Investment Analysis of Real Estate Development Projects

This presentation explores the economic analysis of real estate development projects, focusing on rigorous NPV-based approaches that improve upon traditional feasibility tools.

Beyond Traditional Feasibility

Current Limitations

Traditional feasibility tools are often ad hoc and not grounded in rigorous economic frameworks.

Market Equilibrium

Current methods often fail to fully consider basic economic principles of market equilibrium and opportunity cost.

Communication Gap

Traditional approaches make it difficult to communicate with mainstream finance and investment worlds.

Limited Creativity

Without rigorous frameworks, analysts lack deep understanding that facilitates innovation in project conceptualization.

Unique Features of Development Projects

Time-to-Build

Investment cash outflow is spread out in time instead of occurring all at once upfront.

Construction Loans

Debt financing is almost universal in construction phase, typically covering all construction costs.

Phased Risk Regimes

Development involves different levels of investment risk between construction, absorption, and stabilized phases.

Applying NPV to Development Projects

Identify Benefits and Costs

Forecast magnitudes and timings of benefits (completed buildings) and costs (construction).

Apply Appropriate Discount Rates

Use OCC discount rates appropriate to each type of projected cash flow.

Calculate Present Values

Discount projected values back to present using appropriate rates.

Determine NPV = V-P Costs

Calculate difference between present value of benefits and costs.

The FutureSpace Center Example

Project Details

Two office buildings with construction costs of $1.5M paid quarterly over 12 months.

First building completed at 6 months, second at 12 months.

Each building expected to produce $37,500 monthly cash flow in perpetuity.

