

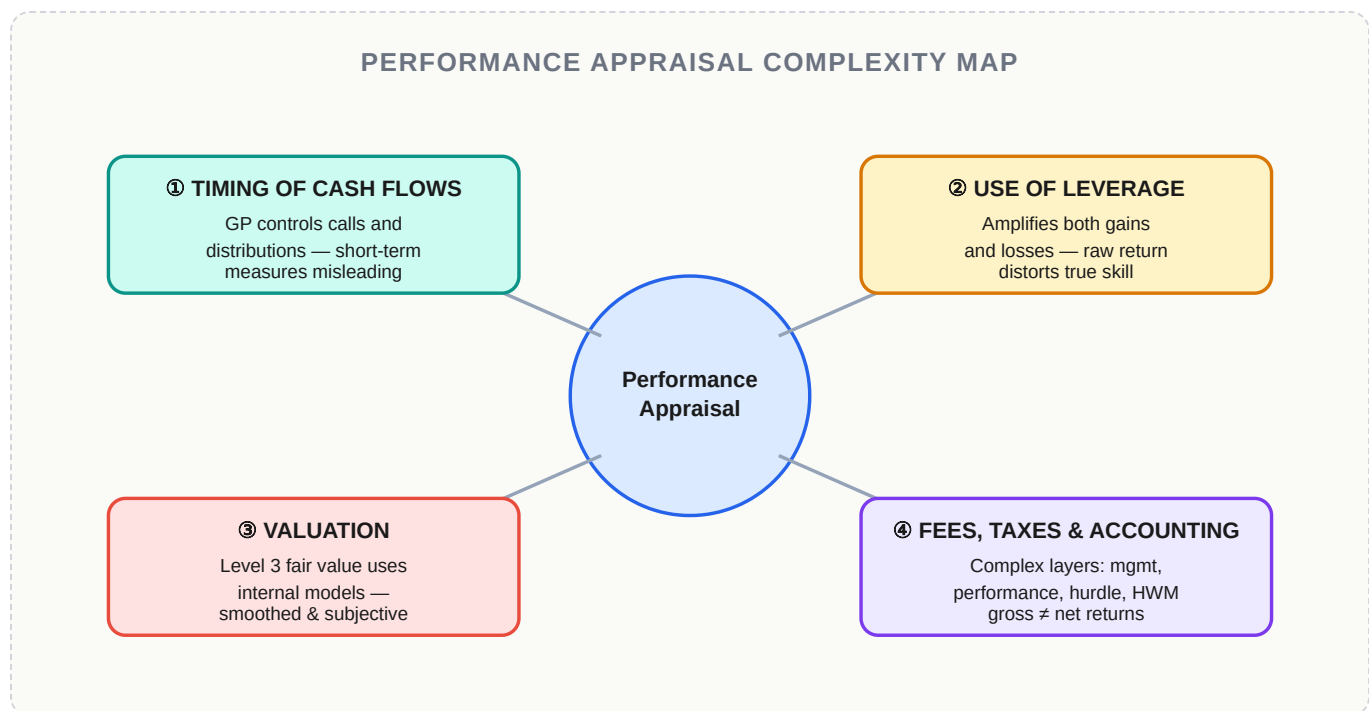
Alternative Investment Performance & Returns

CFA Level I · 2025 Curriculum · LOS a, b

Why Performance Appraisal Is Hard

Alternative investments don't play by the same rules as stocks and bonds. Returns aren't normally distributed, markets aren't liquid, and values aren't always observable. Four structural differences make evaluation genuinely difficult.

The 4 Complicating Factors



Why Returns Are Non-Normally Distributed

FEATURE	CONSEQUENCE FOR APPRAISAL
Illiquidity	Valuations based on stale or modeled prices → smoothed, understated volatility
Strategy complexity	Derivatives, leverage, shorts create asymmetric & fat-tailed return distributions
Long horizons	Short-term returns meaningless; must evaluate across fund's full life cycle

Sample size

Limited history, fund closures, and infrequent data points limit statistical power

□ **Exam Tip:** Sharpe ratios and standard deviation *assume normally distributed returns*. Since alt returns are **not normal**, these measures can be highly misleading — especially for hedge funds and private equity.

LOS A · LIFE CYCLE & THE J-CURVE

The Investment Life Cycle & the J-Curve

Private equity and real estate funds follow a predictable three-phase life cycle. In the early phase, investors see **negative returns** — fees are paid but no gains realized. Only in later years do returns accelerate.

The 3 Phases of a PE Fund

PHASE 1

Capital Commitment

LPs pledge capital. GP identifies deals. Management fees accrue on committed capital. **Returns are negative** (fees but no income).

Typical: Years 0–2

PHASE 2

Capital Deployment

GP calls capital and makes investments. Portfolio companies start generating value. Fees continue but early gains appear.

