

CFA® Level I

One-Page Learning Module Summaries

Alternative Investments

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

How each page works

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

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

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Module 1 — Alternative Investment Features, Methods, and Structures

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

The big picture

Alternatives are grouped together not because they resemble each other but because they **differ** from public equity, fixed income and cash: they need specialised knowledge, are illiquid and long-dated, need large capital outlays and have low correlation with traditional assets. Those features explain *how* investors get in (fund, co-investment, direct) and *why* managers are paid through complex GP/LP fee structures designed to align incentives over many years.

Learning outcomes in plain language

- LOS 1 Describe features and categories.** Alternatives are investments other than public equity, fixed income and cash. Distinguishing features: specialised knowledge to value cash flows and risks, typically low correlation with traditional assets, and illiquidity, long horizons and large outlays; these lead to special structures, incentive fees and appraisal challenges. Three categories: **private capital** (private equity incl. venture capital; private debt incl. venture and distressed debt), **real assets** (real estate, infrastructure, natural resources, plus collectibles, intangibles and digital assets) and **hedge funds** (defined by their *approach* — leverage, derivatives, short selling — not by what they hold).
- LOS 2 Compare the three investment methods.** *Fund investing* (indirect; the fund selects deals; highest fees, least control; usual entry route for less experienced investors). *Co-investing* (invest through the fund *plus* co-investment rights to invest directly in the same deal; lower fees, more control, learning; managers use it to fund large deals, widen scope and diversify). *Direct investing* (no intermediary; maximum control over choice, financing and timing; needs in-house skills — the largest investors, e.g. sovereign wealth funds).
- LOS 3 Describe ownership and compensation structures.** Limited partnership: GP manages with theoretically unlimited liability; LPs are passive, liability capped at their investment, commit capital drawn over time. LPA and side letters (“most favoured nation”, excusal rights); PPPs, MLPs, REITs, joint ventures. Management fee on AUM (hedge funds, REITs) or on **committed capital** (PE); performance fee (carry) with hard or soft hurdle, catch-up, high-water mark, clawback; deal-by-deal (American) vs whole-of-fund (European) waterfall.

Key formulas

Management fees ignored; single-period fund return r , hurdle rate r_h , GP performance fee p (share of return), GP catch-up return r_{cu} .

$$\text{Hard hurdle: } r_{GP} = \max[0, p(r - r_h)] \quad \text{With catch-up: } r_{GP} = \max[0, r_{cu} + p(r - r_h - r_{cu})]$$

Hard hurdle: fee only on the return *above* the hurdle. **Soft hurdle:** once the hurdle is exceeded the fee is on the *entire* return — LPs take 100% up to the hurdle, then the GP takes 100% (catch-up) until the split is 80/20, then 80/20. **High-water mark:** no performance fee until the fund’s peak net value is regained. **Clawback:** LPs reclaim carry already paid. **Waterfalls:** deal-by-deal (American) pays carry per exit and favours the GP; whole-of-fund (European) pays nothing until LPs get back all capital plus the hurdle and favours LPs.

Worked example (CFA curriculum)

Hurdle and catch-up. $r = 18\%$, $p = 20\%$, $r_h = 8\%$. Hard hurdle: $r_{GP} = \max[0, 20\%(18\% - 8\%)] = 2.0\%$, LPs keep 16.0%. With a 2% catch-up: $r_{GP} = 2.0\% + 20\%(18\% - 8\% - 2\%) = 3.6\%$ ($= 20\% \times 18\%$), LPs keep 14.4%; the catch-up adds 1.6% for the GP.

Deal-by-deal waterfall with clawback. Eight deals: \$200m invested, \$200m returned, so the fund only breaks even. Deals 1–3 earn profits of \$10m, \$15m, \$40m and pay 20% carry of $\$2 + \$3 + \$8 = \$13\text{m}$ on exit. Deals 5–8 then lose \$10m, \$5m, \$30m, \$20m ($20\% = \$2\text{m}, \$1\text{m}, \$6\text{m}, \$4\text{m}$), so the clawback makes the GP return all \$13m: net carry = 0. Under a whole-of-fund waterfall the GP is never paid, because LPs never recover capital plus the hurdle.

