

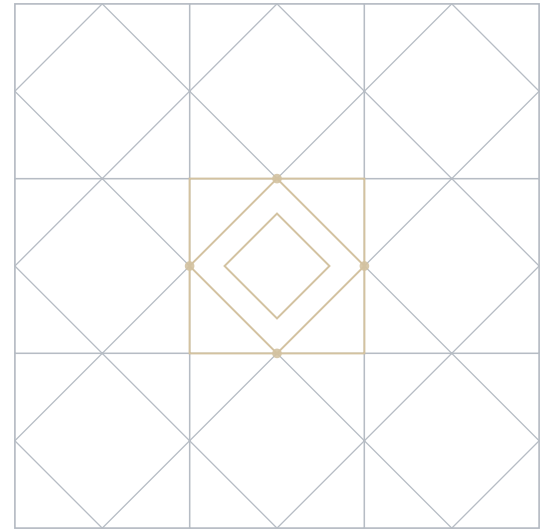
BIIRG

VOLUME III

REAL ASSETS

Analyst Training Manual

Institutional foundations, underwriting,
valuation, portfolio construction, risk, and
Shariah-aware analysis.



Baruch Islamic Investment Research Group

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DISCLAIMER

Educational use only. This manual is designed as analyst training material and does not constitute investment, legal, tax, accounting, engineering, appraisal, or Shariah advice. Valuation conventions, index methodologies, and lease and contract definitions differ across markets and vendors; analysts must apply the source methodology and the standards formally adopted by BIIRG rather than any figure recalled from this text.



BIIRG ANALYST TRAINING SERIES

A five-volume research curriculum

Volume I Equities Research	Volume II Fixed Income & Sukuk
Volume III Real Assets THIS VOLUME	Volume IV Macro Research
Volume V Quantitative Research	

The volumes are designed to be read in any order and used as reference throughout an analyst's tenure. Real Assets is the underwriting volume: physical assets, contracts, and financing are analysed at the asset level before any portfolio conclusion is drawn.

VOLUME III

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FRONT MATTER

How to Use This Manual

This manual is designed to take a new real-assets analyst from first principles to an institutional underwriting mindset.

It deliberately connects accounting, finance, property operations, macroeconomics, capital markets, legal structure, sustainability, and portfolio construction rather than teaching them as isolated topics. The goal is to make an analyst capable of reading an offering memorandum, rebuilding the economics independently, identifying the variables that actually drive value, challenging assumptions, and communicating a defensible investment view.

BIIRG STANDARD – THE UNDERWRITING CHAIN

An analyst should be able to move from asset → operating cash flow → capital structure → valuation → return → risk → portfolio role.

If any link in that chain is weak, the recommendation is incomplete.

The component system

Recurring kinds of material are marked consistently throughout the manual.

DEFINITION

Formal definition of a concept or term.

CORE CONCEPT

Foundational theory the rest of a chapter rests on.

ANALYST NOTE

Practical interpretation and desk-level judgment.

EXAMPLE

Illustrative application of a method.

BIIRG STANDARD**KEY TAKEAWAY**

The central conclusion of a section.

Expected BIIRG methodology or research standard.

FORMULA

Relationship, variable definitions, interpretation, application.

WATCH FOR

Analytical mistakes, data pitfalls, model weaknesses.

INVESTMENT IMPLICATION

Translation of asset-level analysis into a portfolio or capital-allocation decision.

Core analytical principle

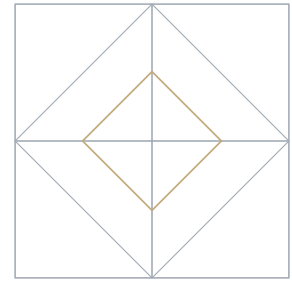
Real assets are physical or economically tangible assets whose value is tied to the use of land, structures, networks, equipment, or natural resources. Their returns usually combine current income with changes in asset value. Because assets are heterogeneous, location-bound, capital intensive, and often illiquid, analysis depends heavily on asset-specific underwriting. Institutional real-estate benchmarks such as the NCREIF Property Index are therefore property-level and market-value based, while global industry standards such as INREV emphasize consistent definitions, valuation, NAV, performance, liquidity, and reporting.

FRONT MATTER

Learning Outcomes

On completing this volume, a BIIRG real-assets analyst should be able to do each of the following without supervision.

-
- 01 Classify the major real-asset sectors and explain how their economic drivers differ.
 - 02 Build and audit property-level and project-level cash-flow models from revenue through levered equity returns.
 - 03 Use direct capitalization, discounted cash flow, comparable transactions, replacement cost, and public-market approaches appropriately.
 - 04 Underwrite debt, leverage, refinancing, covenant, and interest-rate risk rather than treating financing as a plug.
 - 05 Evaluate leases, tenants, development programs, infrastructure concessions, natural-resource economics, and operating KPIs.
 - 06 Distinguish core, core-plus, value-add, and opportunistic strategies and connect strategy labels to actual sources of risk.
 - 07 Measure performance using IRR, equity multiple, TWR, income return, appreciation return, and benchmark-relative analysis.
 - 08 Integrate macro, demographic, climate, regulatory, technological, and liquidity risks into an investment thesis.
 - 09 Apply a Shariah-aware analytical layer to financing, contracts, tenant and activity exposure, and investment structure while recognizing when qualified scholarly review is required.
 - 10 Write an investment memo that separates facts, assumptions, sensitivities, risks, mitigants, and decision criteria.
-

**PART I**

Foundations and Return Architecture

What qualifies as a real asset, why institutions own them, and the value chain that connects a physical asset to an investor return. Chapters 1 and 2 establish the vocabulary the rest of the volume uses.

- 01 Real Assets: The Investment Universe
- 02 Return Architecture and the Real-Asset Value Chain

PART I • FOUNDATIONS AND RETURN ARCHITECTURE**CHAPTER 01**

01 Real Assets: The Investment Universe

What counts as a real asset, the ways an institution can own one, and why the four strategy buckets are shorthand rather than underwriting.

1.1 What counts as a real asset?

Real assets include investments whose economics are substantially linked to physical assets or natural resources. The principal institutional categories are commercial and residential real estate, infrastructure, farmland, timberland, energy and resource assets, and selected

commodity exposures. CFA Institute distinguishes developed real estate from raw or less-developed land used in agriculture and forestry, and describes infrastructure as fixed assets developed for economic use, often involving public entities or public-private partnerships.

The defining analytical feature is not simply tangibility. It is the combination of asset-specific cash flows, physical constraints, local market exposure, capital intensity, and relatively high transaction costs. A warehouse, toll road, apartment building, data center, timber tract, and solar farm are all real assets, but they have radically different revenue contracts, operating leverage, duration, regulatory exposure, and residual-value behavior.

1.2 Direct versus indirect exposure

TABLE 1.1 – ROUTES TO REAL-ASSET EXPOSURE

EXPOSURE	EXAMPLES	ANALYTICAL EMPHASIS
Direct private ownership	Property, infrastructure project, farmland	Asset cash flow, valuation, financing, operations, exit
Private fund / JV	Closed-end fund, open-end core fund, club deal	Manager, fees, governance, NAV, liquidity, portfolio construction
Listed equity	REIT, infrastructure company	Corporate finance, public comps, NAV, FFO/AFFO, market sentiment
Debt	Mortgage, project finance, infrastructure debt	Collateral, DSCR, covenants, recovery, duration
Commodity exposure	Futures, producers, royalty interests	Curve, basis, operating costs, reserves, cyclicalities

Source: BIIRG Real Assets Division framework.

1.3 Why institutions own real assets

- **Income:** contractual rents, user fees, availability payments, crop or timber sales, royalties, or operating distributions.
- **Potential inflation linkage:** rents, replacement costs, regulated tariffs, and commodity prices may adjust with inflation, although timing and contractual structure matter.
- **Diversification:** return drivers can differ from listed equities and nominal bonds; however, correlations are regime-dependent and appraisal-based private indices can understate short-run volatility.
- **Long-duration liabilities:** infrastructure and core real estate can produce long-lived cash flows useful to pensions, insurers, endowments, and sovereign investors.