Typical: Years 2–5

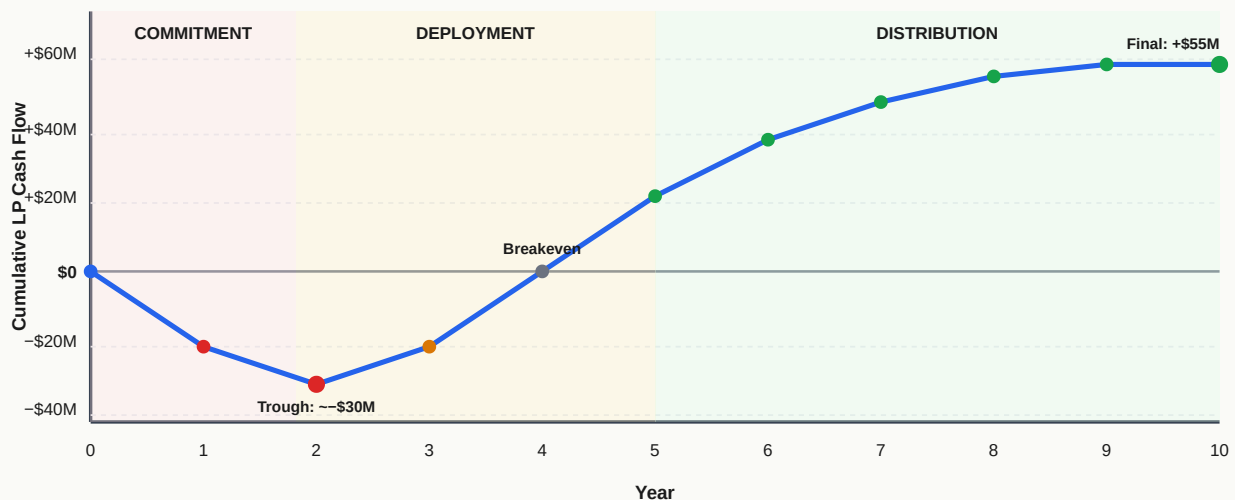
PHASE 3

Capital Distribution

Investments mature. Exits generate distributions to LPs. IRR peaks then stabilizes as fund winds down.

Typical: Years 5–12

J-CURVE — PE FUND CUMULATIVE CASH FLOW TO LP



Why This Matters for Performance Appraisal

- **Early IRRs look terrible.** A 2-year-old PE fund showing -15% IRR may still become top-quartile. Judging PE on short-term returns is meaningless.

- **Time-weighted returns are inappropriate.** IRR (a cash-flow-weighted measure) is most appropriate for closed-end PE funds.
- **Vintage year matters.** Two PE funds with identical strategies but different launch years can have very different realized IRRs — due to market entry/exit timing.

□ **Exam Tip:** The J-curve is a signature feature of PE and some RE investments. Don't confuse it with a general business cycle — it describes the *cumulative cash return profile* of a closed-end fund over its life.

LOS A · CORE PERFORMANCE MEASURES

IRR and MOIC — The Two PE Workhorses

Private equity relies on two core metrics. Each captures a different dimension of performance, and each has blind spots. **You need both to get the full picture.**

IRR · INTERNAL RATE OF RETURN

NPV of all cash flows = 0

Captures **timing**, annualizes returns

MOIC · MULTIPLE OF INVESTED CAPITAL

(Realized + Unrealized Value)
/ Invested Capital

Captures **magnitude**, ignores time

What Each Captures and Misses

	IRR	MOIC
Captures	Time value of money; annualized rate	Absolute \$ multiple returned
Includes unrealized?	Treats as terminal CF	Yes — explicitly both parts
Ignores	Absolute return size; reinvestment assumption unrealistic	Timing of cash flows
Reinvestment assumption	At the IRR itself (often unrealistic)	None
Simple to compute?	Requires iterative solver	Trivial arithmetic
Best for closed-end PE?	✓ Yes	Shortcut measure

Why IRR's Limitations Matter

The reinvestment problem: IRR implicitly assumes interim distributions are reinvested *at the IRR*. If a fund achieves a 25% IRR, that assumes LPs can redeploy interim distributions at 25% — which is usually impossible.

The scale problem: Two funds with the same IRR may have wildly different dollar outcomes. A 30% IRR on 1M *is not the same as a 30%* 100M.

MOIC's blind spot: MOIC ignores *when* returns are earned. A 2.0× MOIC over 3 years is spectacular (~26% IRR). A 2.0× MOIC over 15 years is mediocre (~4.7% IRR). Same multiple, totally different quality.

WORKED EXAMPLE

Illustration: Two PE funds each invested 100M and returned 200M.

FUND	HOLDING PERIOD	MOIC	IMPLIED IRR
Fund A	3 years	2.0×	~26.0%
Fund B	10 years	2.0×	~7.2%

✓ SOLUTION

Same MOIC, very different outcomes. Fund A is top-quartile performance; Fund B is below public market returns. **Never evaluate PE on MOIC alone.**

□ **Exam Tip:** On the exam, know when each measure is appropriate: **IRR** is most appropriate for closed-end PE. **MOIC** is a shortcut that loses the time dimension. Always pair them together.

LOS A · REAL ESTATE & WORKED EXAMPLES

Cap Rate for Real Estate + MOIC Worked Example

Cap Rate — The Real Estate Benchmark

CAPITALIZATION RATE

$$\text{Cap Rate} = \text{Annual Rent (NOI)} / \text{Price Paid for Property}$$

The cap rate is a simple **income yield** measure specific to real estate. A higher cap rate means higher current yield — but often higher risk.

