. Under MM Prop II *with taxes*, the cost of equity is:

Q8. An all-equity firm has value €100m. It issues €40m of debt to buy back equity. Corporate tax rate = 25%. Per MM Proposition I *with taxes*, the levered firm value is:

Q9. According to the static trade-off theory, the optimal capital structure (D*) is the level at which:

Q10. Which assumption is *not* part of the original MM framework?

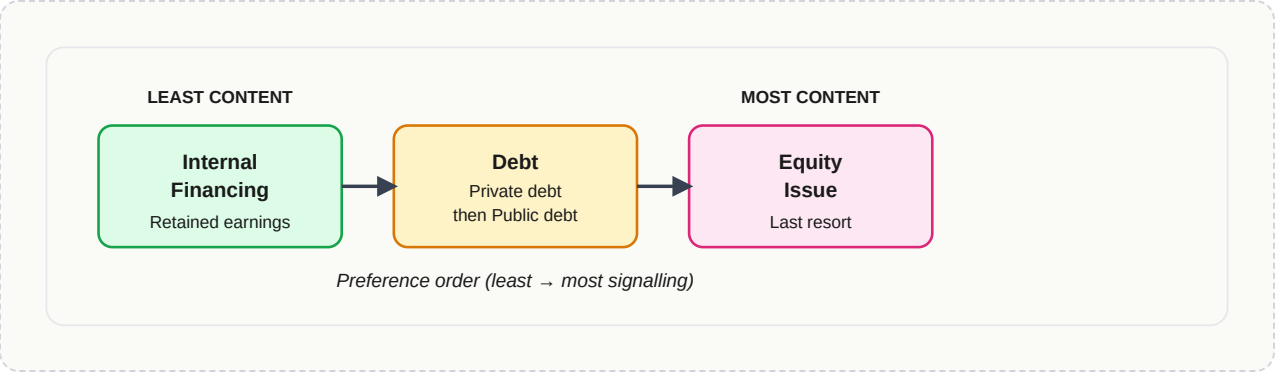
LOS D · ALTERNATIVES TO STATIC TRADE-OFF

Pecking Order, Agency Costs & Market Timing

MM's homogeneous-information world is a fiction. In reality, **management has more information than investors** (asymmetric information). The greater the asymmetry, the higher the return investors demand. Two important behavioral theories follow.

Pecking Order Theory (Myers)

Managers prefer financing methods with the **least potential information content** — the least signal to outsiders.



Interpreting financing choices:

ACTION	SIGNAL	REASONING
Equity issuance	Negative	Management may believe shares are overvalued; also, needing to raise capital despite cost is negative
Debt issuance	Positive	Confidence in taking on obligation to pay interest

Agency Costs & Free Cash Flow Hypothesis

Agency costs are incremental costs from conflicts of interest among managers, shareholders, and bondholders. **Increased debt may reduce agency costs of equity**: more debt → less free cash for managers to waste → management runs the company more efficiently (*Free Cash Flow Hypothesis*).

Market-Timing Theory

Firms issue **equity when they perceive shares to be temporarily overvalued**, and issue **debt when interest rates are thought to be temporarily low**. They may repurchase stock when management judges

it undervalued. Investors infer from these decisions whether management believes the firm is over- or undervalued. Taking on fixed interest payments signals confidence.

Exam Tip: Connect theories: MM (no taxes) says structure is irrelevant. MM (with taxes) says more debt is always better. Static trade-off adds distress costs to find an optimum. Pecking order is driven by information asymmetry. Market timing adds behavioral/opportunistic dimensions.

LOS D · TARGET VS ACTUAL STRUCTURE

Target Capital Structure — Actual vs Target

To maximize value, a firm aims for a **target capital structure** — management's beliefs about the optimal mix. In practice, the *actual* structure fluctuates around the target because the firm's debt and equity market values fluctuate and managers may exploit short-term opportunities.

Why actual deviates from target

1. **Short-term opportunities** — management takes advantage of attractive rates or over- / under-valued stock prices (market-timing behavior).
2. **Changing market values** — a change in share price or bond price automatically changes the market-value capital-structure weights, even when no new security is issued.
3. **Transaction costs / minimum issue sizes** — make it impractical to hit a specific number continuously, so the target is typically a *range*.

Why management expresses targets in book values

- Market values fluctuate substantially and "seldom impact the appropriate level of borrowing."
- Primary concern is the amount and types of capital *invested by* the company, not *in* the company.
- Capital-structure policy is aligned to measures used by third parties (e.g., rating agencies).

Estimating target capital structure when not disclosed

Analysts can estimate the target by:

1. Using the firm's **current market-value capital structure** as a proxy for the target.
2. Examining **trends** in the capital structure or **management statements** about capital-structure policy.
3. Using the **average of comparable companies**' capital structures.

WORKED EXAMPLE

Example — estimating from peers. Company G: $50m debt$,60m equity. Competitors A, B, C averages.

FIRM	MV DEBT	MV EQUITY	W_D	W_E

Company G (current)	50	60	0.455	0.545
Competitor A	25	50	0.333	0.667
Competitor B	101	190	0.347	0.653
Competitor C	40	60	0.400	0.600
Avg of competitors	—	—	**0.360**	**0.640**

Using a target D/E of 0.7: $w_d = 0.7/1.7 = 0.412$, $w_e = 1/1.7 = 0.588$.