Practice check. $r = 20\%$, hard hurdle 10%, $p = 18\%$, no catch-up: $r_{GP} = 18\%(20\% - 10\%) = 1.8\%$.

What examiners like to test

- **Fee base:** PE charges management fees on *committed* capital (reduces the urge to deploy capital quickly); hedge funds and REITs on AUM. After missing the hurdle the GP still earns the management fee, not the carry.
- **Hard vs soft hurdle:** with a full catch-up the GP ends with $p \times r$ (3.6%), not $p(r - r_h)$ (2.0%). Know which clause changes which number.
- **Who is who:** the GP (fund manager) has unlimited liability and controls the fund; LPs are passive with limited liability. A hedge fund investing in listed shares is still an alternative; a junior ABS tranche is still traditional fixed income.

Module 2 — Alternative Investment Performance and Returns

Topic: Alternative Investments · Exam relevance: High-yield · Calculation-heavy

The big picture

Alternative returns are hard to compare with stocks and bonds: cash goes in and out at the manager's discretion (J-curve), leverage magnifies results, illiquid assets are marked to model (Level 3), and every investor may face a different fee deal. So the curriculum starts with IRR, uses MOIC as a shortcut, and then makes you compute the **investor's net return** after management fees, performance fees, hurdles and high-water marks.

Learning outcomes in plain language

- LOS 1 Describe performance appraisal.** Life cycle: capital commitment (negative returns), deployment (outflows exceed inflows), distribution (J-curve). IRR is the preferred measure (captures timing; needs financing/reinvestment assumptions); MOIC is simple but ignores timing. Leverage magnifies gains and losses (margin calls). Fair value hierarchy Levels 1–3: Level 3 (mark-to-model) smooths returns and understates volatility and correlation. Fees and their timing make results investor-specific.
- LOS 2 Calculate returns before and after fees.** Management fee on (year-end) AUM; performance fee calculated independently or net of the management fee; hard hurdle; high-water mark (net of fees); clawback; soft hurdle with catch-up; fund-of-funds fee layering; either/or fees; founders shares; lockups, notice periods, gates; survivorship and backfill bias in hedge fund indexes.

Key formulas

$$\text{MOIC} = \frac{\text{Realized value} + \text{Unrealized value}}{\text{Total invested capital}} \quad r_L = r + \frac{V_b}{V_c}(r - r_b) \quad r_i = \frac{P_1 - P_0 - R_{GP}}{P_0}$$

$$R_{GP} = (P_1 r_m) + \max[0, (P_1 - P_0) p] \quad R_{GP(\text{Net})} = (P_1 r_m) + \max\{0, [P_1(1 - r_m) - P_0] p\}$$

$$R_{GP(\text{Net with Hurdle})} = (P_1 r_m) + \max\{0, [P_1(1 - r_m) - P_0(1 + r_h)] p\} \quad R_{GP(\text{HWM})} = (P_2 r_m) + \max\{0, [P_2(1 - r_m) - P_{HWM}] p\}$$

where invested capital = paid-in capital less management fees and fund expenses; V_c = cash (equity) position, V_b = borrowed funds at rate r_b ; P_0, P_1 = beginning and end-of-period assets; r_m = management fee on end-of-period AUM; p = performance fee; r_h = hurdle; P_{HWM} = highest fund value at any previous period end *net of fees*. For Year 2 use $r_i = (P_2 - P_1 - R_{GP})/P_1$ with P_1 = the investor's net value. [Note: the book prints the HWM equation as $P_2((1 - r_m) - P_{HWM})$; its worked numbers use $P_2(1 - r_m) - P_{HWM}$, as shown here.]