□ WORKED EXAMPLE

Cap Rate Example: An investor purchases a commercial property for 10M. *Net operating income (rent net of expenses) is expected to be 650,000 annually.*

✓ SOLUTION

$$\text{Cap Rate} = 650,000 / 10,000,000 = 6.5\%$$

The property is "trading at a 6.5% cap." A comparable property trading at a 5% cap would be more expensive relative to its income (lower yield, but potentially higher-quality location).

Inverse relationship: Cap rate ↑ → price relative to income ↓. Lower cap rates imply buyers are paying more per \$1 of NOI (expecting appreciation or low risk).

MOIC Worked Example — PE Fund

□ WORKED EXAMPLE

Scenario: PE fund closes with €750M committed. Capital calls: €500M initially + €250M at end of Year 1. Management fee = 2% p.a. on *committed capital*. At end of Year 5: €1.0 billion distributed to LPs, €500M remaining asset value. Calculate MOIC.

✓ SOLUTION

ITEM	CALCULATION	AMOUNT
Total paid-in capital	€500M + €250M	€750M
Total management fees (5 yrs)	€750M × 2% × 5	€75M

Total invested capital (net of fees)	€750M – €75M	€675M
Realized value (distributions)		€1,000M
Unrealized value (remaining NAV)		€500M
Total value	€1,000 + €500	€1,500M
MOIC	€1,500M / €675M	≈ 2.22×

Key insight: Invested capital = *paid-in capital minus fees*. Management fees reduce the capital actually working in investments — so they effectively raise MOIC denominator calculations. Some methodologies use paid-in capital including fees; *check the exam question context*.

□ **Exam Tip:** On MOIC questions, carefully read: is "invested capital" gross of fees (paid-in capital) or net of fees? The CFA curriculum typically uses **paid-in capital less fees/expenses** — check the exact wording.

QUIZ 1 · CHECKPOINT

Test Your Understanding: Life Cycle & Performance Measures

Q1. The J-curve effect in private equity is *best* described as:

Q2. A major limitation of IRR is that it:

Q3. A real estate property generates \$900K in net operating income and is trading at a 6% cap rate. The implied property value is closest to:

LOS A · LEVERAGE

Leverage — The Return Amplifier

Most alternative investments use leverage to amplify returns. PE uses debt at the portfolio-company level. Hedge funds use margin and derivatives. Real estate uses mortgages. Leverage is the **single biggest source of both outperformance and catastrophic loss** in this asset class.

The Leveraged Return Formula

RETURN ON LEVERAGED POSITION

$$r_L = r + (V_b / V_c) \times (r - r_b)$$

Where:

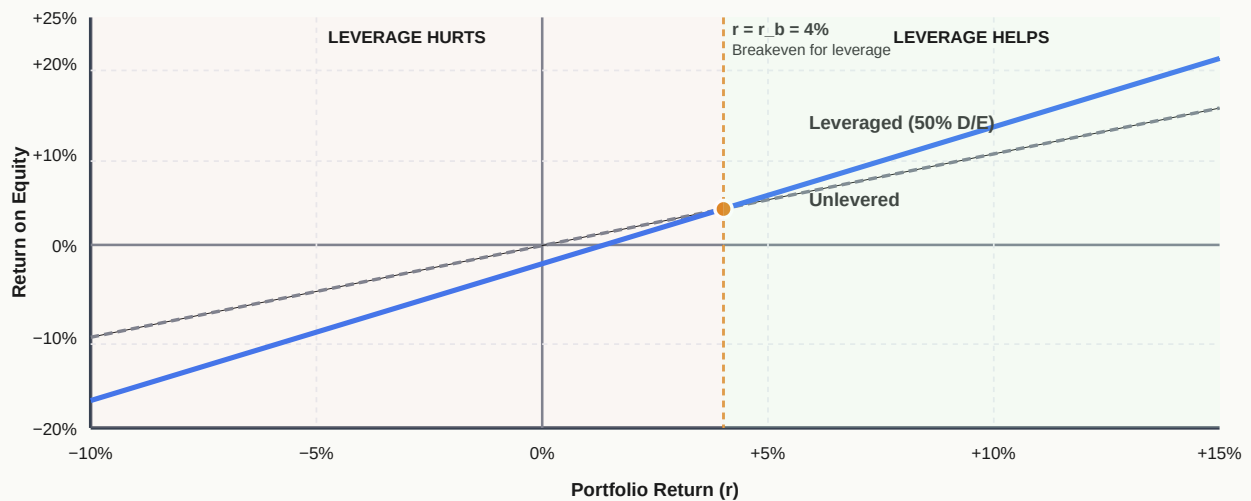
- r_L = leveraged return on equity
- r = return on the underlying portfolio (unlevered)
- V_c = equity capital (investor's cash)
- V_b = borrowed funds
- r_b = borrowing cost (interest rate)

Intuition: The levered return equals the base return PLUS a boost equal to the debt-to-equity ratio times the "spread" between portfolio return and borrowing cost.