Key Calculations

Present value of benefits (V_0): $9.352M

Present value of construction costs (K_0): $5.889M

Net economic value: $3.463M

Operational Leverage in Development

Higher Risk & Return

Development investments have higher risk and expected returns

Operational Leverage

Future costs not perfectly correlated with future benefits

Stabilized Properties

No operational leverage as investment occurs entirely at time 0

Risk Comparison: Development vs. Stabilized

9.38%

Stabilized Property IRR

Expected return for Hereandnow Place

16.59%

Development Project IRR

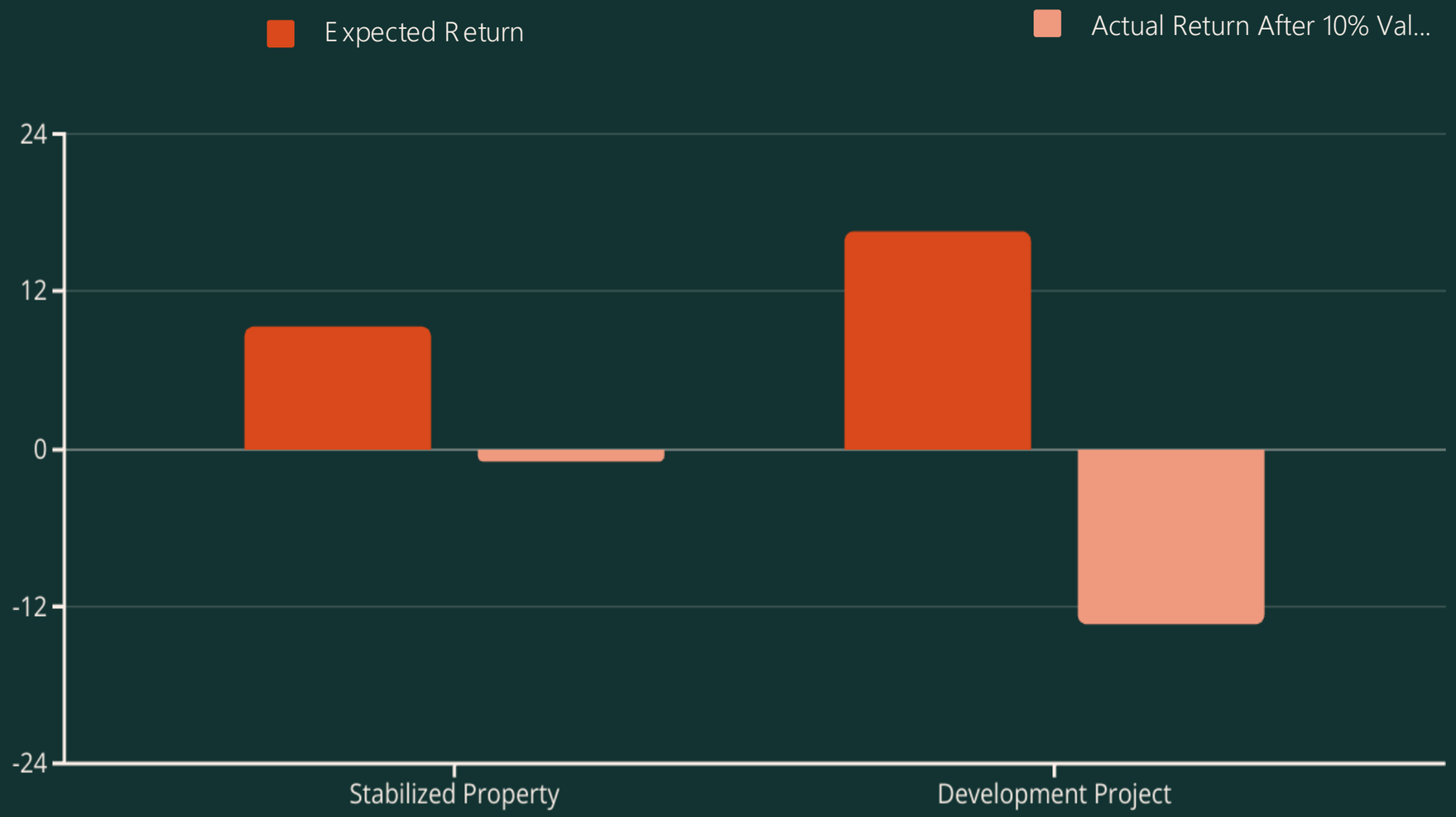
Expected return for FutureSpace Center

2.14x

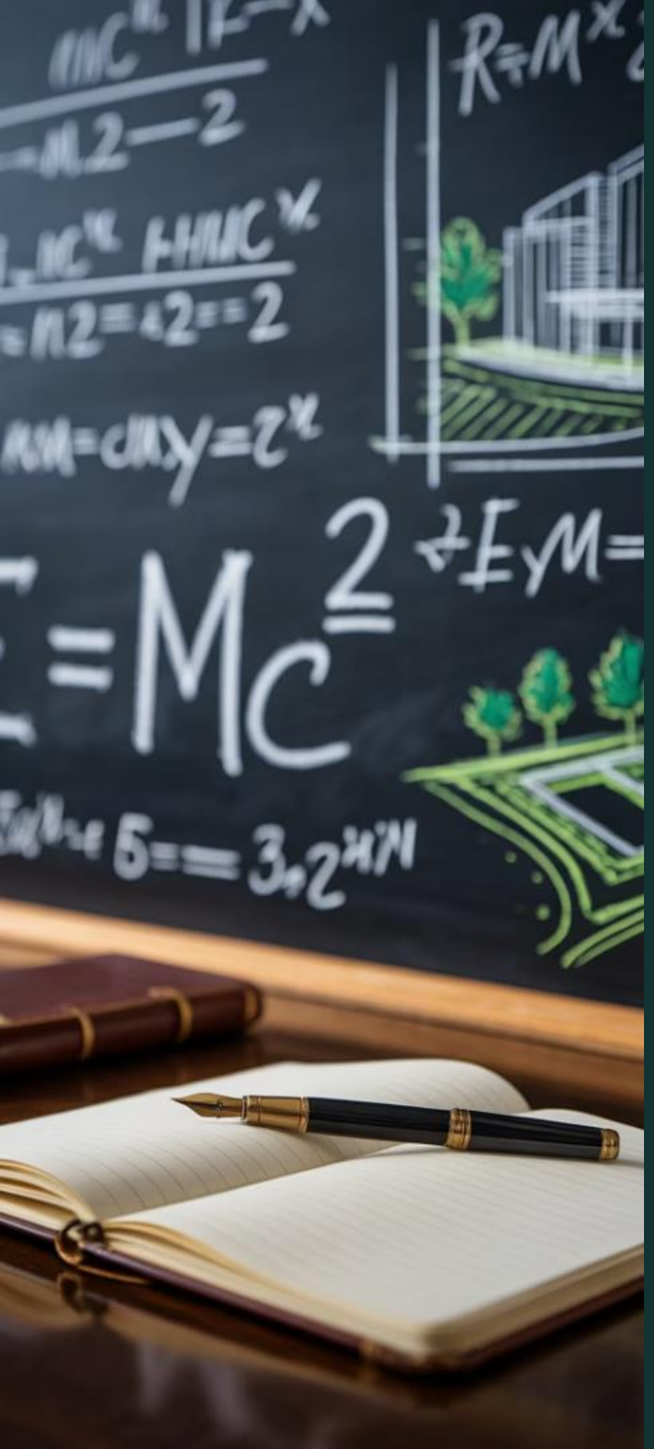
Risk Premium Ratio