- **Operational alpha:** active leasing, redevelopment, cost control, financing, entitlement, and asset repositioning can create value beyond market beta.
- **Scarcity and barriers to entry:** land, permits, network effects, zoning, interconnection rights, water rights, and replacement-cost economics can support durable value.

1.4 The four strategy buckets

TABLE 1.2 — CORE, CORE-PLUS, VALUE-ADD, OPPORTUNISTIC

STYLE	TYPICAL ASSET CONDITION	INCOME STABILITY	LEVERAGE / PLAN RISK	PRIMARY RETURN SOURCE
Core	Stabilized, high quality, strong market	High	Low	Income + modest appreciation
Core-plus	Mostly stabilized with manageable issues	Moderate-high	Low-moderate	Income + leasing/operational upside
Value-add	Vacancy, capex, repositioning, lease-up	Moderate-low	Moderate	NOI growth + re-rating
Opportunistic	Development, distress, major repositioning, complex markets	Low / variable	High	Execution + development + capital markets

Source: BIIRG Real Assets Division.

WATCH FOR

Style labels are shorthand, not substitutes for underwriting. A core asset with a near-term lease cliff, floating-rate debt, weak tenant credit, or climate exposure can contain more risk than a conservatively financed value-add asset with pre-leasing and capped construction costs.

02 Return Architecture and the Real-Asset Value Chain

Where return actually comes from, and why inflation linkage is a line-item question rather than an asset-class property.

2.1 The fundamental return identity

At the asset level, total return can be decomposed into income return plus capital appreciation. At the equity level, financing modifies both the magnitude and timing of returns.

CORE CONCEPT – THE VALUE CHAIN

Demand → occupancy/utilization → pricing/rent → revenue → operating expenses → NOI/EBITDA → capex → unlevered cash flow → debt service → equity cash flow → terminal value → investor return.

2.2 Sources of value creation

- **Market beta:** broad changes in rents, utilization, cap rates and yields, commodity prices, and discount rates.
- **Selection:** buying an asset, submarket, tenant mix, concession, or resource base that outperforms peers.
- **Operations:** increasing occupancy, rent, throughput, ancillary revenue, recovery ratios, or cost efficiency.
- **Capital program:** renovations, expansions, energy upgrades, amenity packages, conversion, or redevelopment.
- **Capital structure:** financing at an appropriate cost, maturity, amortization profile, and hedge structure.
- **Structuring:** tax, governance, JV, concession, or contractual design that improves risk-adjusted economics.
- **Timing:** disciplined entry and exit, including avoiding forced sales into weak capital markets.

2.3 Going-in yield, growth, and exit yield

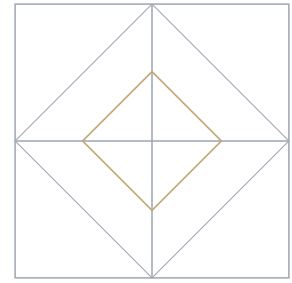
A simplified real-estate return intuition is that expected return depends on the initial income yield, growth in income, changes in valuation yield, capital expenditures, transaction costs, and leverage. If NOI grows while the market capitalization rate is unchanged, value rises. If cap rates expand, value can fall even when NOI grows. This interaction between cash-flow growth and discount or yield repricing is central to real-asset analysis.

2.4 Real versus nominal returns

Real assets are often marketed as inflation hedges, but analysts must distinguish contractual inflation linkage from empirical inflation sensitivity. Short leases can reprice faster than long leases. Infrastructure tariffs may have explicit CPI escalators, partial pass-through, caps, floors, or regulatory lag. Development costs can inflate faster than rents. Debt can be fixed or floating.

KEY TAKEAWAY

The correct inflation question is never whether an asset class hedges inflation. It is which line items reprice, by how much, and with what lag.



PART II

Real Estate Fundamentals

Property types and their operating models, the market study behind a demand assumption, the construction of NOI, the contracts that produce it, and the four valuation approaches. Chapters 3 to 7 are the technical core of the volume.

- 03 Real Estate Property Types and Operating Models
- 04 Market, Location, and Demand Analysis
- 05 Property-Level Financial Statements and NOI
- 06 Leases, Rent Rolls, Tenants, and Revenue Quality
- 07 Real Estate Valuation

03 Real Estate Property Types and Operating Models

Each sector is a different business wearing the same balance-sheet clothing. The demand driver, lease length, and operating leverage differ more than the buildings do.

3.1 Multifamily and residential

Multifamily economics are driven by household formation, employment, wage growth, migration, housing affordability, competing supply, concessions, renewal spreads, turnover, bad debt, and operating costs. Lease duration is typically short, which allows faster repricing but also exposes owners to frequent turnover and local regulation.

CORE CONCEPT – MULTIFAMILY KPI SET

Physical and economic occupancy	Turnover rate
Effective rent per unit	Bad debt and delinquency
New-lease and renewal rent growth	Operating expense per unit
Concessions	NOI margin
Supply pipeline as a share of stock	

3.2 Office

Office underwriting requires attention to tenant credit, lease duration, rollover schedules, tenant improvement allowances, leasing commissions, free rent, sublease availability, building quality, floorplate, transit access, and obsolescence. Headline rent can be misleading because net effective rent after concessions and capital costs may be much lower.

3.3 Industrial and logistics

Industrial demand is linked to goods consumption, inventories, manufacturing, e-commerce, logistics networks, port and rail access, power availability, clear height, loading configuration, truck courts, and last-mile density. Analysts should track rent per square foot, vacancy, new supply, absorption, tenant concentration, and replacement-cost economics.

3.4 Retail

Retail performance depends on trade-area demographics, tenant sales productivity, occupancy cost, tenant mix, anchor quality, lease structure, foot traffic, e-commerce substitution, and experiential or service demand. Grocery-anchored centers differ materially from regional malls, high-street retail, and net-lease assets.

3.5 Hotels

Hotels are operating businesses attached to real estate. Revenue resets daily and therefore has high cyclical sensitivity. Core metrics include occupancy, average daily rate, and revenue per available room. Analysts also examine GOP, EBITDA margins, brand and

management fees, property improvement plans, labor intensity, seasonality, and group versus transient mix.

FORMULA – REVPAR

$$\text{RevPAR} = \text{ADR} \times \text{Occupancy}$$

WHERE	ADR is average daily rate; occupancy is rooms sold divided by rooms available.
INTERPRETATION	Revenue per available room combines price and volume into one figure, so identical RevPAR can be produced by very different rate and occupancy mixes.
APPLICATION	Always decompose a RevPAR change into rate and occupancy before drawing a conclusion about pricing power or demand.

3.6 Specialized sectors

TABLE 3.1 – SPECIALIZED PROPERTY SECTORS

SECTOR	CORE DEMAND DRIVER	CRITICAL UNDERWRITING VARIABLES
Data centers	Cloud and AI compute, connectivity	Power availability, PUE, interconnection, tenant credit, capex, obsolescence
Life science	Biotech and pharma R&D	Cluster depth, lab buildout, tenant funding, specialized capex
Self-storage	Household mobility and space needs	Move-ins, street rates, occupancy, local supply
Student housing	Enrollment and university ecosystem	Pre-leasing, beds, distance to campus, academic calendar
Senior housing	Aging demographics and care needs	Occupancy, labor, acuity, regulation, operator quality
Medical office	Healthcare delivery	Health-system affiliation, tenant retention, specialized fit-out
Single-family rental	Household demand	Home prices, rent, maintenance, turnover, scattered-site efficiency

Source: BIIRG Real Assets Division.

04 Market, Location, and Demand Analysis

Moving from macro narrative to a specific parcel without losing the transmission mechanism along the way.

4.1 Top-down to bottom-up

A defensible market study moves from macro conditions to metro, submarket, micro-location, and asset. Analysts should avoid using national narratives to explain a local asset without testing the transmission mechanism.

TABLE 4.1 — THE FIVE LAYERS OF A MARKET STUDY

LAYER	QUESTIONS
Macro	Growth, inflation, rates, credit, construction costs, policy?
Metro	Population, employment, industry mix, incomes, household formation?
Submarket	Inventory, vacancy, absorption, rents, pipeline, barriers to entry?
Micro-location	Transit, roads, schools, amenities, safety, visibility, competing parcels?
Asset	Quality, layout, age, capex, amenities, tenant fit, functional obsolescence?