Critical insight: The term $(r - r_b)$ can be *negative*. When portfolio return drops below borrowing cost, leverage amplifies losses. Breakeven is at $r = r_b$.

Visualizing Leverage Amplification

LEVERAGED VS. UNLEVERED RETURN — 50% D/E RATIO, 4% BORROW COST



Worked Scenarios

CASE	R (PORTFOLIO)	V_B/V_C	R_B	LEVERAGED RETURN (R_L)
Good times	+8%	0.50	4%	$0.08 + 0.50 \times (0.08 - 0.04) = \mathbf{10.0\%}$
Break-even on debt	+4%	0.50	4%	$0.04 + 0.50 \times (0) = \mathbf{4.0\%}$ (no effect)
Modest loss	-2%	0.50	4%	$-0.02 + 0.50 \times (-0.06) = \mathbf{-5.0\%}$
High leverage, bad year	-1%	1.50	5%	$-0.01 + 1.50 \times (-0.06) = \mathbf{-10.0\%}$

Observe: A 1.5× D/E ratio turns a small 1% portfolio loss into a devastating 10% equity loss. Leverage magnifies the *downside* just as much as the upside.

□ **Exam Tip:** Memorize the formula shape: $r_L = r + (D/E) \times (r - r_b)$. The key insight: leverage is a **spread bet** — you profit when your portfolio return exceeds your borrowing cost, and you're hurt when it doesn't.

INTERACTIVE TOOL

Leverage Calculator — See the Amplification Effect

Adjust the inputs to see how leverage and borrowing cost affect your return on equity.

Equity (V_E):

100

\$M

Borrowed (V_B):

50

\$M

Portfolio Return (r):

8

%

Borrowing Cost (r_B):

4

%

UNLEVERED RETURN

8.00%

On \$100M portfolio alone

LEVERAGED RETURN

10.00%

On \$100M equity

AMPLIFICATION

+2.00%

Leverage helped

Breakdown

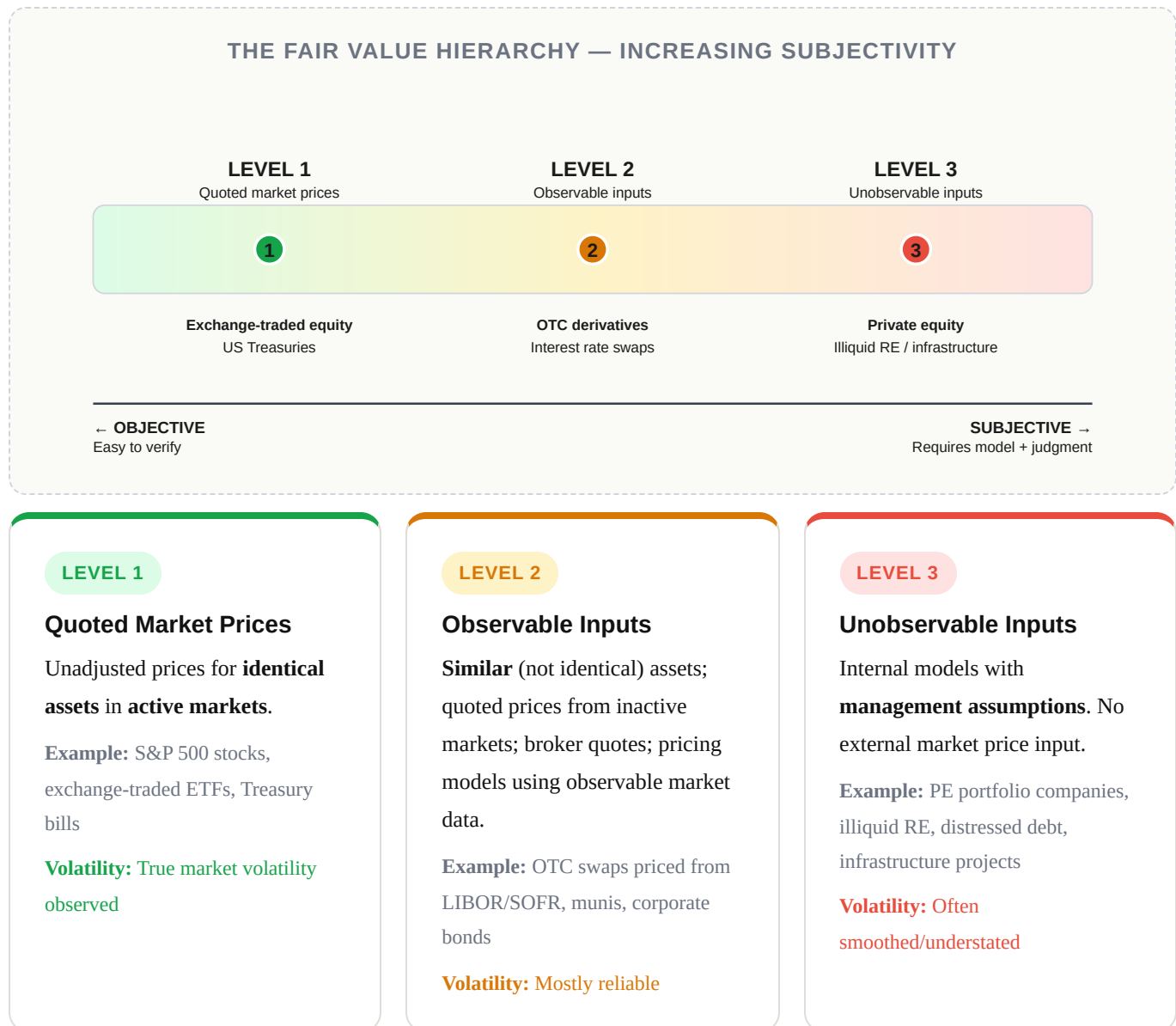
ITEM	CALCULATION	VALUE
Debt-to-Equity Ratio	50 / 100	0.50
Spread ($r - r_B$)	8.0% - 4.0%	+4.00%
Leverage Boost	0.50 × 4.00%	+2.00%
Leveraged Return (r_L)	8.0% + 2.00%	10.00%