Development risk premium vs. stabilized property

Impact of Negative Market Shifts



When asset values drop 10%, the development investment suffers a much larger percentage decline in returns due to operational leverage.



The Canonical Formula for Development OCC

A standardized approach to measuring development project OCC:

$$E[r_C] = [((V_T - K_T)(1 + E[r_V])^T (1 + E[r_D])^T)/((1 + E[r_D])^T V_T - (1 + E[r_V])^T K_T)]^{(1/T)} - 1$$

Equilibrium Condition

Balances markets for developable land, built property, and contractually fixed cash flows.

Standardized Timing

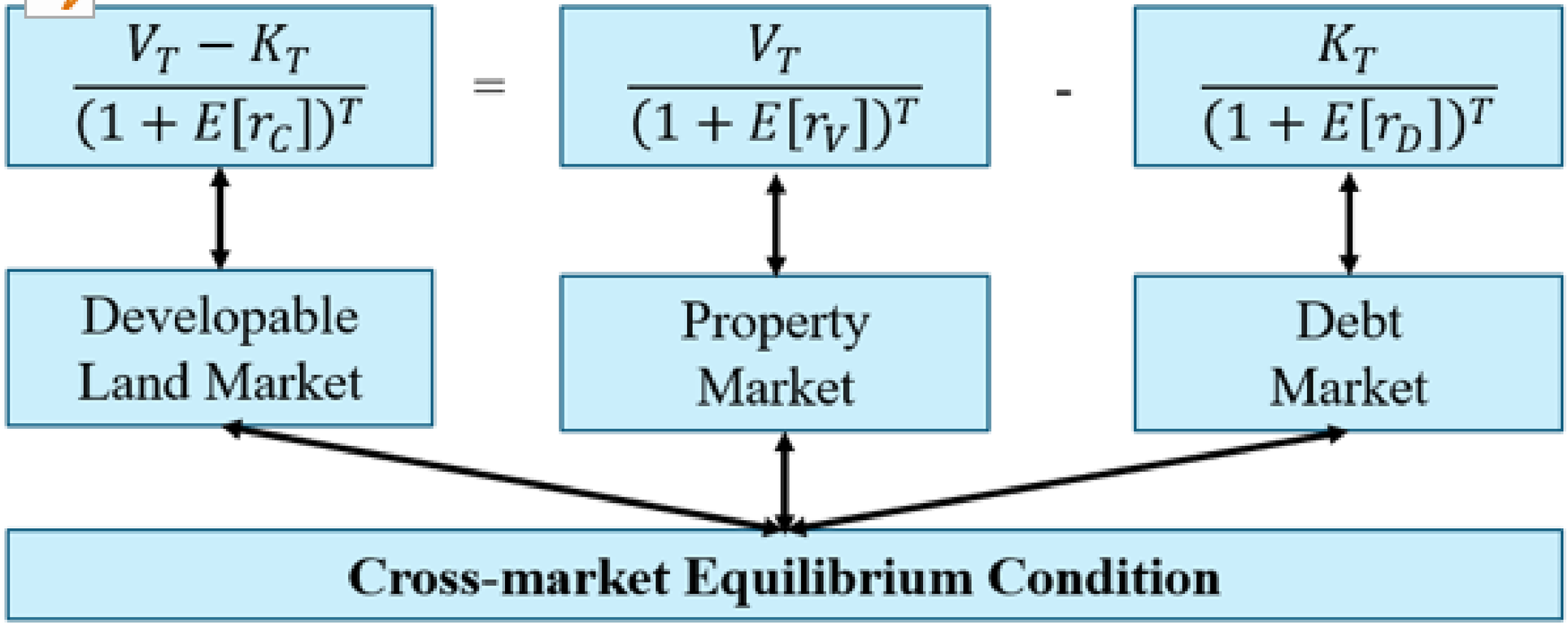
All cash flows occur at two points: time 0 (land cost) and time T (construction completion).