Source: BIIRG Real Assets Division.

4.2 Supply, demand, and absorption

Net absorption measures the change in occupied space over a period. Positive absorption indicates that occupied inventory increased; negative absorption indicates contraction. Vacancy alone is insufficient because a market can have low vacancy and a large construction pipeline, or high vacancy with little future supply. Analysts should build a forward supply-demand bridge: current vacant stock plus deliveries less expected net absorption equals implied future vacancy.

4.3 Replacement cost

Replacement cost includes land, hard construction costs, soft costs, financing carry, developer profit, and required return. When market values sit materially below replacement cost, new construction may become uneconomic, eventually constraining supply. When values are far above replacement cost and barriers to entry are weak, new supply can erode rents and occupancy.

4.4 Demographics and economic base

- Population growth and net migration are useful but insufficient; income, age, household size, education, and tenure matter.
- Employment growth should be decomposed by industry because sectors have different space intensity and cyclicalities.
- Concentration risk matters: a market dominated by one employer, university, military base, commodity, or government function may be less diversified.
- Accessibility and infrastructure can shift demand across submarkets even when metro-level fundamentals are stable.

05 Property-Level Financial Statements and NOI

Building revenue from drivers rather than growth rates, and stating the NOI definition before comparing anything to it.

5.1 Revenue build

A real-estate model should build revenue from contractual or operational drivers rather than simply growing last year's total. For a leased property, start with the rent roll and lease terms. For multifamily, use units multiplied by rent and occupancy, adjusted for concessions and bad debt. For hotels, use rooms multiplied by days, occupancy, and ADR, plus ancillary revenue.

5.2 Net operating income

DEFINITION — NET OPERATING INCOME

NOI is property revenue less property operating expenses before financing costs, income taxes, depreciation, and generally before capital expenditures. The exact definition must be stated because market participants may treat reserves, owner-paid tenant costs, or certain recurring capital items differently. NCREIF notes that even capitalization-rate definitions can differ depending on which NOI period and which value are used.

TABLE 5.1 – WHAT SITS ABOVE AND BELOW NOI

ABOVE NOI	BELOW NOI / NOT NORMALLY IN PROPERTY NOI
Base rent	Interest expense
Expense recoveries	Principal amortization
Parking and ancillary income	Income taxes at investor level
Property taxes	Depreciation and amortization
Insurance	Acquisition and disposition costs
Repairs and maintenance	Major capital expenditures
Utilities, payroll, management	Tenant improvements and leasing commissions, depending on convention

Source: BIIRG Real Assets Division; conventions vary by market and by vendor.

5.3 Expense recoveries and lease structure

In a gross lease, the landlord bears more operating-expense risk. In a net lease, some or all property expenses are passed to tenants. Triple-net structures typically shift taxes, insurance, and maintenance obligations substantially toward the tenant, but the exact lease language controls. Analysts should model reimbursement mechanics rather than infer economics from labels.

5.4 Capex versus opex

Operating expense maintains current operations and is generally recognized in the current period; capital expenditure creates or extends long-lived value and is capitalized for accounting purposes. Investment underwriting should focus on economic reality: recurring roof, HVAC, unit turns, leasing capital, and lifecycle replacement can consume cash even if accounting presentation places them below NOI.

5.5 Same-store analysis

Same-store analysis compares a stable cohort of assets across periods, reducing distortion from acquisitions, dispositions, and developments. It is useful for separating organic NOI growth from portfolio growth.

06 Leases, Rent Rolls, Tenants, and Revenue Quality

The contract is the asset. Duration, escalation, recovery, options, and credit determine how much of the headline rent an owner actually keeps.

6.1 Anatomy of a lease

- Premises and rentable area; commencement and expiration dates.
- Base rent, escalation schedule, indexation, percentage rent, or turnover rent.
- Operating-expense recoveries, base-year stops, caps, exclusions, and audit rights.
- Renewal, expansion, contraction, termination, purchase, and co-tenancy options.
- Security deposit, guarantee, letter of credit, parent support, or other credit enhancement.
- Tenant improvement allowance, landlord work, leasing commission, free rent, and other inducements.
- Assignment and subletting rights, change-of-control provisions, casualty and condemnation, and default remedies.

6.2 Rent roll analysis

The rent roll is a schedule of tenants, areas, rents, lease dates, and often recoveries or options. It is the starting point for revenue quality. Analysts should reconcile total rentable area, occupied area, contractual rent, and expiration schedules to the financial statements and offering materials.

6.3 Lease expiration risk

Weighted average lease expiry summarizes lease duration but can hide concentration. A property with a five-year WALE may still have 45% of rent expiring in one year. Always build an annual lease-expiry schedule by both area and base rent.

6.4 Mark-to-market

Mark-to-market compares in-place rent with current market rent. Below-market leases create potential upside at rollover; above-market leases create downside. The analyst must then incorporate downtime, probability of renewal, tenant improvements, leasing commissions, free rent, and market-rent growth.

6.5 Tenant credit

Tenant credit affects expected rent collection, downtime, renewal probability, and valuation. Public ratings are useful when available, but analysts should also examine profitability, leverage, liquidity, industry conditions, store or unit economics, funding runway, and the strategic importance of the location.

WATCH FOR

A long lease is not automatically low risk. A long lease to a deteriorating tenant at above-market rent can create significant binary credit and re-leasing risk.

07 Real Estate Valuation

Four approaches, one reconciliation, and the discipline to treat divergence between methods as information rather than noise.

7.1 Direct capitalization

FORMULA – DIRECT CAPITALIZATION

$$\text{Value} = \text{NOI} \div \text{Cap Rate} \quad \cdot \quad \text{Cap Rate} = \text{NOI} \div \text{Value}$$

WHERE	NOI is a stabilized or normalized forward figure; the cap rate is drawn from comparable transactions on a consistent NOI and value definition.
INTERPRETATION	A one-period income capitalization framework, most appropriate when a stabilized income stream can be represented by a single normalized NOI.
APPLICATION	State the NOI period and the value basis every time a cap rate is quoted, including in comparables.

TABLE 7.1 – CAP-RATE SENSITIVITY OF VALUE

NOI	CAP RATE	IMPLIED VALUE
\$5.0m	5.0%	\$100.0m
\$5.0m	5.5%	\$90.9m
\$5.0m	6.0%	\$83.3m
\$5.5m	5.5%	\$100.0m

Source: BIIRG Real Assets Division; illustrative.

The table demonstrates convex sensitivity: a 50 basis point cap-rate move can create a large valuation change. Cap rates reflect expected growth, risk, liquidity, capital costs, asset quality, and market conditions; they should not be treated as a mechanically observable discount rate.

7.2 Discounted cash flow

DCF values the asset as the present value of periodic unlevered cash flows plus terminal value. The analyst explicitly models rents, occupancy, expenses, capital costs, and sale proceeds. Terminal value is commonly estimated by capitalizing a forward NOI at an exit cap rate and deducting selling costs.

DCF is powerful because it makes assumptions visible. It is also vulnerable to false precision. A model with twenty tabs does not become reliable if market rent, downtime, capex, or exit assumptions are weak.

7.3 Comparable sales

Comparable-sales analysis uses observed transactions adjusted for differences in location, quality, age, tenancy, growth, lease duration, financing conditions, and timing. Common metrics include price per square foot, price per unit, cap rate, and price per key for hotels.

7.4 Cost approach

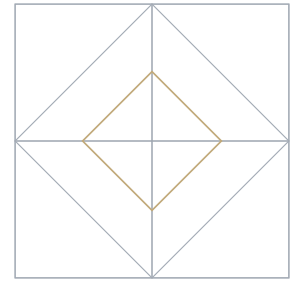
The cost approach estimates land value plus depreciated replacement or reproduction cost. It is particularly relevant for newer, specialized, or thinly traded assets and as a supply discipline. Functional and economic obsolescence must be recognized.

7.5 Valuation reconciliation

Institutional valuation rarely relies on one method. The analyst should reconcile DCF, direct cap, transactions, and replacement cost, explaining why one receives greater weight. A divergence between methods is information: it may indicate unstable NOI, unusual capital requirements, stale comps, or a market dislocation.