❑ **Exam Tip:** Try setting the portfolio return to 3% (below borrowing cost). Watch how leverage becomes destructive — the leveraged return falls *below* the unlevered return.

LOS A · VALUATION & FAIR VALUE

Fair Value Hierarchy — 3 Levels

GAAP (ASC 820) and IFRS (IFRS 13) require alternative investment funds to report at **fair value**. The three-level hierarchy reflects how much judgment is involved in valuation.



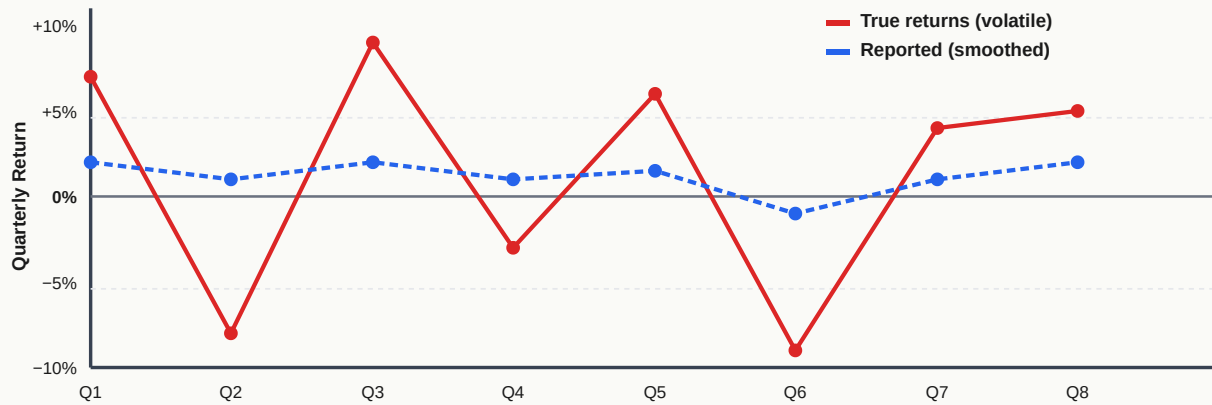
Why Level 3 Valuations Are Dangerous for Performance Appraisal

The smoothing problem: Level 3 values are often set via *periodic* discounted cash flow (DCF) or transaction comparables — they don't respond to daily market moves. As a result:

- **Reported volatility** is lower than true economic volatility
- **Sharpe ratios** appear artificially high
- **Correlations** with public markets look lower (spurious diversification)

- **Drawdowns** arrive later and look shallower than actually experienced

SMOOTHED (REPORTED) VS. TRUE RETURNS — WHY LEVEL 3 UNDERSTATES VOLATILITY



Numerical Example of Smoothing

METRIC	TRUE RETURNS	REPORTED (SMOOTHED)
Mean quarterly return	~1.4%	~1.3%
Standard deviation	~6.7%	~0.9%
Apparent Sharpe ratio	Modest	Artificially inflated
Correlation with stocks	High	Appears low

Consequence: Same investment, two very different risk pictures. Investors comparing PE/RE to stocks using *reported* volatility will systematically overestimate the diversification benefit.

□ **Exam Tip:** Level 3 values are the norm for PE, RE, and many HF positions. They're not wrong — they're *appraisal-based*. But they create the illusion of stability, so reported returns should be interpreted with caution when comparing to public markets.

QUIZ 2 · CHECKPOINT

Test Your Understanding: Leverage & Valuation

Q4. A hedge fund with 200M *equity* borrows 100M at 3% and earns a 7% portfolio return. The leveraged return on equity is closest to:

Q5. A fund with 100M *equity* borrows 150M at 5%. Portfolio returns –1%. The leveraged return is closest to:

Q6. Which level of the fair value hierarchy is *most likely* to understate reported return volatility?

Q7. An investor compares a PE fund (Level 3 valuations) to an S&P 500 index fund using reported monthly returns and finds the PE fund's Sharpe ratio is dramatically higher. The *most accurate* critique is:

LOS B · FEE COMPUTATION — THE DETAILS

Fee Mechanics — Where the Variations Are

"2 and 20" is the headline, but the actual fee you pay depends on many choices in the LPA. The exam tests whether you understand these variations.