Practical Application

Allows for consistent comparison across different development projects.

The "Canonical" Formula

$$\frac{V_T - K_T}{(1 + E[r_C])^T} = \frac{V_T}{(1 + E[r_V])^T} - \frac{K_T}{(1 + E[r_D])^T}$$



Development Risk Ratio (DRR)

Definition

Ratio of investment risk in development project to risk in unlevered investment in identical stabilized property.

Measurement

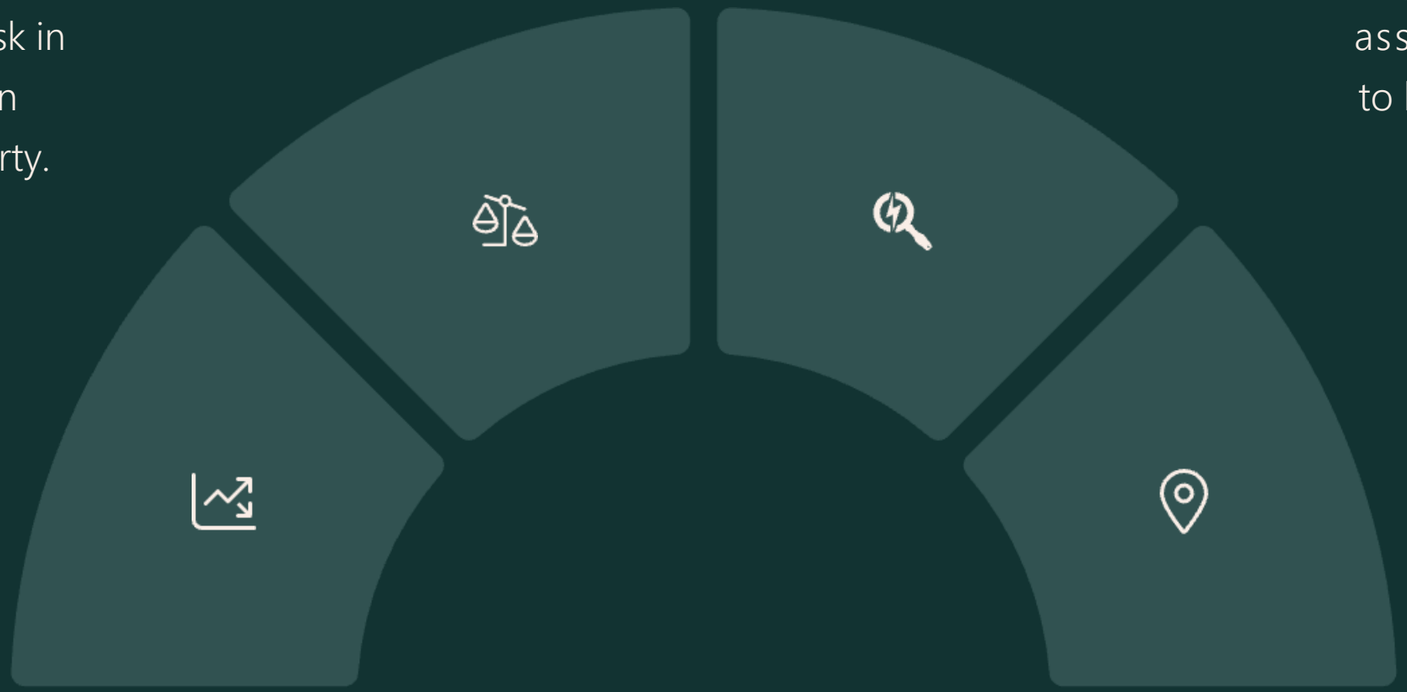
Calculated as ratio of risk premium in development project OCC divided by risk premium in stabilized asset OCC.