Worked example (CFA curriculum)

Kettlebridge Timberland: \$100m, $r_m = 1\%$ of year-end AUM, $p = 20\%$; Year 1 value \$130m. (a) Fees independent: $1.3 + 0.2(30) = \$7.3\text{m}$, $r_i = 22.7\%$. Net of mgmt fee: $1.3 + 0.2(128.7 - 100) = \$7.04\text{m}$, $r_i = 22.96\%$. (b) Plus 6% hard hurdle: $1.3 + 0.2(128.7 - 106) = \$5.84\text{m}$, $r_i = 24.16\%$; investor ends at \$124.16m = HWM. (c) Year 2 value \$110m: $1.1 + \max[0, 0.2(108.9 - 124.16)] = \$1.1\text{m}$, $r_i = (110 - 124.16 - 1.1)/124.16 = -12.29\%$, net \$108.9m. Year 3 value \$128m: $1.28 + 0.2(126.72 - 124.16) = \$1.792\text{m}$, $r_i = (128 - 108.9 - 1.792)/108.9 = 15.89\%$; new HWM \$126.208m. [Note: the book's text and table call the HWM \$122.70m (Year-1 value under the no-hurdle fees of Example 3) but compute with \$124.16m; \$124.16m is used here, consistent with part (b). With \$122.70m the Year-3 fee would be \$2.084m and r_i 15.63%.]

Leverage (Lupulus): $V_c = 100$, $V_b = 50$, $r_b = 4\%$: $r = 8\% \Rightarrow r_L = 8\% + 0.5(4\%) = 10\%$; $r = -2\% \Rightarrow r_L = -5\%$. **MOIC:** capital calls EUR750m, fees $750 \times 2\% \times 5 = 75$, invested 675; $(1,000 + 500)/675 = 2.2\times$.

What examiners like to test

- Fee order matters:** fees calculated net of the management fee or with a hurdle give a *higher* investor return; a new investor buying after a drawdown has no HWM protection and pays a larger performance fee than an investor who has been in since inception.
- Soft vs hard hurdle waterfall:** \$100m sold for \$160m after 2 years, 8% p.a. preferred (not compounded): soft with catch-up LP \$148m / GP \$12m; hard, no catch-up LP \$151.2m / GP \$8.8m. Fund of funds ("1 and 10" on top of "2 and 20") cuts 14% to 11.6%.
- Appraisal traps:** MOIC ignores timing; Level 3 values make returns look smooth and less correlated; hedge fund indexes are biased *upward* (survivorship + backfill).

Module 3 — Investments in Private Capital: Equity and Debt

Topic: Alternative Investments · Exam relevance: Medium-yield · Concept-heavy

The big picture

Private capital is funding raised outside public markets and outside traditional institutions such as banks: as equity it is **private equity**, as a loan it is **private debt**. Where it sits in a company's life cycle (seed to decline) and in the capital structure (senior debt to equity) drives its risk and return. Returns come from access to private companies, control and leverage, but illiquidity, concentration and the fund's **vintage year** matter as much as manager skill.

Learning outcomes in plain language

- LOS 1 Explain private equity features and characteristics.** Strategies: leveraged buyouts (MBO, MBI; “going private”), venture capital (pre-seed/angel, seed, early stage, later stage; mezzanine-stage bridge to IPO; convertible preferred shares give seniority in liquidation) and growth/minority equity (incl. PIPEs). Exits: trade sale, public listing (IPO, direct listing, SPAC), recapitalization (not a true exit), secondary sale, write-off/liquidation. Higher return than public equity from private access, control and leverage, but higher risk; PE indexes are biased and smoothed.
- LOS 2 Explain private debt features and characteristics.** Direct lending (senior, secured, covenants; leveraged loans), mezzanine debt (subordinated, usually unsecured, warrants/conversion rights), venture debt (start-ups; lines of credit or term loans without diluting owners), distressed debt (incl. DIP financing); also unitranche debt (blended secured/unsecured, rate in between) and specialty loans (e.g. litigation finance). Floating rate over a reference rate; illiquidity premium; riskier than traditional bonds.
- LOS 3 Describe diversification benefits of private capital.** Vintage year drives results, so diversify across vintages; risk–return rises from infrastructure debt through senior lending, unitranche and mezzanine to private equity; correlations with public indexes of 0.63–0.83 give only a *moderate* diversification benefit, with venture capital the lowest.