5 Key Fee Computation Variables

VARIABLE	OPTIONS	TYPICAL IMPACT
Mgmt fee base (HF)	Beginning AUM, Ending AUM, or Average	Ending AUM charges more in up years
Mgmt fee base (PE)	Committed capital, Invested capital, or NAV	Committed capital charges more early on
Incentive fee base	Gross profit OR Profit net of mgmt fee	"Net of mgmt" is investor-friendly
Hurdle type	Hard, Soft, or None	Hard most LP-friendly
HWM	Yes or No	Prevents double charging after losses

"Net of Management Fee" vs. "Gross" Incentive Fee

When incentive fees are calculated **net of management fee**:

$$IncentiveFee = 20$$

This is *investor-friendly* because the manager's incentive fee can't double-count the management fee already taken. Most modern LPAs use this approach.

HF Fee Base — Beginning vs. Ending AUM

Beginning AUM

Mgmt fee based on AUM at *start* of year. Stable, doesn't grow with performance.

Ending AUM

Mgmt fee based on AUM at *end* of year. Grows with performance — effectively a "backdoor incentive."

Example: Start $100M \times 22.0M$ regardless of year-end value

Example: Start $100M$, end $130M \rightarrow 130 \times 2\% = \$2.6M$.
More in good years.

□ **Exam Tip:** Read fee problem details carefully. Beginning vs. ending AUM, gross vs. net of mgmt fee for the incentive, and hurdle type all shift the numerical answer. Small wording changes $\rightarrow$ different correct answer.

LOS B · COMPREHENSIVE WORKED EXAMPLE

Fee Calculation — 3 Variations, Same Fund

Scenario: HF starts year with 200M AUM. Year 1 gross return = 30% (260M). Examine 3 scenarios.

Variation 1: Independent Fees, No Hurdle

WORKED EXAMPLE

Mgmt fee based on year-end AUM; incentive fee on gross profit (independent of mgmt fee).

✓ SOLUTION

FEE	CALCULATION	AMOUNT
Gross profit	$260M - 200M$	\$60M
Management fee	$2\% \times \$260M$	\$5.20M
Incentive fee	$20\% \times \$60M$	\$12.00M
Total fees		\$17.20M
Investor net return	$(260M - 17.20M) / \$200M - 1$	21.40%

Variation 2: Incentive Fee Net of Mgmt Fee

WORKED EXAMPLE

Same as Variation 1, but incentive fee calculated on profit *after* subtracting mgmt fee.

✓ SOLUTION

FEE	CALCULATION	AMOUNT
Gross profit	$260M - 200M$	\$60M
Management fee	$2\% \times \$260M$	\$5.20M

Profit net of mgmt fee	$60M - 5.20M$	\$54.80M
Incentive fee	$20\% \times \$54.80M$	\$10.96M
Total fees	$5.20M + 10.96M$	\$16.16M
Investor net return	$(260M - 16.16M) / \$200M - 1$	21.92%

Investor saves **\$1.04M** vs. Variation 1 thanks to net-of-mgmt-fee incentive calculation.

Variation 3: Hard Hurdle at 5%, Incentive Net of Mgmt Fee

WORKED EXAMPLE

Now add a 5% hard hurdle. Incentive fee applies only to excess above hurdle, net of mgmt fee.

✓ SOLUTION

FEE	CALCULATION	AMOUNT
Gross profit	$260M - 200M$	\$60M
Management fee	$2\% \times \$260M$	\$5.20M
Hurdle amount	$5\% \times \$200M$	\$10M
Profit above hurdle, net of mgmt	$60M - 5.20M - \$10M$	\$44.80M
Incentive fee	$20\% \times \$44.80M$	\$8.96M
Total fees	$5.20M + 8.96M$	\$14.16M
Investor net return	$(260M - 14.16M) / \$200M - 1$	22.92%

Summary Comparison

VARIATION	TOTAL FEES	INVESTOR NET RETURN	\$ SAVED VS. V1
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V1: Independent, No Hurdle	\$17.20M	21.40%	—
V2: Net of Mgmt Fee	\$16.16M	21.92%	+\$1.04M
V3: Hard Hurdle + Net of Mgmt	\$14.16M	22.92%	+\$3.04M

Takeaway: Small wording changes in the LPA shift investor outcomes meaningfully. On a \$200M investment, the difference between "worst case" (V1) and "best case" (V3) is **\$3M** — over 1.5% of equity.

□ **Exam Tip:** The exam often asks you to compute fees under specific terms. Read carefully: is it *gross* or *net of mgmt fee* incentive? Is there a *hurdle*? Is the mgmt fee on *beginning* or *ending* AUM? These change the arithmetic.

LOS B · HWM ACROSS YEARS

Multi-Year High-Water Mark Example

Scenario: A HF starts Year 1 with \$200M AUM. "2 and 20" with HWM. Mgmt fee on year-end AUM; incentive net of mgmt fee. Gross returns: Y1 +30%, Y2 -8%, Y3 +12%.