Diagnostic Tool

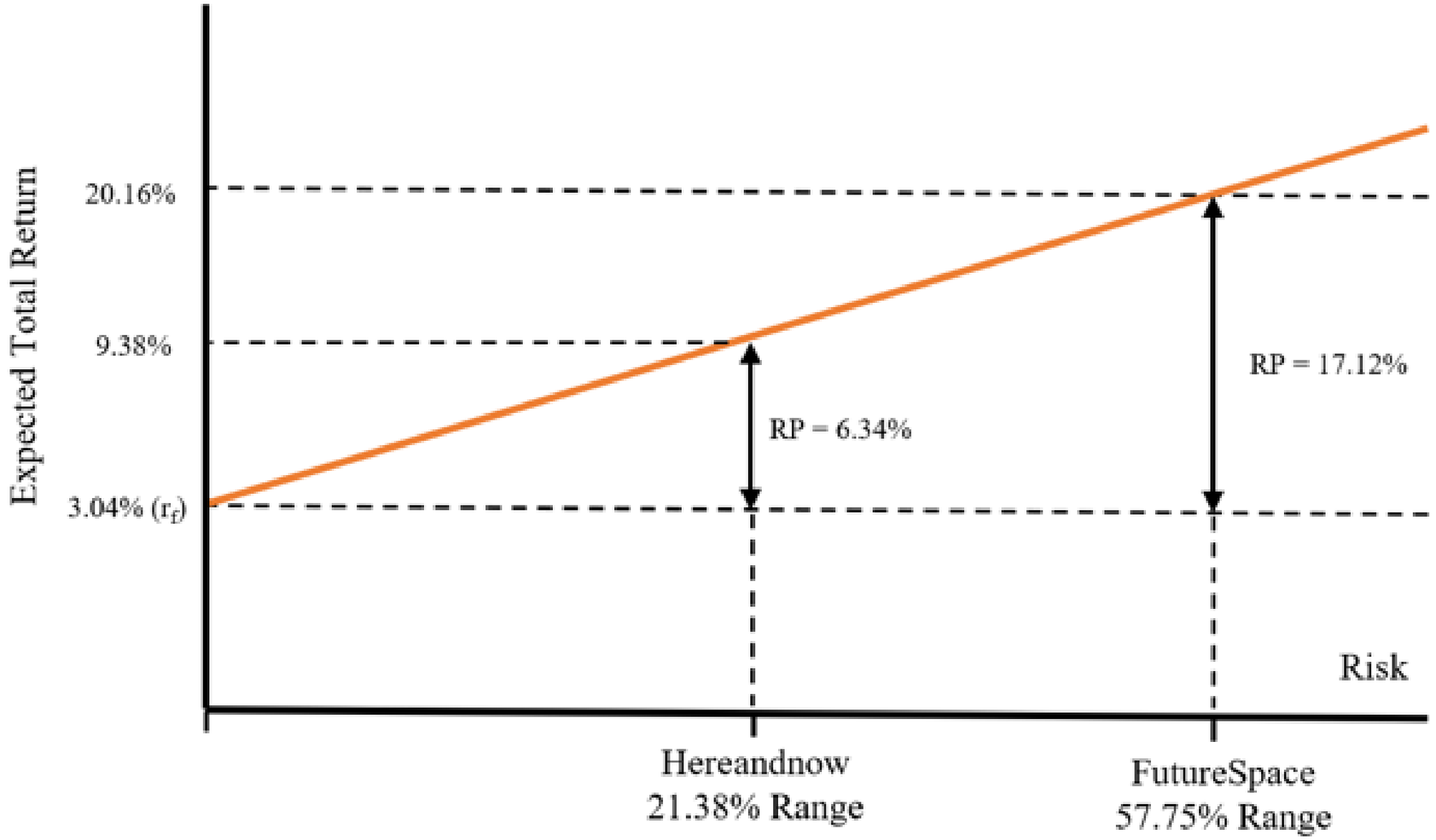
Can help flag particularly risky development projects or those not fully using site value.

Location Impact

Higher land values typically associated with lower DRRs to less operational leverage.



The "price of risk" (the ex-ante investment return risk premium per unit of risk) must be the same across the relevant asset markets:



Relationship to Real Options Model

1

Land as Option

Development project valuation is consistent with real options model of land value.

2

Option Exercise

Development represents optimal exercise of the real option to develop.

3

Risk Premium Ratio

Equals option elasticity at moment of optimal development.

4

Land Value Fraction

Inverse of option elasticity, affected by market volatility and cap rates.