Key facts

	Advantages	Disadvantages
Trade sale	Immediate cash; synergy premium from strategic buyer; fast, simple, confidential	Management opposition; limited set of buyers (regulatory scrutiny); employees lose monetisation
IPO	Highest potential price; management approval; visibility; upside from retained stake	High costs; long lead time; market volatility; onerous disclosure; lockup; suits large, fast-growing firms
SPAC	Extended disclosure and forward guidance; fixed valuation; flexible structure; seasoned sponsors	Dilution from warrants and fees; announced vs true value gap; redemption risk; stockholder overhang

Life cycle: start-up (low revenue, negative cash flow, high risk) = VC; growth (increasing cash flow, high risk) = both; maturity (positive, predictable cash flow, low risk) and decline (declining cash flow, increasing risk) = PE (LBO). **Fund life:** vintage year = year of first investment; 10–12 years = investment period ($\approx$ first 5 years) + harvesting period. Funds seeded in an *expansion* do best with early-stage companies; in a *contraction*, with distressed companies. **Correlations** (Preqin vs S&P 500): PE 0.80, VC 0.65, buyout 0.82, private debt 0.82.

Worked example (CFA curriculum)

Expedia PIPE (2020). USD1.2bn of preferred shares at a 9.5% fixed rate, plus warrants on 8.4m shares at USD72. Redeemed after 2 years at 102% with no dividends paid: cost = $(1.02 + 0.095 \times 2) \times \text{USD1.2bn} = \text{USD1.45bn}$, about **USD250m** above the amount raised (plus possible warrant dilution) — versus a 5.6% yield on a large preferred ETF.

Syndicated leveraged mortgages (Peterburgh/BridgeRock). Six properties worth GBP100m secure GBP75m of mortgages: $\text{LTV} = 75/100 = 0.75$, giving GBP25m of excess collateral; MRR + 150 bps, 15 years, GBP5m annual amortization, first lien. LTV matters to both the borrower and the syndicate: amortization lowers it; a fall in property value forces the sponsor to add collateral. [Note: this version also says the fund raised GBP30m of equity, which with GBP75m of debt is GBP105m against a GBP100m purchase; the LTV figures are unaffected.]

What examiners like to test

- **Mezzanine financing vs mezzanine-stage financing:** the first is a hybrid instrument (convertible debt/preferred); the second is *timing* — bridge finance just before an IPO or sale.
- **Which debt type?** Warrants, junior and unsecured = mezzanine; start-up, no dilution, line of credit = venture debt; fixed payment schedule, senior secured = direct lending; blended rate = unitranche.
- **Diversification ranking:** venture capital has the lowest correlation with public indexes, so the highest diversification benefit; vintage diversification is for *investors*, not funds.

Module 4 — Real Estate and Infrastructure

Topic: Alternative Investments · Exam relevance: Medium-yield · Concept-heavy

The big picture

Real estate and infrastructure are long-lived, location-specific, illiquid real assets. Real estate earns rent and price appreciation and can be held directly or through REITs, funds and mortgage securities, from bond-like senior debt to speculative development. Infrastructure provides essential public services and earns contractual, often inflation-linked cash flows; its risk depends mainly on the **stage of development** (greenfield, brownfield, secondary stage).

Learning outcomes in plain language

- LOS 1 Explain real estate features.** Residential (largest sector, over 75% of global value) vs commercial (office, retail, industrial, warehouse, hospitality). Heterogeneous, large lot sizes, fragmented local markets, opaque price discovery, high transaction costs. Direct ownership: control, tax benefits, diversification vs complexity, expertise, large capital, concentration, illiquidity. Indirect: funds, JVs, REITs (equity, mortgage, hybrid; distribute 90%–100% of taxable income to avoid double taxation).
- LOS 2 Explain real estate investment characteristics.** Return = income (more than half; steadier) + appreciation. Risk–return spectrum: senior debt → core → core-plus → value-add → opportunistic; bond-like at the low end, equity-like at the high end; leverage magnifies both. Inflation protection from rent step-ups; low correlations that rise in steep downturns.
- LOS 3 Explain infrastructure features.** Capital-intensive, long-lived assets for public use. Cash flows from availability payments, usage-based payments (tolls) and take-or-pay contracts. Economic (transport, ICT, utility/energy) vs social (schools, hospitals, prisons). Stages: greenfield (new build; build-operate-transfer), brownfield (expand or privatise existing assets), secondary stage (fully operational). Direct (consortia, control, concentration) vs indirect (funds, ETFs, listed shares, MLPs).
- LOS 4 Explain infrastructure investment characteristics.** Risk and return rise from secondary stage → brownfield → greenfield, and from social/regulated → demand-based. Stable long-term cash flows linked to GDP and inflation, low correlation with public markets, lower default rates and higher recovery on infrastructure debt, and a match for long-dated liabilities.