7.6 Cap rate versus discount rate

The cap rate capitalizes one year's income into value and embeds expected growth implicitly. The discount rate prices a stream of future cash flows explicitly. Under a simplified perpetuity-growth model, the cap rate is conceptually related to the discount rate minus long-run growth, but real-world cash flows, capex, leases, and risk are too complex for that identity to be used mechanically.



PART III

Capital, Transactions, and Execution

Financing as an underwriting decision rather than a plug, the transaction process from teaser to closing, development economics, and the asset-management work that determines whether the business plan is delivered.

- 08 Debt, Leverage, and Capital Structure
- 09 Acquisition Underwriting and Transaction Process
- 10 Development and Redevelopment Underwriting
- 11 Asset Management and Value Creation

PART III · CAPITAL, TRANSACTIONS, AND EXECUTION

CHAPTER 08

08 Debt, Leverage, and Capital Structure

Why leverage amplifies value changes faster than it amplifies income, and what a levered underwriting must stress before it reaches committee.

8.1 Core debt metrics

TABLE 8.1 — DEBT METRICS AND WHAT THEY TEST

METRIC	FORMULA OR MEANING	INTERPRETATION
LTV	Loan balance / asset value	Collateral leverage
LTC	Loan / total project cost	Development financing intensity
DSCR	NOI or CFADS / debt service	Debt-service capacity
Debt yield	NOI / loan balance	Unlevered lender yield and leverage check
Interest coverage	NOI or EBITDA / interest	Ability to pay interest
Amortization	Scheduled principal repayment	Reduces balance but uses cash
Maturity	Date principal becomes due	Refinancing and balloon risk

Source: BIIRG Real Assets Division.

8.2 Positive and negative leverage

Leverage is accretive when the return on the asset exceeds the effective cost of debt, all else equal. It is dilutive when borrowing costs exceed asset returns. More importantly, leverage increases equity sensitivity to changes in asset value. A 10% decline in a 60% LTV asset can reduce equity value by roughly 25% before transaction costs, because the debt claim does not fall proportionally.

8.3 Fixed versus floating rate

Fixed-rate debt creates payment certainty but can carry prepayment costs. Floating-rate debt exposes the borrower to benchmark-rate changes and may require interest-rate caps or swaps. Analysts should model the actual benchmark, spread, floor, cap, hedge premium, extension tests, and maturity.

8.4 Refinancing risk

Refinancing risk is a function of future NOI, future valuation yields, lender LTV and DSCR requirements, and debt-market pricing. An asset can perform operationally yet still require an equity injection at maturity if cap rates expand or lenders reduce proceeds.

8.5 Covenants and structural protections

- Cash-management triggers and lockboxes.
- Reserve requirements for taxes, insurance, capex, or leasing.
- Minimum DSCR or debt-yield tests.

- Maximum LTV tests.
- Interest-rate hedge requirements.
- Recourse carve-outs and bad-boy guarantees.
- Completion guarantees for development.
- Distribution restrictions and cash sweeps.

8.6 Debt sensitivity

BIIRG STANDARD – MINIMUM DEBT STRESS

Every levered underwriting should test: +100 and +200 basis points on interest rates where relevant, a lower refinance LTV, a higher refinance spread, lower NOI, a higher exit cap rate, and a delayed sale or refinancing.

09 Acquisition Underwriting and Transaction Process

The sequence from screening to closing, the diligence workstreams that support it, and the difference between estimating value and rationalizing a price.

9.1 From teaser to closing

1. Screen the opportunity against mandate, geography, sector, check size, return target, leverage, and Shariah constraints.
2. Build a first-pass underwriting using independent market assumptions.
3. Review the offering memorandum, rent roll, historical operating statements, capex history, leases, debt, tax, and physical information.
4. Submit an indication of interest or preliminary bid if economics meet threshold.
5. Conduct detailed commercial, legal, financial, tax, technical, environmental, insurance, and where relevant Shariah due diligence.
6. Negotiate the purchase and sale agreement, financing, JV documents, representations, escrows, and closing conditions.
7. Refresh underwriting for diligence findings and prepare final investment committee materials.

8. Close, establish reporting and controls, and transfer the asset into the asset-management plan.

9.2 Sources and uses

TABLE 9.1 – SOURCES AND USES OF FUNDS

SOURCES	USES
Equity	Purchase price
Senior debt	Closing costs
Mezzanine or preferred equity	Immediate capex
Seller financing	Financing fees and reserves
Other	Working capital and interest reserve

Source: BIIRG Real Assets Division.

Sources must equal uses. The model should make financing fees, lender reserves, transfer taxes, acquisition fees, and immediate capital needs explicit rather than burying them in purchase price.

9.3 Due-diligence workstreams

TABLE 9.2 – DUE-DILIGENCE WORKSTREAMS

WORKSTREAM	EXAMPLES
Financial	Historical P&L, bank statements, AR/AP, tax bills, capex
Lease / tenant	Lease abstracts, estoppels, options, arrears, disputes
Physical	Roof, structure, MEP, façade, elevators, deferred maintenance
Environmental	Phase I/II, contamination, hazardous materials, flood
Legal / title	Title, survey, easements, zoning, litigation, permits
Market	Comps, pipeline, absorption, rent, incentives, tenant demand
Insurance	Coverage, exclusions, deductibles, catastrophe pricing
Tax	Property-tax reassessment, transfer tax, entity tax, withholding
Technology / data	Building systems, cyber exposure, metering, controls

Source: BIIRG Real Assets Division.

9.4 Price versus value

INVESTMENT IMPLICATION

The analyst's job is to estimate value and return under a range of outcomes, not to rationalize the seller's price. Bid discipline should be linked to a required return, downside protection, and probability-weighted scenarios.

10 Development and Redevelopment Underwriting

Entitlement, design, procurement, construction, leasing, financing, and exit risk arrive at the same time. The development spread is what compensates for all of them.

10.1 Development economics

Development transforms land and capital into a completed asset. The key economic spread is between stabilized value and total development cost, adjusted for time, risk, financing, and required profit. Development creates exposure to entitlement, design, procurement, construction, leasing, financing, and exit markets simultaneously.

10.2 Development budget

- Land and acquisition costs.
- Hard costs: sitework, structure, MEP, interiors, landscaping.
- Soft costs: architecture, engineering, legal, permits, consultants.
- Financing costs: interest, lender fees, hedging, carry.
- Developer fee and project management.
- Leasing and marketing, tenant improvements, commissions.
- Contingency.
- Operating deficit and stabilization carry.

10.3 Yield on cost

FORMULA — STABILIZED YIELD ON COST

$$\text{Yield on cost} = \text{Stabilized NOI} \div \text{Total project cost}$$

WHERE	Total project cost includes land, hard and soft costs, financing carry, leasing capital, contingency, and the developer fee.
INTERPRETATION	Comparing yield on cost with the market cap rate gives the development spread. A positive spread suggests value creation.
APPLICATION	The spread is only meaningful if cost, schedule, stabilization, and exit assumptions are credible; test each before quoting it.

10.4 Construction risk

Analysts should distinguish guaranteed maximum price contracts from cost-plus structures, and understand contractor credit, contingencies, change-order mechanisms, long-lead items, labor availability, material escalation, and liquidated damages. Schedule delay affects both cost and present value.

10.5 Lease-up and stabilization

A development model should use explicit absorption, lease commencement, free-rent, TI and LC, and occupancy assumptions. Stabilization is not the date construction ends; it is the point at which the asset reaches a sustainable operating state.

10.6 Residual land value

Residual land value works backward from expected completed value, subtracting construction and soft costs, financing, required developer profit, and a risk allowance. It is useful for testing what land price a development can support.

11 Asset Management and Value Creation

The business plan after closing: what is monitored, what is escalated, and how the hold-versus-sell question should actually be framed.

11.1 Asset management versus property management

Property management handles day-to-day operations such as collections, maintenance, vendors, and tenant service. Asset management acts on behalf of ownership to maximize risk-adjusted value through business planning, leasing strategy, capital allocation, financing, performance monitoring, and disposition decisions.