Active vs passive management of structure

Active: management actively issues or repurchases to stay near the target. Passive: structure drifts with market values and is rebalanced only when deviations become material. Costs of being *below* optimal debt are relatively small; costs of being *too leveraged* can be large.

LOS A + D · WACC FROM A TARGET CAPITAL STRUCTURE

Integrated Example — WACC from Target

WORKED EXAMPLE

Given. A manufacturing firm has:

Target D/E	0.5 (so $w_d = 0.333$, $w_e = 0.667$)
YTM on outstanding debt	$r_d = 6.0\%$
r_f	3.0%
β	1.20
Equity risk premium	5.5%
Marginal tax rate	t = 25%

Find: WACC using the target capital structure.

SOLUTION

Step 1 — cost of equity via CAPM:

$$r_e = r_f + \beta \times ERP = 3.0$$

Step 2 — after-tax cost of debt:

$$r_d(1 - t) = 6.0$$

Step 3 — target weights from D/E = 0.5:

$$w_d = 0.5/1.5 = 0.3333; w_e = 1/1.5 = 0.6667$$

Step 4 — WACC:

$$\text{WACC} = 0.3333 \times 4.5$$

Interpretation. 7.90% is the required return on the firm's aggregate invested capital. Use it as the discount rate for projects with similar risk. If the firm is currently more heavily levered than its target

(say D/E = 0.75), market-value WACC would be *lower* (more weight on cheaper debt) — but for valuation we use the target, which management believes reflects the optimal D*.

When to use which weight

- **If the firm discloses a target** → use it.
- **Otherwise** → use current market-value weights (or peer averages, or trend estimates).
- Never mix pre-tax r_d with (1 − t) already applied (double-count); never apply (1 − t) to r_e or r_p.

QUIZ 3 · INTEGRATED

Test Your Understanding: Theory + Target Structure

Q11. According to pecking order theory, which financing choice is the *least* preferred?

Q12. A firm has target $w_d = 0.30$, $w_e = 0.70$. Pre-tax $r_d = 6\%$, $t = 30\%$. Using CAPM with $r_f = 4\%$, $\beta = 1.10$, ERP = 5%, its WACC equals:

Q13. Which of the following best explains why the *actual* capital structure fluctuates around the target?

Q14. The free cash flow hypothesis argues that higher debt levels:

Q15. A firm with an all-equity value of 200*missues*80m of perpetual debt and uses the proceeds to repurchase equity. t = 20%. What is the levered firm value, and what is the approximate tax shield?

Q16. "When firms issue equity during a market rally and issue debt when interest rates are unusually low." This observation is most consistent with:

Q17. The cost of capital is highest for a firm whose:

MODULE COMPLETE

Your Scorecard

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LM06 Key Takeaways — Exam-Ready Cheat Sheet

WACC Formula

1. **WACC = $w_d \cdot r_d(1 - t) + w_p \cdot r_p + w_e \cdot r_e$.** Apply (1 − t) *only* to cost of debt; preferred dividends and common dividends are not tax-deductible.
2. **Market-value weights preferred** for current opportunity cost; target / book weights acceptable when disclosed.
3. **Cost of equity** — CAPM ($r_f + \beta \cdot ERP$), DDM ($D_1/P_0 + g$), bond-yield-plus-risk-premium (r_d + premium).
4. **Cost of debt** — YTM on outstanding debt, or comparable new-issue yield; convert to after-tax.

Factors & Life Cycle

5. **Amount & type** depend on business model (capital-intensive vs capital-light) and life-cycle stage (start-up / growth / mature).
6. **Costs** depend on top-down macro (risk-free + spread) and issuer-specific factors (sales risk, operating leverage, financial leverage, collateral).
7. **Life cycle:** start-up ≈ all equity → growth = mix (secured/convertible debt) → mature = more debt, unsecured, low cost.

Modigliani–Miller

8. **MM I (no taxes):** $V_L = V_U$. Capital structure is irrelevant. MM II: $r_e = r_0 + (r_0 - r_d)(D/E)$; WACC constant.
9. **MM I (with taxes):** $V_L = V_U + tD$ — tax shield adds value. MM II: $r_e = r_0 + (r_0 - r_d)(1 - t)(D/E)$; WACC falls monotonically — naive optimum is 100% debt.

Optimal & Target Structure

10. **Static trade-off:** $V_L = V_U + tD - PV(\text{distress})$. Optimal D* minimizes WACC; marginal tax benefit = marginal distress cost.
11. **Pecking order (Myers):** internal financing → debt → equity — driven by asymmetric information. Equity issuance = negative signal; debt = positive signal.
12. **Market timing:** issue equity when overvalued, debt when rates are low.
13. **Target vs actual:** actual deviates due to market value moves, short-term opportunities, and transaction costs. Estimate target from current market weights, trends/statements, or peer averages.

Last-Minute Exam Checklist

WACC: $w_d r_d(1-t) + w_p r_p + w_e r_e$ · **Weights:** market values preferred

CAPM: $r_e = r_f + \beta \cdot ERP$ · **DDM:** $r_e = D_1/P_0 + g$

MM I no-tax: $V_L = V_U$ · **MM II no-tax:** $r_e = r_0 + (r_0 - r_d)(D/E)$

MM I w/tax: $V_L = V_U + tD$ · **MM II w/tax:** $r_e = r_0 + (r_0 - r_d)(1-t)(D/E)$

Static trade-off: $V_L = V_U + tD - PV(\text{distress})$; WACC U-shaped at D*

Pecking order: internal → debt → equity · **Timing:** equity high, debt low rate