Key facts

Real estate spectrum (low → high risk)		Infrastructure target equity returns (net of fees)	
Senior debt	First mortgages, investment-grade CMBS	Low risk	6%–8%: brownfield, contracted revenue, stable OECD; current yield
Core	Stable leased property, public REITs, sale-leaseback	Medium	10%–12%: mostly brownfield; yield + growth
Core-plus / value-add	Minor refurbishment; leasing vacancies, redevelopment	High risk	14%+: greenfield, no demand guarantee; capital appreciation
Opportunistic	Development, mezzanine, unrated CMBS, distressed		

$LTV = \frac{\text{Mortgage liability}}{\text{Property (portfolio) value}}$; required reduction in debt = Mortgage liability – (Required LTV × Portfolio value).

Correlation with S&P 500 (Prequin, 2008–2021): infrastructure 0.12, real estate 0.51.

Worked example (CFA curriculum)

Peterburgh Real Estate Fund — LTV breach. Properties bought for GBP100m with GBP75m of mortgages; the loans require LTV of 0.75 and amortize GBP5m a year. After one year the debt is GBP70m and the properties are valued at GBP92m: $LTV = 70/92 = 0.76$, a breach. To restore 0.75 with GBP70m of debt the collateral must be $70/0.75 = 93.3$, so Peterburgh adds about **GBP1.3m** of collateral.

Akasaka (practice problem) — repay debt instead. Warehouses THB3.60bn, mortgage THB2.61bn (LTV 0.725 required). After 18 months: value THB3.23bn, mortgage THB2.35bn, LTV 0.7276. Required reduction = $2.35 - 0.725 \times 3.23 = \text{THB8.25 million}$.

What examiners like to test

- **Collateral vs repayment:** adding collateral raises the denominator, repaying debt cuts the numerator; the amounts differ (Peterburgh: GBP1.3m collateral or GBP1.0m repayment).
- **Stage ranking:** secondary stage = lowest risk and return; greenfield = highest; brownfield in between (and appeals to investors wanting long-term, stable returns).
- **REIT facts:** main appeal is elimination of double corporate taxation; advantage = transparency and liquidity; disadvantage = higher correlation with equities than private real estate.

Module 5 — Natural Resources

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

The big picture

Natural resources split into **land** (raw land, farmland, timberland), which is illiquid, appraised infrequently and valued for soil, climate and location rather than buildings, and **commodities**, which earn no cash flow and are mostly traded through derivatives. Commodity futures are tied to spot prices by no-arbitrage: carry costs push the forward price up, convenience yield pulls it down. Commodities hedge inflation; farmland and timberland mainly diversify.

Learning outcomes in plain language

- LOS 1 Explain raw land, timberland and farmland.** Like real estate: unique, illiquid, location-specific; unlike it, value comes from soil, climate or geology, not physical improvements. Raw land earns mainly price appreciation (see note); farmland adds crop income (harvest when ripe) and timberland adds timber income with a flexible harvest (“factory and warehouse”). Return drivers: harvest quantities, commodity/lumber prices, biological growth, land prices. Risks: weather, climate, disease. Vehicles: direct, partnerships, REITs, TIMOs (timber); farmland mostly family owned, timberland mostly institutional.
- LOS 2 Describe commodities.** Sectors: energy, base metals, precious metals, agriculture, other (carbon credits, freight). Usually accessed through futures and forwards (liquid, transparent) rather than physical holdings (storage, insurance, tax); also ETPs (ETFs/ETNs), CTAs/managed futures and specialised funds. Spot and forward prices linked by cost of carry and convenience yield: **contango** (forward > spot) hurts long-only investors; **backwardation** (forward < spot, typical when inventories are low) helps them.
- LOS 3 Analyze risk, return and diversification.** Supply adjusts slowly to demand (growing cycles, mine lead times). Commodities: highest return and volatility (7.81%, 24.39%), best inflation hedge (correlation with inflation 0.54). Farmland 10.95% and timberland 8.69% with low volatility partly because they are appraisal based; both face weather and global trade risk; correlations with stocks and bonds near zero.