11.2 Annual business plan

CORE CONCEPT – COMPONENTS OF THE ANNUAL PLAN

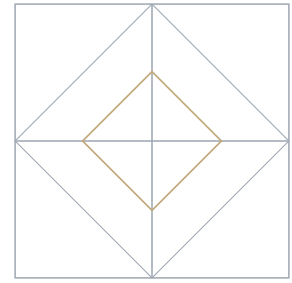
Budget and monthly cash-flow forecast	Valuation and hold/sell analysis
Leasing plan and tenant-retention strategy	Risk register and insurance review
Capital plan with ROI and lifecycle priority	Sustainability and resilience initiatives
Financing and covenant plan	Variance thresholds and escalation procedures

11.3 Variance analysis

Compare actual against budget and prior year for occupancy, rent, recoveries, bad debt, payroll, repairs, utilities, taxes, insurance, NOI, capex, and leasing costs. Variance commentary should identify cause, persistence, controllability, and action.

11.4 Hold/sell analysis

The relevant decision is forward-looking: expected return from today's value if held versus proceeds and reinvestment alternatives if sold. Original cost is sunk. Analysts should model transaction costs, taxes where relevant, debt prepayment, near-term capex, and changing risk.



PART IV

Infrastructure, Resources, and Vehicles

Beyond buildings: concession and contract economics, biological and reserve-based assets, the listed market's version of the same cash flows, and the fund structures through which institutions actually hold them.

- 12 Infrastructure
- 13 Natural Resources, Timber, Farmland, and Commodities
- 14 Public Real Assets: REITs and Listed Infrastructure
- 15 Fund Structures and Private-Market Vehicles

PART IV · INFRASTRUCTURE, RESOURCES, AND VEHICLES

CHAPTER 12

12 Infrastructure

Revenue models decide the risk profile. Who bears volume risk, who sets price, and what happens at concession expiry are the first three questions.

12.1 Infrastructure categories

TABLE 12.1 – INFRASTRUCTURE CATEGORIES AND REVENUE MODELS

CATEGORY	EXAMPLES	REVENUE MODEL
Transportation	Toll roads, airports, ports, rail	User fees and concessions
Utilities	Electricity, gas, water networks	Regulated or contracted tariffs
Digital	Fiber, towers, data infrastructure	Long-term contracts and usage
Energy transition	Solar, wind, storage, transmission	PPAs, merchant power, capacity
Social	Hospitals, schools, public facilities	Availability and government payments

Source: BIIRG Real Assets Division.

12.2 Greenfield versus brownfield

Greenfield infrastructure is developed from new construction and bears permitting, construction, ramp-up, and demand risk. Brownfield assets are operational and offer historical data but may require maintenance capex, concession renewal, or modernization.

12.3 Revenue models

- **Availability-based:** payment depends primarily on asset availability and performance rather than demand volume.
- **Demand-based:** revenue depends on traffic, throughput, passengers, or users.
- **Regulated:** tariffs are set under a regulatory framework, often based on allowed returns or cost recovery.
- **Contracted:** long-term offtake or service contracts determine price and volume.
- **Merchant:** revenue is exposed substantially to market prices and volumes.

12.4 Project finance

Project finance commonly uses a bankruptcy-remote special-purpose vehicle where lenders rely primarily on project cash flows and contractual protections. Analysts focus on cash flow available for debt service, DSCR, the loan life coverage ratio, reserve accounts, contract counterparties, completion support, and waterfall priority.

12.5 Concession analysis

For concessions, the analyst must understand term, handback obligations, tariff escalation, performance standards, force majeure, change-in-law provisions, termination compensation, and residual value. A high current yield can be misleading if the concession has a short remaining life and no terminal ownership.

12.6 Infrastructure risk matrix

TABLE 12.2 – INFRASTRUCTURE RISK MATRIX

RISK	QUESTION
Construction	Can the project be delivered on time and budget?
Demand	Who bears volume risk?
Price	Is pricing fixed, indexed, regulated, or merchant?
Counterparty	Can the offtaker, government, or tenant pay?
Regulatory	Can allowed returns or permits change?
Technology	Could the asset become obsolete?
Political	Can concession terms, taxes, or ownership rules change?
Residual	What happens at contract or concession expiry?

Source: BIIRG Real Assets Division.

13 Natural Resources, Timber, Farmland, and Commodities

Biological growth, reserve life, and curve shape replace leases and occupancy as the underlying mechanics of return.

13.1 Farmland

Farmland returns combine operating income and land appreciation. Drivers include crop yields, commodity prices, input costs, water access, soil quality, weather, tenant or operator structure, local land supply, and alternative-use value. Lease structures may be fixed cash rent, crop share, or directly operated.

13.2 Timberland

Timber has a distinctive biological growth component: trees physically grow in volume and can often be harvested within a range of dates, creating optionality to defer harvest when prices are weak. Analysts examine species, age class, growth rates, harvest schedule, mill access, transport, fire and pest risk, land value, and carbon or conservation economics where relevant.

13.3 Energy and mineral assets

Upstream resource assets require reserve and resource analysis, production decline curves, realized commodity prices, operating costs, royalties, taxes, sustaining capex, development capex, and abandonment liabilities. The distinction between proved, probable, and possible resources is fundamental because certainty and development status drive valuation.

13.4 Commodity exposure

Commodity futures are not equivalent to owning a physical productive asset. Futures returns can include spot-price movement, collateral yield, and roll yield arising from the shape of the futures curve. Contango can create negative roll yield for a long investor; backwardation can create positive roll yield, all else equal.

13.5 Royalty and streaming models

Royalty interests receive a share of revenue or production with limited direct operating responsibility. Streaming agreements typically provide the right to purchase a portion of production at a predetermined price. Analysts must understand counterparty, reserve life, cost-inflation exposure, contract seniority, and asset concentration.

14 Public Real Assets: REITs and Listed Infrastructure

The same buildings, priced daily by a different mechanism. FFO, AFFO, and NAV are the bridge between property underwriting and public-equity valuation.

14.1 REIT economics

Listed REIT analysis bridges property-level underwriting and public-equity valuation. Analysts should understand portfolio NOI,

14.2 FFO and AFFO

Funds from operations is commonly used to adjust net income for real-estate depreciation and gains or losses on property

same-store growth, the development pipeline, leverage, debt maturity, management quality, external growth, and the relationship between share price and net asset value.

sales. Adjusted funds from operations attempts to move closer to recurring distributable cash flow by making further adjustments, often including recurring capital expenditures and straight-line rent. Definitions vary by issuer, so reconcile rather than accept labels.

14.3 NAV analysis

A REIT NAV model estimates gross asset value by capitalizing property NOI or using asset-level DCF and comparables, then subtracts net debt and other claims and adds non-property assets. NAV per share can be compared with the market price. A discount may reflect governance, leverage, asset quality, external management, or capital-allocation concerns; a premium may reflect growth, quality, scarcity, or management credibility.

14.4 Public versus private pricing

WATCH FOR

Listed real assets reprice continuously and can lead appraisal-based private valuations. Private indices may appear smoother because appraisals occur periodically and are not transaction prices every day. Be careful when comparing volatility and correlation across public and private datasets.

15 Fund Structures and Private-Market Vehicles

Term, liquidity, control, and the waterfall determine how much of the asset-level return reaches the investor.

15.1 Closed-end funds

Closed-end private funds typically raise commitments during a fundraising period, call capital as investments are made, operate for a fixed term with possible extensions, and distribute proceeds as assets are realized. Analysts should

15.2 Open-end funds

Open-end vehicles have no fixed termination date and may offer periodic subscriptions and redemptions, subject to liquidity mechanisms. In private real estate, redemption queues, gates, cash buffers, and secondary transfers matter because underlying assets are illiquid.

understand investment period, term, extensions, recycling, key-person clauses, removal rights, and distribution waterfalls.

15.3 Joint ventures

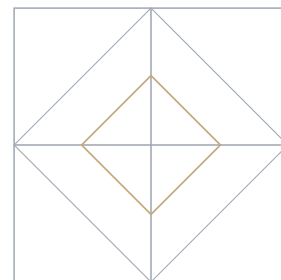
A joint venture aligns a capital partner with an operating partner. Core terms include contributions, control rights, major decisions, budgets, additional capital, dilution and default remedies, fees, promote, transfer restrictions, buy-sell mechanisms, and exit rights.