Capital Structure for Development

Joint Venture Structure

Most developments organized as joint ventures between GPs and LPs

General Partner Role

Local, entrepreneurial investor handling preliminary phase and operations

Limited Partner Role

Institutional investors providing capital while retaining control over major decisions

Example Joint Venture Structure

Investment Split

LP invests 90% of costs ($18M), GP invests 10% ($200K)

Return Structure

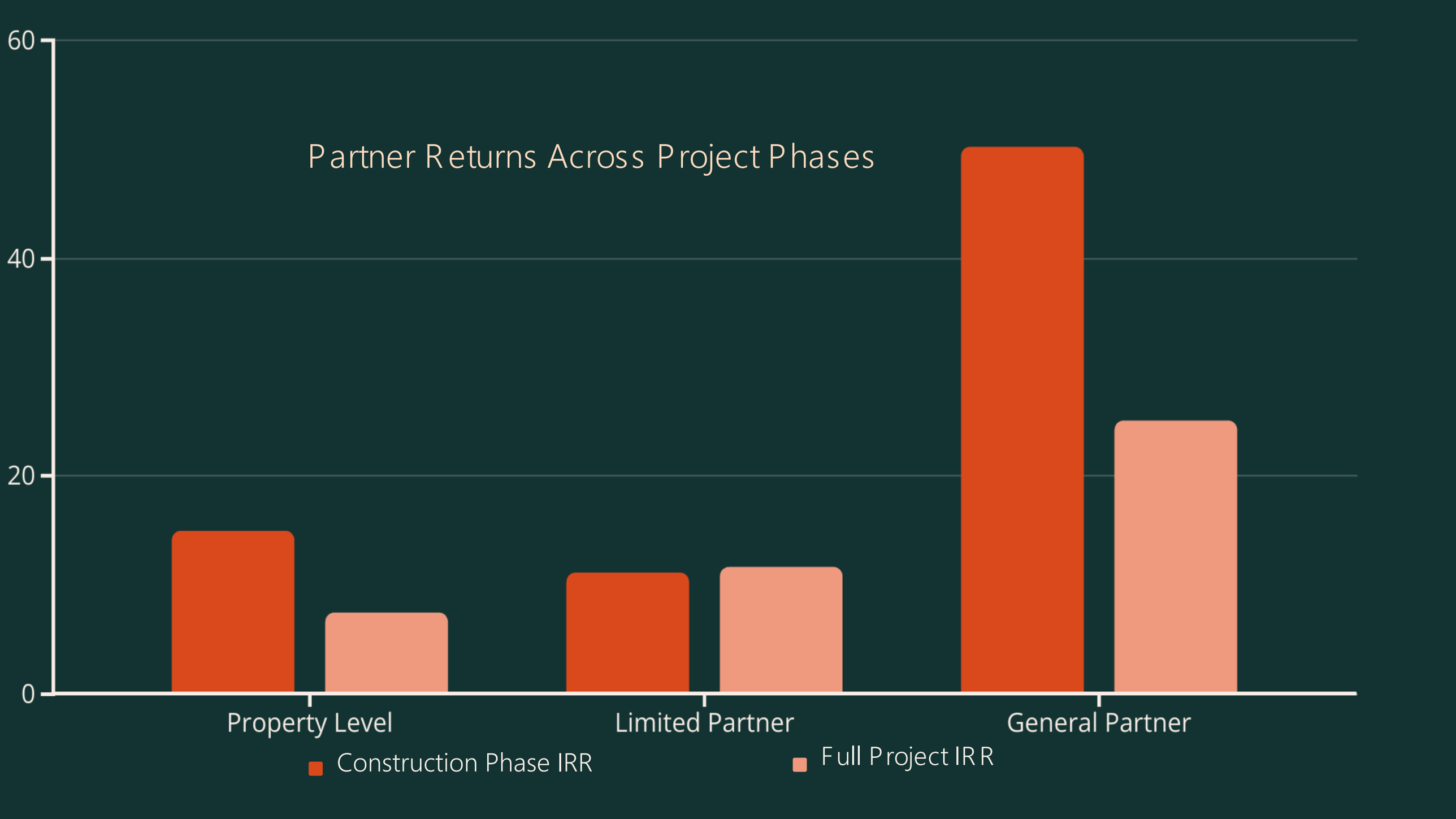
LP receives 5.5% preferred return, then remaining profits split 50/50

Construction Financing

$8M construction loan covers all construction costs

Permanent Financing

Interest-only permanent loan at 4% replaces construction loan upon completion


Partner Returns Across Project Phases
60
40
20
0
Property Level
Limited Partner
General Partner
Construction Phase IRR
Full Project IRR

"Unblending" the Blended IRR

Phase-Specific Analysis

Each development phase has different risk/return profiles and should be evaluated separately.