Year-by-Year Walkthrough

YEAR	START AUM	GROSS RETURN	END AUM (PRE-FEE)	MGMT FEE	INCENTIVE	END AUM (POST-FEE)	HWM
1	\$200.00M	+30%	\$260.00M	\$5.20M	\$10.96M [1]	\$243.84M	\$243.84M
2	\$243.84M	-8%	\$224.33M	\$4.49M	\$0 [2]	\$219.84M	\$243.84M
3	\$219.84M	+12%	\$246.22M	\$4.92M	\$0 [3]	\$241.30M	\$243.84M

[1] Y1: $20\% \times (60M \text{ gross profit} - 5.20M \text{ mgmt fee}) = 20\% \times 54.80M = 10.96M$

[2] Y2: End AUM after mgmt fee ($219.84M$) is below HWM ($243.84M$). **No incentive fee.**

[3] Y3: End AUM after mgmt fee ($241.30M$) is still below HWM ($243.84M$). **No incentive fee.**

Why This Matters

The fund gained back most of the Y2 loss in Y3, but because AUM never rose above the HWM, **the GP earned no incentive fee in Y2 or Y3** despite Y3 being a positive performance year.

This is the HWM's core protection for investors: you don't pay a performance fee on "recovering losses" — only on making *new* gains.

When Will the GP Earn Incentive Fees Again?

The fund must recover to approximately **\$243.84M + mgmt fee provision** before incentive fees resume. With Y3 ending at \$241.30M, the fund needs roughly another 1.1% gain (on pre-fee basis) to exceed HWM.

Only gains above that threshold will generate incentive fees. A Y4 gross return of +5% would put end AUM above HWM and generate incentive on the excess.

□ **Exam Tip:** HWM math: apply the HWM **only to the incentive fee**. The management fee is charged every year regardless. The HWM resets *upward* to each new net peak — it never drops.

LOS A · SURVIVORSHIP & BACKFILL BIAS

Hedge Fund Index Biases — Why Reported Returns Overstate Reality

Hedge fund indices report *higher* average returns than the underlying universe. Two structural biases explain most of the overstatement.

① Survivorship Bias

Indices include only funds that **still exist**. Funds that closed (often due to poor performance) are excluded from historical data — even from periods when they *were* reporting.

Effect: Removes losers retroactively. Index appears higher.

Direction: Overstates reported index returns

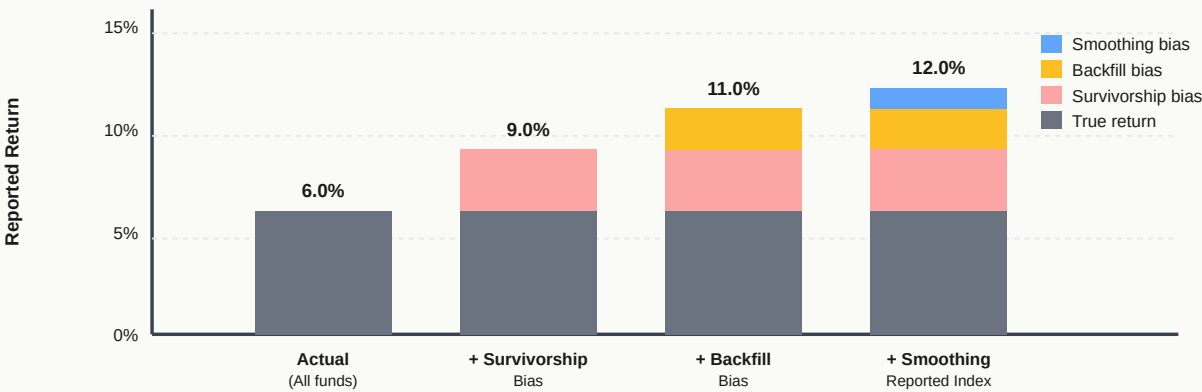
② Backfill Bias

When a new fund joins an index, its **historical returns are added retroactively**. Funds with poor early records don't voluntarily join. Only funds with strong track records "opt in."

Effect: Cherry-picks winners' history. Index appears higher.

Direction: Overstates reported index returns

ILLUSTRATION: HOW BIASES INFLATE REPORTED RETURNS



Illustrative only. Actual bias magnitudes vary by index methodology and time period. The key point: reported HF index returns systematically overstate the returns experienced by typical investors.

Additional Biases to Know

BIAS	WHAT IT IS	EFFECT ON RETURNS
Survivorship	Failed funds removed from history	Overstates

Backfill	New fund's past performance added retroactively	Overstates
Self-reporting	Managers choose whether to report	Overstates (poor performers stay quiet)
Return smoothing	Illiquid assets marked at stale/modeled prices	Understates volatility

□ **Exam Tip:** Both **survivorship** and **backfill** bias *overstate* reported index returns. Return smoothing (separate concept) *understates* reported volatility. Together, they make HF indices look better on every risk-adjusted metric than the actual investor experience.

INTERACTIVE TOOL

Fee Calculator — Test Different Structures

Compare how different fee structures affect investor net returns. Adjust the inputs to see all scenarios simultaneously.

