Measuring Investment Performance: The Concept of Returns

This presentation explores how return and risk are measured in real estate investment analysis. We'll cover the basic building blocks of investment performance measurement, including periodic returns, multiperiod returns, and how to account for risk and inflation.

Two Fundamental Types of Return Measures

Periodic Returns (HPR)

Measure investment growth within single periods, assuming cash flows occur only at beginning and end.

Used for short, regular periods (daily, monthly, quarterly, annually).

Multiperiod Returns (IRR)

Give a single return number for longer periods with intermediate cash flows.

Don't require knowing asset values at intermediate points.

Time-Weighted vs. Money-Weighted Returns

Time-Weighted Return (TWR)

Averages periodic returns across time, ignoring the size of cash flows.

Insensitive to timing of capital flows, making it ideal for evaluating investment managers without control over cash flow timing.

Money-Weighted Return (IRR)

Reflects different amounts of money invested at different times.

Better for evaluating managers with control over capital flow timing.

When to Use Each

TWR: For macro-level analysis, comparing asset classes, evaluating managers without cash flow control.

IRR: For individual properties, development projects, evaluating managers with cash flow control.

Components of Total Return

Income Return

Cash flow paid to owner during period as fraction of asset value.

Appreciation Return

Change in asset market value during period as fraction of initial value.

Total Return

Sum of income and appreciation returns.

The total return is the most important measure because it's more complete than either component alone. Converting between yield and growth is possible but may be more difficult with real property than with financial securities.

Calculating Periodic Returns

$$r_t = \frac{CF_t + V_t - V_{t-1}}{V_{t-1}}$$

Total Return Formula

Where CF_t is cash flow during period t, V_t is asset value at end of period, and V_{t-1} is value at beginning.