Key formulas

$$F_0(T) = S_0 e^{(r+c-i)T}$$

Forward price = Spot price + Costs of carry – Benefits of ownership

where $F_0(T)$ = forward price for expiration T ; S_0 = spot price; r = risk-free rate; c = cost of carry (storage, transport, insurance); i = convenience yield (non-cash benefit of holding the physical good, inversely related to inventories); continuous compounding.

	Raw land	Farmland	Timberland
Return drivers	Price of land	Harvest quantities, commodity prices, land price	Biological growth, harvests, lumber prices, land price
Main risks	Best alternative use	Weather and climate change	Biological factors, disease
Owners	Mostly institutional	Mostly individuals	Mostly institutional

Inflation regimes (1993–2021): commodities +22.87% in higher-inflation years vs –9.26% in lower-inflation years; farmland 12.78% vs 9.85%; timberland 10.44% vs 5.70%. **Correlation with global stocks:** commodities 0.41, farmland 0.12, timberland 0.02.

Worked example (Illustrative)

Oil spot $S_0 = 80$, $r = 4\%$, storage and insurance $c = 2\%$, one-year forward.

Low inventories ($i = 7\%$): $F_0 = 80 e^{(0.04+0.02-0.07)} = 80 e^{-0.01} = 79.20 < 80 \Rightarrow$ **backwardation**; convenience yield exceeds carry; as a rule of thumb this *enhances* long-only returns.

Full storage ($i = 1\%$): $F_0 = 80 e^{0.05} = 84.10 > 80 \Rightarrow$ **contango**, which lowers long-only returns — as in NYMEX crude, which moved from backwardation (January 2020, low inventories) to contango (May 2020, storage nearly full). [CFA curriculum] data: the 32.13 percentage point gap between commodity returns in higher- vs lower-inflation years (22.87% vs –9.26%) is what makes commodities the inflation hedge.

What examiners like to test

- **Backwardation logic:** low inventories $\rightarrow$ high convenience yield $\rightarrow$ benefit > carry $\rightarrow$ spot above forward. Convenience yield cannot be negative.
- **Inflation hedge vs diversifier:** commodities have the highest correlation with inflation but the highest correlation with stocks; farmland and timberland diversify better but hedge inflation less. Low appraisal-based volatility understates their true risk.
- **Farmland vs futures:** owning land gives exposure to crops with no futures market (spices, nuts, fruit) but loses liquidity and price transparency. [Note: the module overview says raw land earns returns only from price changes, but Exhibit 1 and practice problem 1 also list lease revenue for raw land; read the question's wording.]

Module 6 — Hedge Funds

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

The big picture

A hedge fund is defined by *how* it invests, not *what* it holds: private, lightly regulated pooled vehicles that use leverage, short selling and derivatives across any market to earn absolute or risk-adjusted returns, mainly from **alpha** (manager skill exploiting inefficiencies) rather than market beta. In return investors accept high fees, lockups and limited transparency, and must read hedge fund indexes with their biases in mind.