Starting AUM:	200	\$M
Gross Return:	20	%
Management Fee:	2	%
Performance Fee:	20	%
Hurdle Rate:	5	%
Mgmt Fee Base:	Ending AUM	▼

Net Return Across 4 Fee Structures

STRUCTURE	MGMT FEE	INCENTIVE FEE	TOTAL FEES	NET RETURN
V1: Independent, No Hurdle	\$4.80M	\$8.00M	\$12.80M	13.60%
V2: Incentive Net of Mgmt	\$4.80M	\$7.04M	\$11.84M	14.08%
V3: V2 + Hard Hurdle	\$4.80M	\$5.04M	\$9.84M	15.08%
V4: V2 + Soft Hurdle	\$4.80M	\$7.04M	\$11.84M	14.08%

□ **Exam Tip:** Soft hurdle gives the manager the entire incentive fee if the hurdle is cleared. Hard hurdle only applies the incentive to excess above hurdle. When gross return is high, the difference is large.

QUIZ 3 · CHECKPOINT

Test Your Understanding: Fees & Index Biases

Q8. A hedge fund has a "2 and 20" structure with mgmt fee on ending AUM and incentive fee on profit net of mgmt fee. Start AUM = $100M$. $EndAUM(pre - fees) = 120M$. The investor's net return is closest to:

Q9. If a fund's current value is below its high-water mark, the GP will most likely receive:

Q10. Which of the following biases tends to *overstate* reported hedge fund index returns?

Q11. A hedge fund has a "2 and 20" with a 4% **soft** hurdle and earns a 15% gross return. Mgmt fee on ending AUM. Starting AUM = \$100M. Incentive fee is closest to:

FINAL COMPREHENSIVE QUIZ

Final Assessment — Integrating Concepts

Q12. A PE fund has total paid-in capital of $500M$ and total management fees of $40M$ over its life. It distributes $800M$ and retains $200M$ in unrealized assets. The MOIC (based on invested capital net of fees) is closest to:

Q13. A real estate fund uses 60% loan-to-value financing ($D/V = 60\%$, so $D/E = 1.5$). The property generates a 10% unlevered return. Financing cost is 6%. The levered return on equity is closest to:

Q14. An investor compares two funds. Fund A reports 12% annualized return with 5% volatility. Fund B reports 10% with 15% volatility. Fund A is Level 3 valued; Fund B uses Level 1 quotes. The *most likely* conclusion is:

MODULE COMPLETE

Your Scorecard

0 / 14

LM02 Key Takeaways — Exam-Ready Cheat Sheet

Performance Appraisal Challenges

- 1 **4 complicating factors:** timing of cash flows, use of leverage, valuation, and complexity of fees/taxes/accounting. Returns are non-normal → Sharpe/stdev unreliable.
- 2 **J-curve:** PE/RE show initial negative returns → accelerating gains. Three phases: commitment → deployment → distribution. Short-term returns meaningless.

Performance Metrics

- 3 **IRR:** NPV-zero discount rate. Most appropriate for closed-end PE. Weakness: assumes reinvestment at IRR (unrealistic).
- 4 **MOIC** = (Realized + Unrealized) / Invested Capital. Simple; ignores timing. Pair with IRR.
- 5 **Cap Rate** = NOI / Price. Real estate income yield. Low cap = expensive; high cap = cheap or risky.
Value = NOI / Cap Rate.

Leverage

- 6 **Leverage formula:** $r_L = r + (V_b/V_c)(r - r_b)$. Amplifies BOTH gains and losses. Breakeven at $r = r_b$.

Valuation

- 7 **Fair value hierarchy:** L1 (market prices, objective) → L2 (observable inputs) → L3 (internal models, subjective). L3 smooths returns and understates volatility.
- 8 **Smoothing consequence:** Reported Sharpe ratios for PE/RE/illiquid HFs are artificially inflated. Reported volatility understates true risk.

Fees

- 9 **Read fee problems carefully:** Beginning vs. ending AUM; gross vs. net of mgmt fee; hurdle type (hard/soft/none); HWM present? Each changes the number.
- 10 **HWM:** Applies ONLY to incentive fee. Mgmt fee always charged. Ensures investor doesn't pay twice on the same gain.
- 11 **Hard hurdle:** fee on excess above hurdle (LP-friendly). **Soft hurdle:** fee on entire return if hurdle cleared (GP-friendly).

Index Biases

- 12 **Survivorship bias + Backfill bias** → **OVERSTATE** reported HF index returns. Self-reporting bias compounds the problem.
- 13 **Return smoothing** → **UNDERSTATE** reported volatility. Opposite direction to survivorship/backfill, but also misleading.

✂ Last-Minute Formula Checklist

MOIC = (Realized + Unrealized) / Invested Capital

Cap Rate = NOI / Property Value

Leveraged Return = $r + (V_b/V_c) \times (r - r_b)$

✂ Directional Memory Aids

Bias directions: Survivorship ↑ returns. Backfill ↑ returns. Smoothing ↓ volatility.

Hurdle friendliness: Hard = LP. Soft = GP.

Waterfall friendliness: European = LP. American = GP.

Return measure: IRR is most appropriate for closed-end PE.

Step 1 of 17