Income Return

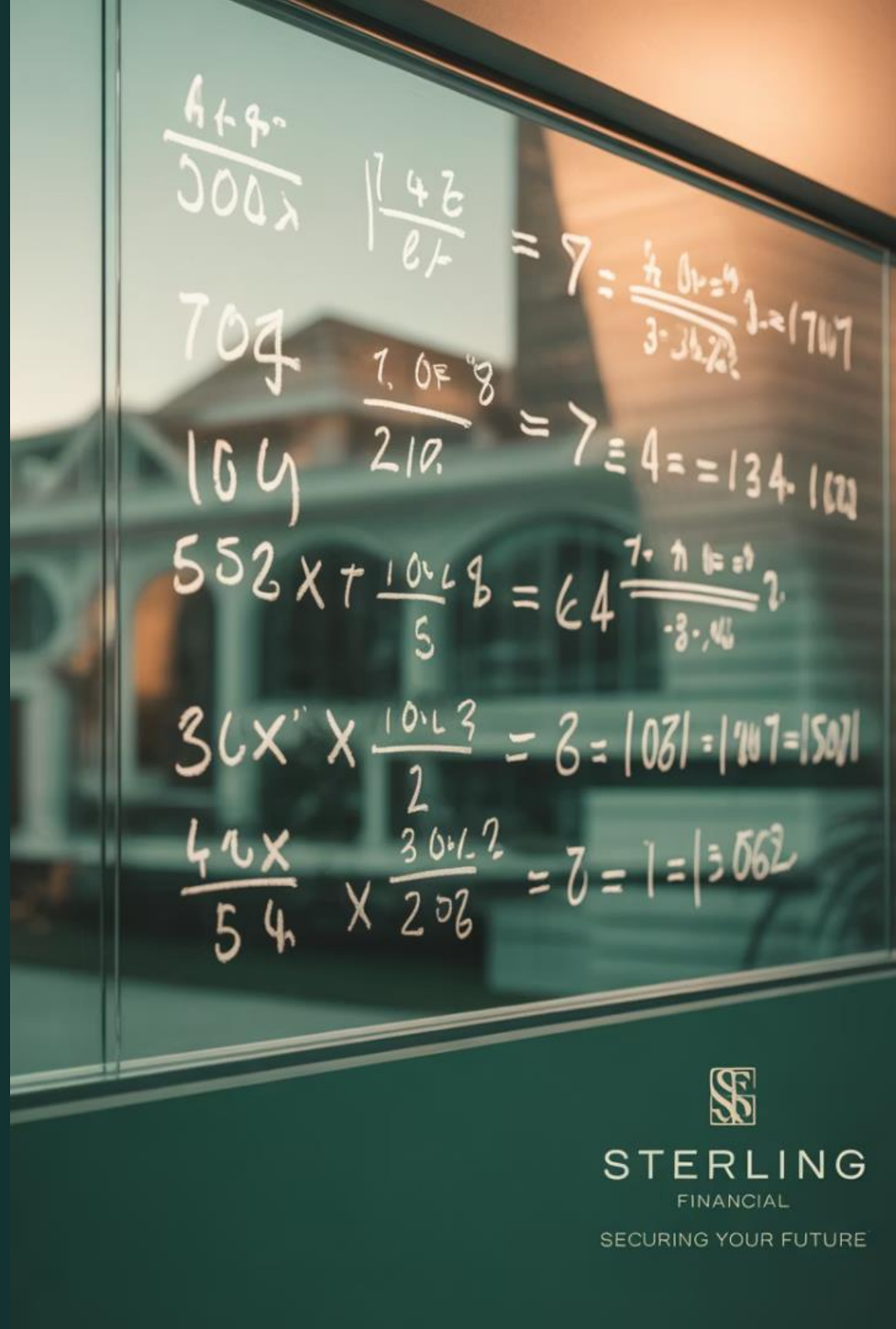
y_t = CF_t / V_{t-1}

Appreciation Return

g_t = (V_t - V_{t-1}) / V_{t-1}

Key Relationship

r_t = y_t + g_t

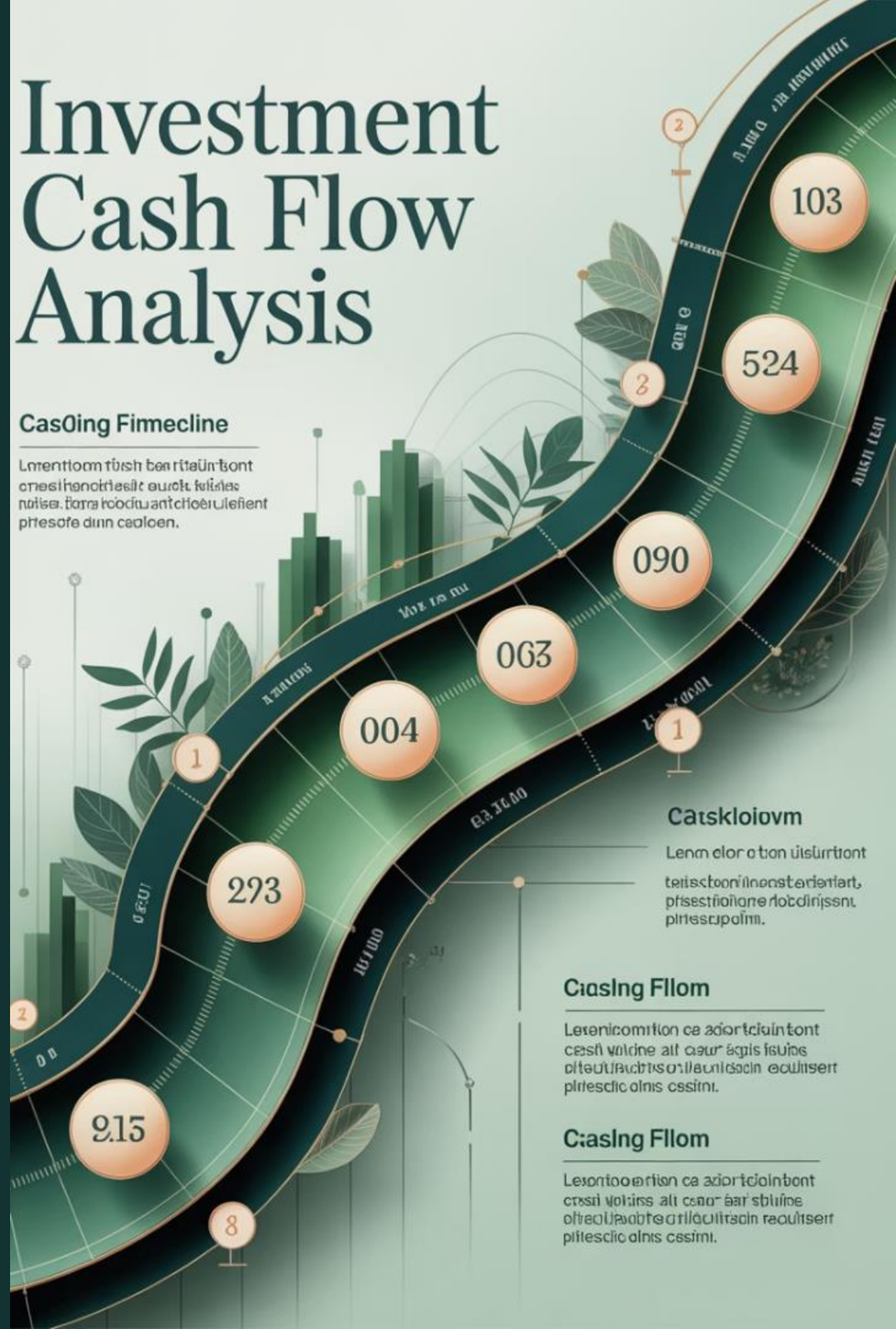


Time-Weighted Investment

When cash flows occur within periods, we need to adjust the simple HPR formula:

$$r = \frac{EndValue - BeginValue + \sum CF_i}{BeginValue - \sum w_i CF_i}$$

$100	$10	10.71%
Beginning Value	Cash Flow	Adjusted Return
Asset worth at start of quarter	Paid at end of first month	Using time-weighted denominator



Real vs. Nominal Returns

Nominal Return

Return measured in current dollars, including inflation

Relationship

Real Return ≈ Nominal Return - Inflation Rate

Inflation

Loss of purchasing power as prices rise over time

Real Return

Return net of inflation, measured in constant-purchasing-power dollars

Example: Real vs. Nominal Returns

2023 Property value	$1,000,000
2024 Cash flow	$80,000
2024 Property value	$1,020,000
2024 Inflation	3.33%

10%

Nominal Return

Income (8%) + Appreciation (2%)