Learning outcomes in plain language

- LOS 1 Explain investment features and contrast with other asset classes.** Not an asset class but a set of strategies. Five categories: *equity* (fundamental long/short, growth, value, short biased, market neutral), *event driven* (merger arbitrage, distressed/restructuring, special situations, activist), *relative value* (convertible bond arbitrage, fixed income, multi-strategy), *opportunistic* (global macro, managed futures/CTAs), *multi-manager* (fund of funds, multi-strategy). Distinguishing features: fewer legal constraints, flexible mandates (shorting, derivatives), wide universe, concentrated positions, liberal leverage, lockups and gates, high fees. Vs mutual funds: performance fee, manager co-investment, accredited investors only. Vs PE: shorter horizon, more liquid assets.
- LOS 2 Describe investment forms and vehicles.** Direct: limited partnership or LLC (GP/managing member), offering documents and side letters; **master-feeder** (onshore and offshore feeders into one master fund; tax efficiency, scale); **fund of one** and **SMA** (assets in the investor's name; customised, transparent, lower fees, but complex and only the manager's most liquid trades). Indirect: **funds of hedge funds** (diversification, lower minimums, access to closed funds; extra fee layer, often 1% and 10%) and hedge fund replication ETFs (liquid, cheap, but lag true hedge funds). Liquidity: LPs least liquid → SMAs → closed-end → mutual funds → ETFs.
- LOS 3 Analyze risk, return and diversification.** Return = market beta + strategy beta + alpha. Index biases: self-reporting, selection, survivorship, backfill; equal weighting; reporting lag — all tend to overstate performance, so fund-of-funds indexes are used. FoF 1990–2014: 7.2% return, 6.0% volatility (like bonds), correlation 0.56 with stocks and 0.07 with bonds; 2015–2019: 2.48% and 0.86 with stocks. Hedge funds improve a 60/40 portfolio's Sharpe ratio.

Key facts

Fee terms	“2 and 20” (2% management fee to the operating entity, 20% of net profits to the GP); newer “1 or 30” (greater of 1% management fee or 30% of alpha over a benchmark); high-water mark; soft lockup = redemption fee paid to the fund
Liquidity terms	Lockup period; notice period (typically 30–90 days); gate limiting redemptions; redemption fee
Market neutral	Beta near zero; stable single-digit returns, so leverage is often needed
Merger arbitrage	Long target, short acquirer; main risk is deal failure; least long-biased event strategy
Managed futures	Trend/momentum in futures; help in trending and stressed markets; hurt by mean reversion

Worked example (CFA curriculum)

HedgeAway (self-assessment). USD100m start, year-end AUM USD120m; management fee 1.6% of end value; 18% performance fee on the gain above an 8% hurdle, after the management fee.

Management fee = $1.6\% \times 120 = 1.92\text{m}$. Excess = $20 - 8 - 1.92 = 10.08\text{m}$; performance fee = $0.18 \times 10.08 = 1.81\text{m}$. Total fees = 3.73m , so investors keep $20 - 3.73 = 16.27\text{m}$; return $\approx 16.27\%$ (**16.3%**). [Note: the book's solution shows total fees of 3.72m and an answer of 16.38% (option A), which do not follow from its own steps: $1.92 + 1.81 = 3.73$ and $20 - 3.73 = 16.27$. The nearest choice is still A.]

Fee layering (LM2, Example 7). EUR100m, 20% gross return. Direct in a “2 and 20” fund (fees independent, management fee on beginning AUM): $(20 - 2 - 4)/100 = 14\%$. Through a “1 and 10” fund of funds holding identical funds: $(14 - 1 - 1.4)/100 = 11.6\%$ — the price paid for due diligence, diversification and access.

What examiners like to test

- **Strategy identification:** buy target / short acquirer = merger arbitrage (event driven); buy convertible and short stock by delta = convertible arbitrage (relative value); long undervalued Ford, short overvalued GM = equity long/short; top-down macro trades = global macro (opportunistic).
- **Bias vocabulary:** survivorship = failed funds dropped; backfill = past returns added when a successful fund joins; selection = only good performers report. All push index returns *up*.
- **Structure fit:** SMA = large investor wanting control, customisation and negotiable fees; fund of funds = small investor wanting diversified access; managed futures = commodity exposure without borrowing or shorting.

Module 7 — Introduction to Digital Assets

Topic: Alternative Investments · Exam relevance: Medium-yield · Concept-heavy

The big picture

Digital assets are created, stored and transmitted electronically on **distributed ledgers** (blockchains), where a consensus mechanism rather than a central intermediary validates ownership. Most have no cash flows or fundamental value: prices rest on expected appreciation from scarcity and future usefulness. The result is high returns, very high volatility and low (but rising) correlation with traditional assets, with weak legal protection and frequent fraud.