15.4 Fees and waterfalls

- **Management fee:** often charged on commitments, invested capital, NAV, or another base depending on phase.
- **Transaction fees:** acquisition, disposition, development, and property-management fees must be identified separately from investment-management fees.
- **Preferred return or hurdle:** return threshold before performance participation changes.
- **Catch-up:** allocation that allows the manager to reach an agreed profit share after the hurdle.
- **Carried interest or promote:** performance participation allocated after specified conditions.
- **Clawback:** mechanism intended to reconcile over-distributed carry at fund end.

15.5 NAV and reporting standards

INREV's guidelines organize non-listed real-estate standards across governance, reporting, property valuation, performance measurement, NAV, fee and expense metrics, liquidity, data delivery, and tax conduct. Its NAV framework seeks an economic measure based on the fair value of underlying assets and liabilities with specified adjustments.



PART V

Performance, Portfolio, and Risk

Measuring what was earned, deciding what role an asset plays in a portfolio, and framing the risks that a single-asset model does not naturally surface.

- 16 Performance Measurement and Benchmarking
- 17 Portfolio Construction and Real Assets in Multi-Asset Portfolios
- 18 Risk Framework
- 19 Macroeconomic and Capital-Markets Framework
- 20 Sustainability, Climate, and Resilience

PART V · PERFORMANCE, PORTFOLIO, AND RISK

CHAPTER 16

16 Performance Measurement and Benchmarking

Money-weighted and time-weighted returns answer different questions, and the benchmark has to match the mandate before any comparison means anything.

16.1 IRR

IRR is the discount rate that sets the net present value of cash flows to zero. It is money-weighted and therefore sensitive to the timing of contributions and distributions. INREV notes that since-inception IRR is commonly used for investment performance, while time-weighted returns can be more indicative of manager performance where cash-flow timing is not controlled by the manager.

16.2 Equity multiple

Equity multiple is total equity distributions divided by total equity invested. It is intuitive but ignores time. A 2.0x multiple over three years is economically different from 2.0x over ten years.

16.3 Time-weighted return

TWR geometrically links subperiod returns and reduces the effect of external cash-flow timing. It is widely used for comparing manager performance when the manager does not control client cash flows.

16.4 Income and appreciation return

Property total return can be decomposed into income return and capital-value return. NCREIF's NPI is a quarterly, market-value-weighted, unleveraged property index for institutional U.S. commercial real estate, and reports total return based on property performance rather than fund leverage.

16.5 Private-market multiples

TABLE 16.1 – PRIVATE-MARKET PERFORMANCE MULTIPLES

METRIC	FORMULA	USE
DPI	Distributions / paid-in capital	Realized cash returned
RVPI	Residual value / paid-in capital	Unrealized value
TVPI	(Distributions + residual value) / paid-in capital	Total value relative to capital
MOIC	Value / invested capital	Broad multiple; definition should be stated

Source: BIIRG Real Assets Division.

16.6 Benchmarking

Benchmark selection must match geography, sector, leverage, strategy, and vehicle type. A levered value-add fund should not be evaluated mechanically against an unlevered core property index. NCREIF itself cautions that the NPI represents a specific institutional property universe and may not represent the market as a whole.

16.7 GIPS

The GIPS standards are voluntary ethical standards for calculating and presenting investment performance, built around fair representation and full disclosure. Analysts working with track records should understand firm definition, discretion, composites, valuation, fees, and verification concepts.

17 Portfolio Construction and Real Assets in Multi-Asset Portfolios

Diversification measured across economic drivers rather than labels, and risk budgeted by contribution rather than by capital.

17.1 Portfolio role

The same asset can serve different portfolio roles depending on structure. A stabilized apartment portfolio may be an income and diversification allocation; a development fund may behave more like leveraged cyclical equity; infrastructure debt may resemble long-duration credit; commodity futures may provide inflation or crisis sensitivity.

17.2 Diversification

Diversification should be assessed across economic drivers, not only labels. Two office buildings in different cities may share exposure to the same technology tenants and refinancing market. A data center and a utility may both depend on power infrastructure. Farmland and food-processing infrastructure may share weather and commodity risks.

17.3 Correlation and appraisal smoothing

Private real-asset returns are often appraisal based and less frequently observed than public securities. This can smooth measured volatility and correlation. Portfolio analysis should therefore combine historical statistics with economic factor analysis and stress testing.

17.4 Allocation dimensions

CORE CONCEPT – THE TEN ALLOCATION DIMENSIONS

Sector and subsector	Tenant and counterparty concentration
Geography and currency	Leverage and debt maturity
Strategy and business-plan intensity	Development exposure
Vintage year	Liquidity and vehicle structure
Lease or contract duration	Climate and regulatory exposure

17.5 Risk budgeting

INVESTMENT IMPLICATION

Risk budgeting asks how much portfolio risk each exposure contributes, not merely how much capital is allocated. A small highly levered development sleeve can contribute more downside risk than a much larger stabilized core allocation.

18 Risk Framework

A taxonomy, the difference between sensitivity and scenario work, and the break-even variables that a memo must state explicitly.

18.1 Risk taxonomy

TABLE 18.1 – REAL-ASSET RISK TAXONOMY

RISK	EXAMPLES	PRIMARY MITIGANTS AND ANALYSIS
Market	Rent decline, cap-rate expansion	Basis, diversification, sensitivity, margin of safety
Credit	Tenant or offtaker default	Credit analysis, guarantees, diversification
Liquidity	No buyer, redemption queue	Hold capacity, liquidity terms, staggered exits
Leverage	Covenant breach, equity wipeout	Lower LTV, fixed debt, reserves
Refinancing	Maturity proceeds shortfall	Longer maturity, amortization, extension options
Development	Cost, schedule, lease-up	Contingency, GMP, pre-leasing, experienced team
Operational	Poor management, outages	KPIs, controls, operator diligence
Physical	Fire, flood, structural failure	Engineering, insurance, resilience capex
Regulatory	Rent control, tariffs, zoning	Scenario analysis, legal diligence
Climate	Flood, heat, wildfire, transition	Hazard analysis, adaptation, insurance
Technology	Obsolescence	Capex plan, adaptable design, demand analysis
Governance	Conflicts, weak controls	Rights, reporting, independent oversight

Source: BIIRG Real Assets Division.

18.2 Sensitivity versus scenario analysis

Sensitivity analysis changes one variable at a time to understand model mechanics. Scenario analysis changes a coherent set of variables together. A recession scenario might combine lower rent growth, higher vacancy, greater concessions, slower lease-up, higher cap rates, and tighter refinancing.

18.3 Break-even analysis

- **Break-even occupancy:** occupancy required to cover operating costs and debt service.
- **Break-even construction cost:** maximum cost consistent with required return.

- **Break-even rent:** rent required to hit target return or covenant.
- **Break-even exit cap:** exit cap rate at which target IRR is met.
- **Break-even refinance value or NOI:** level needed to repay or refinance the maturity balance.

18.4 Expected-loss thinking

For binary or tail risks, probability multiplied by severity provides a useful starting framework, but correlations and nonlinearities matter. Flood risk, tenant default, and refinancing stress can occur together during a macro shock.

19 Macroeconomic and Capital-Markets Framework

Rates, inflation, and credit availability reach an asset through several channels at once, and rarely one-for-one.

19.1 Interest rates

Rates affect real assets through discount rates, cap rates, debt costs, development feasibility, buyer leverage, and relative attractiveness versus bonds. The relationship is not one-for-one because NOI growth, credit spreads, capital flows, and risk premia also move.

19.2 Inflation

Analyze inflation at the line-item level. Revenue may reprice through short leases or indexation; wages, utilities, insurance, construction, and property taxes may rise simultaneously. Assets with strong pricing power and low capital intensity may capture inflation better than assets with capped rents and rapidly rising expenses.

19.3 Credit conditions

Real-asset transaction markets depend on debt availability as well as rates. Wider spreads, lower lender LTVs, or stricter DSCR requirements reduce purchasing power and can pressure prices even if benchmark rates are unchanged.

19.4 Economic growth

GDP is a broad indicator; asset-specific demand often maps more directly to payrolls, household formation, retail sales, trade volumes, travel, electricity demand, industrial production, or cloud computing.

