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CFA LEVEL I

Detailed Formula Sheet



Corporate Issuers

Topic 4 of 10 • Fully Explained

💡 Plain-English explanations 📊 Worked examples 🧠 Memory hooks ⚠️ Exam traps

Corporate Structures

Working Capital & Liquidity

Cost of Capital (WACC)

Leverage & Breakeven

Capital Allocation

Capital Structure (MM)

10,000+

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★ Mentored by Deepak Goyal — CFA, FRM ★

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👉 **Topic 4 — Corporate Issuers!** How firms are **structured, financed, and valued** — WACC, leverage, capital budgeting, and the famous Modigliani–Miller propositions. Each card gives the formula, a **plain-English meaning**, a worked example, and **memory hooks**. 📖

💡 **In Plain English**

📊 **Worked Example**

🧠 **Memory Hook**

⚠️ **Watch Out**

📌 **Key Fact**

1 🏢 Corporate Structures & Governance

🏛️ Forms of Business

Sole Proprietorship → Partnership (General / Limited) → Corporation (Limited Company)

💡 In Plain English

Moving along the line: ownership separates from management, liability becomes **limited**, access to capital grows, and life becomes **perpetual**. A **corporation** is a separate legal "person" — owners (shareholders) risk only what they invest.

📌 Key Fact

Limited liability + perpetual life + easy transfer of ownership are the corporation's big advantages; the trade-off is potential **double taxation** (profits taxed, then dividends taxed).

👑 Stakeholders & Corporate Governance

Shareholders • Board • Management • Creditors • Employees • Customers • Suppliers • Government

💡 In Plain English

Corporate governance is the system of controls balancing all stakeholders' interests. The classic conflict is the **principal–agent problem**: managers (agents) may not always act in owners' (principals') best interest.

🧠 Memory Hook

"Shareholders own, the Board oversees, Management runs." Good governance keeps these aligned. 🕒

2 💧 Working Capital & Liquidity

🔄 Operating Cycle & Cash Conversion Cycle

Operating Cycle = DOH + DSO

Cash Conversion Cycle = DOH + DSO – Days Payables

💡 In Plain English

The **operating cycle** = days to turn inventory into cash from customers. The **cash conversion cycle** nets out how long you delay paying suppliers — the true number of days your own cash is tied up. **Shorter is better.**

📊 Worked Example

DOH 50 + DSO 40 = operating cycle **90 days**; minus days payables 30 → CCC = **60 days**.

Cost of Trade Credit (giving up a discount)

$$\text{Cost} = \left(1 + \frac{\text{Discount}}{1 - \text{Discount}}\right)^{(365 / \text{Days beyond discount period})} - 1$$

In Plain English

Terms like "2/10 net 30" offer a 2% discount if you pay in 10 days, else full price by day 30. Skipping the discount is effectively borrowing — and it's **shockingly expensive** on an annualized basis.

Worked Example

Terms 2/10 net 30 (20 extra days): $\text{Cost} = (1 + 0.02/0.98)^{365/20} - 1 \approx 44.6\%$. → Always take the discount if you can!

Key Fact

Liquidity ratios still apply here: $\text{Current} = \text{CA}/\text{CL}$, $\text{Quick} = (\text{Cash} + \text{ST} + \text{Receivables})/\text{CL}$, $\text{Cash} = (\text{Cash} + \text{ST})/\text{CL}$.

3 Cost of Capital (WACC)

Weighted Average Cost of Capital

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

In Plain English

The blended required return across all financing sources, each weighted by its share of capital. Only **debt gets the $(1 - t)$ tax shield** because interest is tax-deductible. WACC is the hurdle rate for new projects.

Worked Example

w_d 40%, r_d 6%, tax 25%; w_e 60%, r_e 12%:

$\text{WACC} = 0.40(6\%)(0.75) + 0.60(12\%) = 1.8\% + 7.2\% = 9.0\%$.

Watch Out

Use **target (or market-value) weights**, not book values, and the **marginal** (new-issue) cost of each source — not historical costs.

The Component Costs

$$\text{After-tax cost of debt} = r_d(1 - t) \quad | \quad \text{Cost of preferred} = \frac{D_p}{P_p}$$

$$\text{CAPM: } r_e = R_f + \beta[E(R_m) - R_f]$$

$$\text{DDM: } r_e = \frac{D_1}{P_0} + g \quad | \quad \text{Bond yield + risk premium: } r_e = r_d + \text{RP}$$

In Plain English

Three ways to estimate the cost of equity. **CAPM** uses systematic risk (beta); **DDM** uses dividend yield plus growth; **bond yield + risk premium** adds an equity cushion onto the firm's own debt yield.

Worked Example

CAPM: R_f 3%, β 1.2, ERP 5% → $r_e = 3\% + 1.2(5\%) = 9\%$.

DDM: D_1 \$2, P_0 \$40, g 5% → $r_e = 5\% + 5\% = 10\%$.

Preferred: D_p \$5, P_p \$50 → **10%**.