Backing Out True OCCs

Use typical developer rules of thumb to extract market's true OCC rates for each phase.

Comparing Across Phases

Determine IRRs implied specifically within each phase based on cash flows and stated long-run IRRs.

Risk and Return Across Development

37.8%

Preliminary Phase

Going-in IRR for land assembly and permitting

17.8%

Construction Phase

Going-in IRR for construction phase investment

9.6%

Lease-up Phase

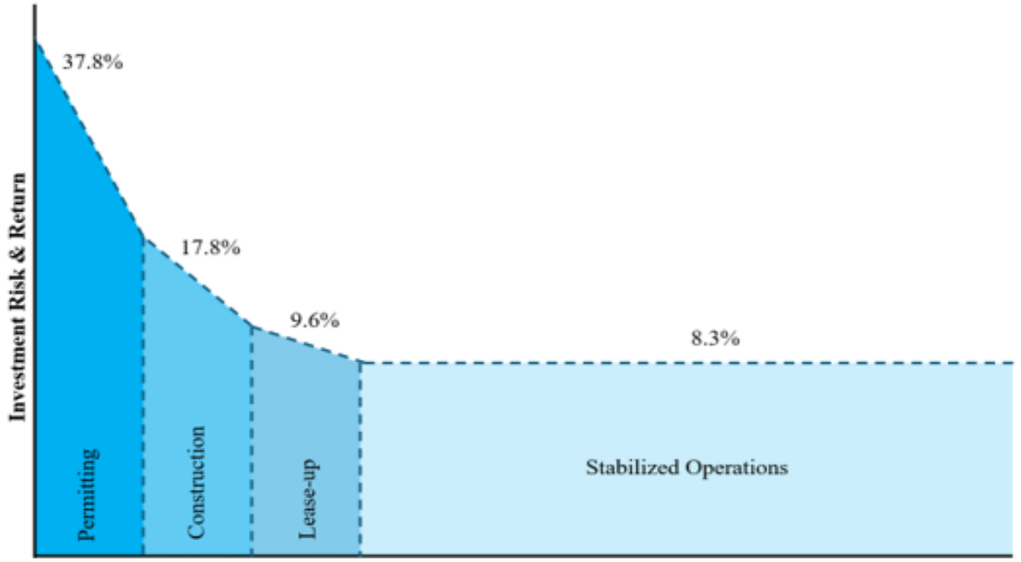
Going-in IRR for lease-up phase investment

8.3%

Stabilized Phase

Going-in IRR for stabilized property investment

An Example of Risk and Return Regimes for Phases of the Development Process (taken from a study of affordable housing development in Massachusetts)



Construction Cost OCC vs. Project OCC

Lower Construction Cost OCC

- Construction costs are relatively stable
- Supply of construction services is elastic
- Risks are mostly idiosyncratic and diversifiable
- Contractors may provide guarantees

Higher Development Project OCC

- Operational leverage increases overall risk
- Similar to financial leverage effect
- Greater expected return required to compensate
- Follows fundamental equilibrium theory

Implications for Urban Development

Higher Volatility Markets

Greater land value fractions and higher density development

Lower Cap Rate Markets

Higher land values and less propensity to build

Higher Appreciation

Lower real depreciation rates as land value doesn't depreciate

Denser Cities

Higher rents and greater irreversibility premium

Using DRR as a Diagnostic Tool

The Development Risk Ratio can help flag projects that may not be optimal for their location, either by being too risky or by underutilizing valuable land.

Key Takeaways

NPV-Based Evaluation

Use rigorous NPV-based financial evaluation for development projects.

Economic Principles

Base analysis on opportunity cost, market equilibrium, and wealth maximization.

Phase-Specific Analysis

Evaluate each development phase separately with appropriate OCC rates.

Practical Application

These methods require no more information than traditional rules of thumb.