19.5 Capital-market regimes

TABLE 19.1 — REGIMES AND REAL-ASSET IMPLICATIONS

REGIME	TYPICAL REAL-ASSET IMPLICATION
Growth with benign inflation	Healthy demand; possible cap-rate compression
Growth with high inflation	Strong nominal revenue possible; financing and cost pressure
Recession with easing	Weak operations but eventual rate support
Stagflation	Weak real demand with high costs; asset selection critical
Credit crunch	Refinancing and transaction stress regardless of asset quality

Source: BIIRG Real Assets Division; see Volume IV for the macro framework in full.

20 Sustainability, Climate, and Resilience

Environmental analysis enters underwriting through cash flow, capex, insurance, financing, and terminal value, or it does not enter at all.

20.1 Investment relevance

Environmental analysis belongs in underwriting when it affects cash flow, capex, insurance, financing, regulation, tenant demand, or terminal value. It should not be treated as a detached scorecard.

20.2 Physical and transition risk

INREV's global definitions distinguish physical climate risk from transition risk. Physical risk includes acute and chronic climate impacts on assets; transition risk arises from policy, technology, market, and behavioral changes associated with movement toward a lower-carbon economy.

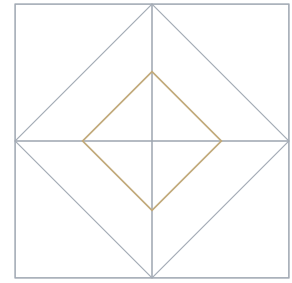
20.3 Key asset-level questions

- Is the asset exposed to flood, wildfire, heat, storm, drought, sea-level, or water stress?
- How are insurance availability, deductibles, exclusions, and premiums changing?
- What adaptation capex is required and when?
- Could building-performance standards require retrofits or penalties?
- Do tenants or buyers pay a premium for efficient and resilient assets, or discount obsolete stock?
- Are energy, water, emissions, and waste data reliable enough to support decisions?
- Could transition capex affect exit liquidity or lender appetite?

20.4 Stranded-asset risk

DEFINITION – STRANDED ASSET

A stranded asset experiences impaired economic value because it no longer meets market, regulatory, technological, or physical requirements without disproportionate reinvestment. Obsolescence can be functional, locational, environmental, or technological.



PART VI

Shariah, Practice, and Case Study

The Shariah-aware analytical layer, the workflow and memo standards BIIRG expects, model quality control, and a worked value-add industrial acquisition that exercises the whole chain.

- 21 Shariah-Aware Real-Asset Analysis
- 22 Analyst Workflow, Investment Memos, and IC Process
- 23 Modeling Standards and Quality Control
- 24 Practical Case Study: Value-Add Industrial Acquisition

PART VI · SHARIAH, PRACTICE, AND CASE STUDY

CHAPTER 21

21 Shariah-Aware Real-Asset Analysis

Where the analyst's work ends and qualified scholarly review begins, and what must be documented in between.

21.1 Scope and limits of this chapter

WATCH FOR

This chapter provides an analytical framework, not a Shariah ruling. Shariah compliance determinations must come from qualified scholars or a recognized Shariah board. The analyst's task is to identify, document, and escalate the features that require review, and to model their economic effect honestly.

21.2 Analytical layers

TABLE 21.1 – THE SHARIAH-AWARE REVIEW LAYERS

LAYER	WHAT THE ANALYST DOCUMENTS
Financing	Structure of debt or financing arrangements, pricing mechanism, and whether Islamic financing alternatives were assessed
Contracts	Lease, concession, offtake, and JV terms, including how risk and ownership are actually allocated
Activity exposure	Tenant, operator, and revenue-source activities, with quantified share of income where relevant
Vehicle structure	Ownership chain, income flows, treasury and cash management, and hedging instruments
Governance	Who reviews, on what standard, at what frequency, and how findings are remediated

Source: BIIRG Real Assets Division framework; determinations rest with qualified scholarly review.

21.3 Real assets and Islamic finance principles

Real assets sit naturally alongside asset-backed and asset-based financing concepts because the underlying exposure is a tangible asset generating income from use. That structural fit does not make any given transaction acceptable. Financing form, contractual substance, tenant activity, and the treatment of cash and hedging all require examination.

21.4 Tenant and revenue screening

Where an asset derives income from multiple tenants or activities, the analyst should quantify income by source rather than describe it qualitatively. A screening conclusion that rests on an unquantified share of revenue cannot be reviewed or monitored. Screening thresholds and the treatment of incidental income are matters for the applicable standard, not for analyst discretion.

21.5 Documentation standard

BIIRG STANDARD — SHARIAH-AWARE FILE

Every real-asset memo carries a section stating the financing structure, the contractual basis, the quantified activity exposure, the open questions referred for scholarly review, and the economic cost of any structuring required. Silence on these points is treated as an incomplete file.

22 Analyst Workflow, Investment Memos, and IC Process

A memo separates facts, assumptions, and judgment so a reader can disagree with the conclusion without re-deriving the analysis.

22.1 Memo structure

TABLE 22.1 — STANDARD MEMO SECTIONS

SECTION	CONTENT
Recommendation	The decision requested, size, structure, and conditions
Asset and transaction	Physical description, seller, process, price, timeline
Market	Metro, submarket, supply, demand, comparables
Business plan	Leasing, capex, operations, financing, exit
Underwriting	Cash flows, key assumptions, comparison to broker case
Returns	Unlevered and levered IRR, multiple, yield on cost, income profile
Sensitivities and scenarios	Downside, base, upside; break-evens
Risks and mitigants	Ranked, specific, with owner and action
Shariah-aware review	Structure, contracts, activity exposure, open questions
Conditions to close	Diligence items, approvals, financing, documentation

Source: BIIRG Real Assets Division.

22.2 Separating fact from assumption

Contractual rent is a fact. Market rent is an estimate. Renewal probability is a judgment. Exit cap rate is an assumption. A memo that presents all four in the same voice prevents the committee from testing the parts that actually carry the risk.

22.3 Comparison to the seller's case

State where BIIRG underwriting differs from the offering memorandum and why, line by line: market rent, downtime, credit loss, expense growth, capex, and exit assumptions. The differences are the analysis.

22.4 Committee discipline

INVESTMENT IMPLICATION

The committee decides on the case as written. An analyst who withholds a weak assumption to protect a recommendation transfers that risk to the portfolio without pricing it.

23 Modeling Standards and Quality Control

A model that cannot be audited by a colleague in an hour is not a usable model, regardless of its output.

23.1 Structure

- Separate inputs, calculations, and outputs; never hard-code an assumption inside a formula.
- One assumptions sheet, clearly labelled, with units and source for every input.
- Consistent periodicity, sign convention, and date logic across every schedule.
- A visible checks row: sources equal uses, balance sheet ties, cash never unintentionally negative, debt balance reconciles.

23.2 Review protocol

CORE CONCEPT — THE FOUR REVIEW PASSES

Tie-out: model to source documents

Logic: formulas, links, and edge cases

Reasonableness: assumptions against market

Stress: does the model break sensibly?

23.3 Common failure modes

WATCH FOR

Growth applied to a total rather than built from drivers. Leasing capital omitted from cash flow but assumed in NOI growth. Exit cap rate set equal to entry regardless of asset age at sale. Interest calculated on an opening balance while the loan draws mid-period. Debt sized on stabilized NOI at closing.

Each of these makes returns look better and each is found by a tie-out pass.

23.4 Version control and audit trail

Every version circulated externally or to committee should be dated, named, and archived unaltered, with a short change log. A model whose history cannot be reconstructed cannot support a post-mortem.

24 Practical Case Study: Value-Add Industrial Acquisition

An illustrative transaction that runs the full chain from rent roll to committee condition.

24.1 The asset

TABLE 24.1 – TRANSACTION SUMMARY (ILLUSTRATIVE)

ITEM	ASSUMPTION
Asset	Two-building warehouse, 320,000 sq ft, 32' clear
Occupancy at closing	78%, three tenants
In-place rent	\$7.10 per sq ft, market \$9.25
Purchase price	\$41.6m (\$130 per sq ft)
Immediate capex	\$3.2m roof, dock, LED, truck court
Financing	60% LTC, floating, capped, three-year term, two extensions
Hold	Five years

Source: BIIRG Real Assets Division; illustrative figures for training only.