4 Leverage & Breakeven

Operating, Financial & Total Leverage

$$DOL = \frac{Q(P - V)}{Q(P - V) - F} \quad | \quad DFL = \frac{EBIT}{EBIT - \text{Interest}}$$

$$DTL = DOL \times DFL = \frac{Q(P - V)}{Q(P - V) - F - \text{Interest}}$$

In Plain English

DOL measures how fixed *operating* costs magnify a change in sales into a bigger change in EBIT. **DFL** measures how fixed *financing* costs (interest) magnify EBIT changes into bigger net-income swings. **DTL** combines both — total sensitivity of earnings to a sales change.

Worked Example

Q 10,000, P \$50, V \$30, F \$60,000, Interest \$40,000:

DOL = 200,000/140,000 = **1.43**; DFL = 140,000/100,000 = **1.40**; DTL = **2.00**.

Memory Hook

"Operating = Sales → EBIT; Financial = EBIT → EPS; Total = Sales → EPS." More fixed costs = more leverage = more risk. 📈

Breakeven Quantities

$$\text{Breakeven } Q_{BE} = \frac{\text{Fixed costs} + \text{Interest}}{P - V} \quad | \quad \text{Operating breakeven } Q_{OBE} = \frac{\text{Fixed costs}}{P - V}$$

In Plain English

The number of units needed to cover all costs. (P - V) is the **contribution margin** per unit. Operating breakeven ignores interest; total breakeven includes it.

Worked Example

Using the figures above: $Q_{BE} = (60,000 + 40,000)/20 = \mathbf{5,000 \text{ units}}$; $Q_{OBE} = 60,000/20 = \mathbf{3,000 \text{ units}}$.

5 Capital Allocation (Investment Decisions)

NPV & IRR

$$NPV = \frac{\sum CF_t}{(1 + r)^t} - \text{Initial Outlay} \quad | \quad \text{IRR: the rate where } NPV = 0$$

In Plain English

NPV = value created in today's dollars. **IRR** = the project's own break-even return. Accept if **NPV > 0** or **IRR > required return (WACC)**.

Worked Example

Invest \$1,000; receive \$500/yr for 3 yrs at 10%:

NPV = 500 × 2.4869 - 1,000 = **+\$243.43**; IRR ≈ **23%** → accept. ✓

Watch Out

For **mutually exclusive projects**, trust **NPV** over IRR — IRR can mislead with different project sizes or unconventional cash flows (multiple IRRs).

Payback, Discounted Payback & Profitability Index

Payback = years to recover the initial outlay (undiscounted)

$$\text{Profitability Index (PI)} = \frac{\text{PV of future cash flows}}{\text{Initial Investment}} = 1 + \frac{\text{NPV}}{\text{Investment}}$$

In Plain English

Payback = how fast you get your money back (ignores time value & later cash flows — a liquidity gauge). **Discounted payback** uses discounted flows. **PI** = bang per dollar invested; accept if **PI > 1**.

Worked Example

From above: Payback = $1,000/500 = 2.0$ years; PI = $1,243.43/1,000 = 1.24$ ($> 1 \rightarrow$ accept).

Memory Hook

"NPV > 0 $\Leftrightarrow$ IRR > WACC $\Leftrightarrow$ PI > 1." All three agree for a single conventional project. 🍷

6 Capital Structure (Modigliani–Miller)

MM Without Taxes

Prop I: $V_L = V_U$ (capital structure is irrelevant; WACC unchanged)

$$\text{Prop II: } r_e = r_0 + (r_0 - r_d) \frac{D}{E}$$

In Plain English

In a perfect, tax-free world, how you split debt vs equity doesn't change firm value (Prop I). Adding cheap debt just raises the cost of equity by exactly enough to keep WACC flat (Prop II). Value comes from **cash flows, not financing**.

Worked Example

r_0 10%, r_d 6%, D/E 0.5: $r_e = 10\% + (10\% - 6\%)(0.5) = 12\%$.

MM With Corporate Taxes

Prop I: $V_L = V_U + tD$ (value rises by the debt tax shield)

$$\text{Prop II: } r_e = r_0 + (r_0 - r_d)(1 - t) \frac{D}{E}$$

In Plain English

Because interest is tax-deductible, debt creates a **tax shield** worth $t \times D$, raising firm value and lowering WACC. The cost of equity still rises with leverage, but more slowly (the $(1 - t)$ factor). Pure theory $\rightarrow$ 100% debt is "optimal."

Worked Example

Same firm, t 25%: $r_e = 10\% + (10\% - 6\%)(1 - 0.25)(0.5) = 11.5\%$.

V_U \$1,000, D \$400 $\rightarrow V_L = 1,000 + 0.25(400) = \$1,100$.



Real-World: Optimal Capital Structure

$$\text{Static Trade-off: } V_L = V_U + tD - \text{PV}(\text{Financial distress costs})$$

💡 In Plain English

In reality, too much debt brings **bankruptcy & distress costs**. The **optimal capital structure** is the debt level where the marginal tax benefit just equals the marginal distress cost — minimizing WACC and maximizing firm value.

📌 Key Fact + Memory Hook

Pecking-order theory: managers prefer internal funds → then debt → then equity last (issuing equity signals the stock may be overvalued). 📊 **"Tax shield pushes debt UP; distress costs pull it DOWN"** — the optimum sits where they balance. ⚖️