Learning outcomes in plain language

- LOS 1 Describe financial applications of DLT.** Distributed ledger = shared database where every node holds a matching copy; elements: ledger, consensus mechanism, participant network; cryptography and **smart contracts** (self-executing code). Blockchain = blocks linked by hashes. **Proof of work** (miners solve costly puzzles; 51% attack threshold; energy intensive) vs **proof of stake** (validators pledge assets). **Permissionless** (open, decentralised, slower, costlier; e.g. Bitcoin) vs **permissioned** (restricted access, faster, cheaper, central governance). Uses: cryptocurrencies, tokenization of physical assets, post-trade clearing and settlement, compliance.
- LOS 2 Explain investment features and contrast with other asset classes.** Differences: *inherent value* (no cash flows), *transaction validation* (decentralised ledgers vs private central ledgers), *medium of exchange* (limited acceptance; not legal tender in most places) and *legal and regulatory protection* (ambiguous, evolving). Types: Bitcoin; altcoins (Ether, programmable), stablecoins (collateralised or algorithmic), meme coins; CBDCs; tokens — NFTs, security tokens (incl. ICOs), utility tokens, governance tokens.
- LOS 3 Describe investment forms and vehicles.** Direct: buy on centralised exchanges (liquid, transparent, but hackable servers) or decentralised exchanges (hard to attack, hard to regulate); held in wallets (lost keys = lost assets; about 20% of Bitcoin reportedly in lost or deserted wallets). Risks: fraud, pump and dump, Ponzi schemes, “whales”. Indirect: coin trusts (no wallet; fees can exceed 2%; premium/discount to NAV), cash-settled futures (e.g. CME), crypto ETFs (cash and derivatives), crypto stocks, hedge funds. Asset-backed tokens (fractional ownership; usually treated as securities), dApps and DeFi.
- LOS 4 Analyze risk, return and diversification.** Value from supply limits (Bitcoin capped at 21 million) and demand; drivers include adoption, network effects, technology, regulation, speculation and risk appetite. Bitcoin: high mean, high volatility, positive skew; low correlations (0.21 with S&P 500, 0.14 with global bonds) that have risen as institutional participation grew — so diversification benefits “remain to be seen”.

Key facts

Monthly log returns, Jan 2011–Jan 2022	Bitcoin	S&P 500 TR	MSCI World	Global Agg. bonds
Average	8.84%	1.13%	0.66%	0.16%
Standard deviation	0.32	0.04	0.04	0.01
Coefficient of variation	3.66	3.43	6.09	8.16
Correlation with Bitcoin	1	0.21	0.22	0.14

Worked example (CFA curriculum)

Bitcoin’s ride. From USD0.05 (mid-2010) to a peak of USD68,789 (10 November 2021), then about USD17,709 (18 June 2022): a drawdown of $1 - 17,709/68,789 = 74\%$ in seven months, which is why early investors gained hugely and later entrants lost heavily.

Terra/Luna (algorithmic stablecoin, backed only by Luna). Redemptions of TerraUSD for newly minted Luna raised Luna’s supply from 350 million to 6.5 trillion coins in a week (about **18,600×**); both collapsed.

FTX (centralised exchange). Alameda held over a third of its USD14.6bn balance sheet (over **USD4.8bn**) in FTT or FTT collateral; FTT fell from over USD25 to about USD1 ($\approx -96\%$); FTX listed USD9bn of liabilities against USD0.9bn of liquid assets (**10%**).

What examiners like to test

- **Direct or indirect?** ICO, NFT purchase, trading tokens on an exchange = direct; ETF, coin trust, futures, crypto stocks, hedge funds = indirect. Best way to track Bitcoin without a wallet = coin trust.
- **PoW vs PoS and value drivers:** miners solve puzzles (PoW); validators stake (PoS); both are rewarded with new assets. Cash flow is *not* a value driver; supply limits and network type are. Decentralised exchanges are least vulnerable to hacks.
- **Two definitions to watch:** [Note: the book says stablecoins “cannot be exchanged for fiat money”, yet Example 2 says Tether and USD Coin can be redeemed for their dollar value from issuers. Exhibit 9 here uses CV = standard deviation/mean (lower = better), while the Hedge Funds module defines CV as return per unit of risk (higher = better).]