6.46%

Real Return

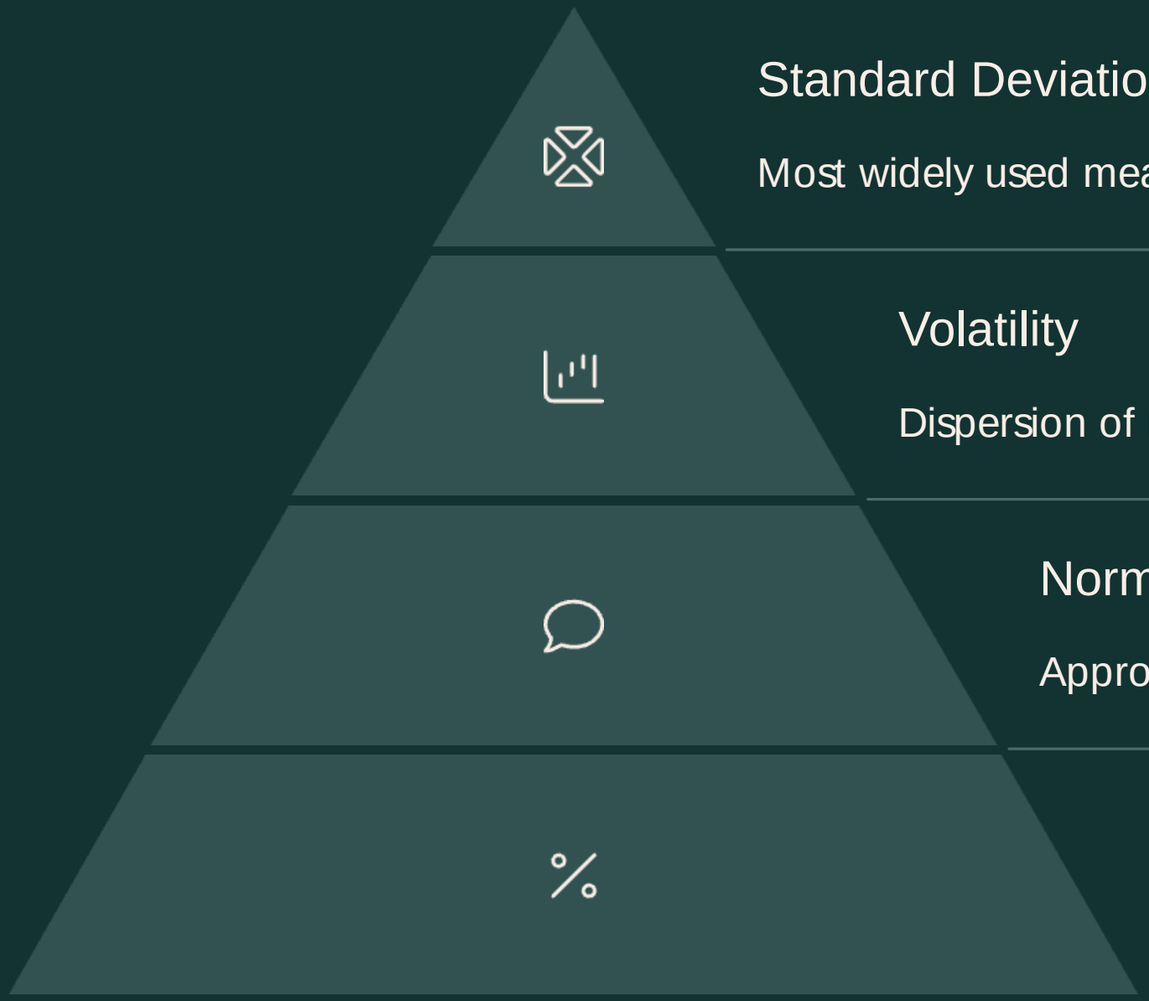
After adjusting for inflation

-1.29%

Real Appreciation

Property value didn't keep pace with inflation

Measuring Risk in Returns



Standard Deviation

Most widely used measure of investment risk

Volatility