24.2 The thesis and where it can fail

The thesis is a mark-to-market story: in-place rent sits 23% below market, and two of the three leases expire within the hold period. Value creation depends on capturing that spread while re-leasing the vacant 22% at market. The plan is therefore a leasing plan, and the risks are leasing risks: absorption in the submarket, competing deliveries, the cost of tenant improvements at market rent, and downtime between leases.

24.3 Underwriting differences from the offering memorandum

TABLE 24.2 — BROKER CASE VERSUS BIIRG CASE

ASSUMPTION	BROKER	BIIRG	BASIS
Market rent	\$9.75	\$9.25	Signed comps, not asking rents
Lease-up period	9 months	16 months	Submarket absorption and pipeline
Downtime at rollover	3 months	6 months	Historical re-leasing at the asset
TI on new leases	\$1.50	\$3.25	Recent deals of comparable term
Exit cap rate	5.25%	5.75%	Entry plus 50 bps for asset age at sale
Expense growth	2.5%	3.5%	Insurance and property-tax reassessment

Source: BIIRG Real Assets Division; illustrative.

24.4 What the sensitivity table has to show

Two variables carry the return: the exit cap rate and the achieved market rent. A memo on this asset should present levered IRR across a rent grid of roughly \$8.75 to \$9.75 and an exit cap grid of 5.25% to 6.25%, and state the break-even exit cap at target return, the break-even market rent, and the refinance NOI required at maturity under the capped floating structure.

KEY TAKEAWAY

The case is not attractive because rent is below market. It is attractive only if the spread can be captured within the hold period, at a leasing cost the model reflects, financed in a structure that survives the lease-up.

REFERENCE MATERIAL

Final Analyst Checklist

Run before any real-asset recommendation reaches committee.

-
- | | |
|----|---|
| 01 | Is the market assumption independent of the seller's, and sourced to signed transactions? |
|----|---|
-
- | | |
|----|--|
| 02 | Does revenue build from drivers, and does the rent roll reconcile to the financials? |
|----|--|
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- | | |
|----|--|
| 03 | Is the NOI definition stated, and are leasing capital and recurring capex funded in cash flow? |
|----|--|
-
- | | |
|----|--|
| 04 | Is the lease-expiry schedule shown by both area and rent, with downtime and renewal probability? |
|----|--|
-
- | | |
|----|---|
| 05 | Do the valuation methods reconcile, and is the divergence between them explained? |
|----|---|
-
- | | |
|----|--|
| 06 | Is the exit assumption justified rather than set equal to entry? |
|----|--|
-
- | | |
|----|---|
| 07 | Has the debt been stressed on rate, refinance proceeds, spread, and timing? |
|----|---|
-
- | | |
|----|--|
| 08 | Are break-even occupancy, rent, exit cap, and refinance NOI stated explicitly? |
|----|--|
-
- | | |
|----|---|
| 09 | Is the downside a coherent scenario rather than one variable moved? |
|----|---|
-
- | | |
|----|--|
| 10 | Are climate, insurance, and regulatory exposures priced into capex and terminal value? |
|----|--|
-
- | | |
|----|---|
| 11 | Does the Shariah-aware section quantify activity exposure and list open questions for review? |
|----|---|
-
- | | |
|----|---|
| 12 | Is the portfolio role stated, including what exposure this adds that the portfolio already has? |
|----|---|
-
- | | |
|----|---|
| 13 | Has the model passed a tie-out, logic, reasonableness, and stress review by a second analyst? |
|----|---|
-

APPENDIX A

Core Formula Sheet

MEASURE	FORMULA	NOTE
Net operating income	Revenue – operating expenses	Before financing, tax, depreciation
Cap rate	NOI ÷ value	State NOI period and value basis
Value (direct cap)	NOI ÷ cap rate	Stabilized income only
Yield on cost	Stabilized NOI ÷ total cost	Development spread versus market cap
RevPAR	ADR × occupancy	Decompose before interpreting
LTV	Loan ÷ value	Collateral leverage
LTC	Loan ÷ total cost	Development leverage
DSCR	NOI or CFADS ÷ debt service	Define the numerator
Debt yield	NOI ÷ loan balance	Value-independent leverage test
Equity multiple	Distributions ÷ equity invested	Ignores time
TVPI	(Distributions + residual value) ÷ paid-in	Total value to paid-in
DPI	Distributions ÷ paid-in	Realized only
Net absorption	Change in occupied space	Read with the supply pipeline
Residual land value	Completed value – costs – profit	Land price a scheme supports
Break-even occupancy	(Opex + debt service) ÷ potential revenue	Covenant headroom

Definitions vary by market and vendor. Apply the source methodology and the standard BIIRG has adopted, not a figure recalled from this sheet.

APPENDIX B

Glossary

AFFO	Adjusted funds from operations; FFO further adjusted toward recurring distributable cash flow.	Availability payment	Infrastructure revenue based on asset availability and performance rather than demand volume.
CFADS	Cash flow available for debt service; the project-finance coverage numerator.	Contango	Futures curve shape in which forward prices exceed spot, creating negative roll yield for a long position.
Debt yield	NOI divided by loan balance; a leverage test independent of appraised value.	Economic occupancy	Rent actually collected as a share of potential rent, unlike physical occupancy.
FFO	Funds from operations; net income adjusted for real-estate depreciation and property gains or losses.	GMP	Guaranteed maximum price construction contract, capping contractor cost exposure.
Handback	Condition in which a concession asset must be returned to the grantor at expiry.	Mark-to-market	The gap between in-place contractual rent and current market rent.
NPI	NCREIF Property Index; a quarterly, unleveraged, market-value-weighted U.S. institutional property index.	Net effective rent	Rent after concessions, free rent, and landlord capital costs are amortized over the term.
Promote	Performance participation allocated to a sponsor after specified return conditions.	Roll yield	The return component arising from rolling futures positions along the curve.
Stranded asset	An asset whose value is impaired because it no longer meets requirements without disproportionate reinvestment.	TWR	Time-weighted return; geometrically linked subperiod returns, reducing cash-flow timing effects.
WALE	Weighted average lease expiry; summarizes duration but can conceal concentration.	Yield on cost	Stabilized NOI divided by total project cost; compared with market cap rates for the development spread.

APPENDIX C

Institutional References and Study Sequence

Standards and data sources

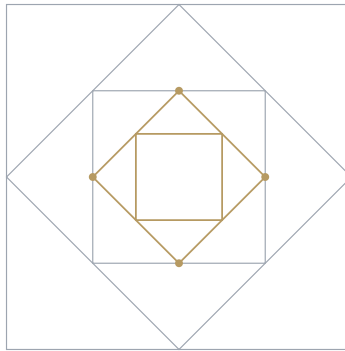
NCREIF	Property-level index methodology, NPI construction, return decomposition, and cap-rate definitions.
INREV	Non-listed real-estate guidelines: governance, reporting, valuation, performance, NAV, fees, liquidity, sustainability definitions.
GIPS	Voluntary standards for calculating and presenting investment performance.
CFA Institute	Real-asset classification, real-estate and infrastructure valuation, and portfolio-role frameworks.
Appraisal standards	The valuation standard applicable in the relevant market for definitions of value and method.

Suggested study sequence

1. Chapters 1 to 2, to fix vocabulary and the return identity.
2. Chapters 5 to 7, until NOI construction and the four valuation approaches are automatic.
3. Chapter 8, then rebuild a levered model from a real offering memorandum without looking at the seller's cash flows.
4. Chapters 3, 4, and 6, applied to one submarket the analyst will cover.
5. Chapters 12 to 15, for whichever non-real-estate sector or vehicle the division is underwriting.
6. Chapters 16 to 20, alongside Volume IV for the macro framework.
7. Chapters 21 to 24, before the first memo goes to committee.

Related volumes

Volume I for corporate and equity analysis underlying listed real assets, Volume II for financing structures and sukuk, Volume IV for the macro and capital-markets framework referenced in Chapter 19, and Volume V for the quantitative treatment of the correlation and risk-budgeting questions raised in Chapter 17.



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