Dispersion of returns around expected return

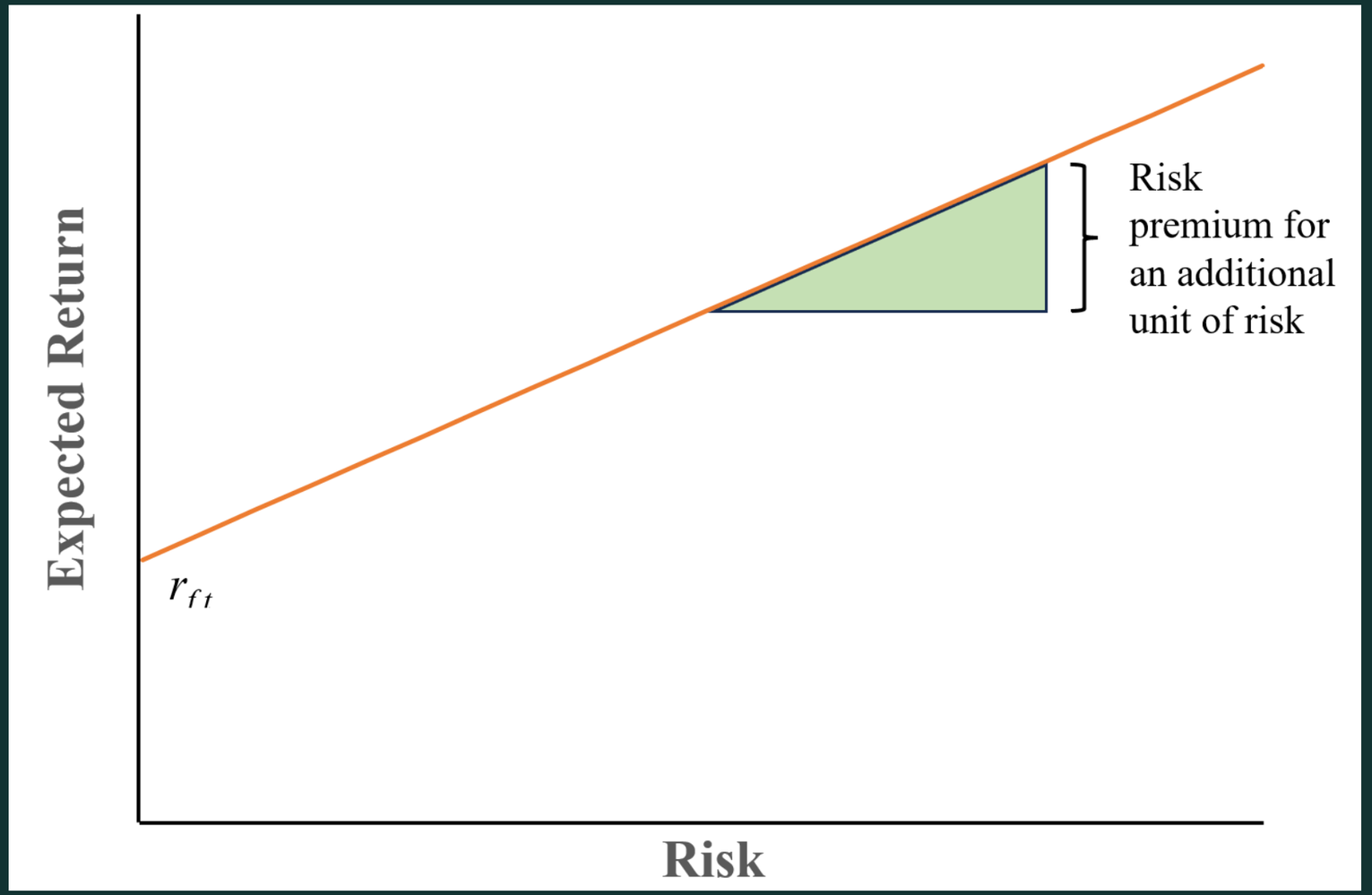
Normal Distribution

Approximates shape of typical return distributions

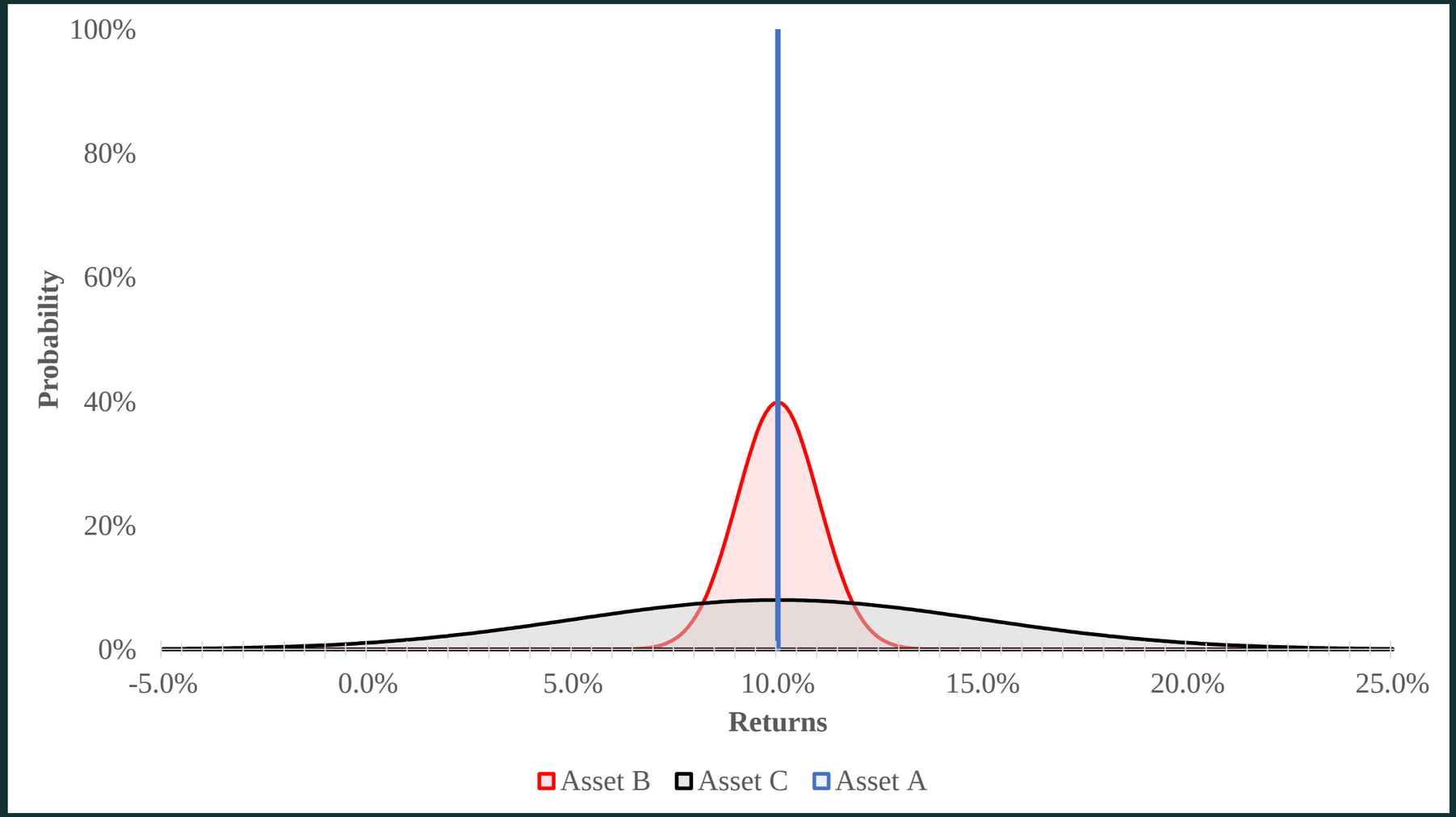
Quantification

Higher standard deviation means greater risk

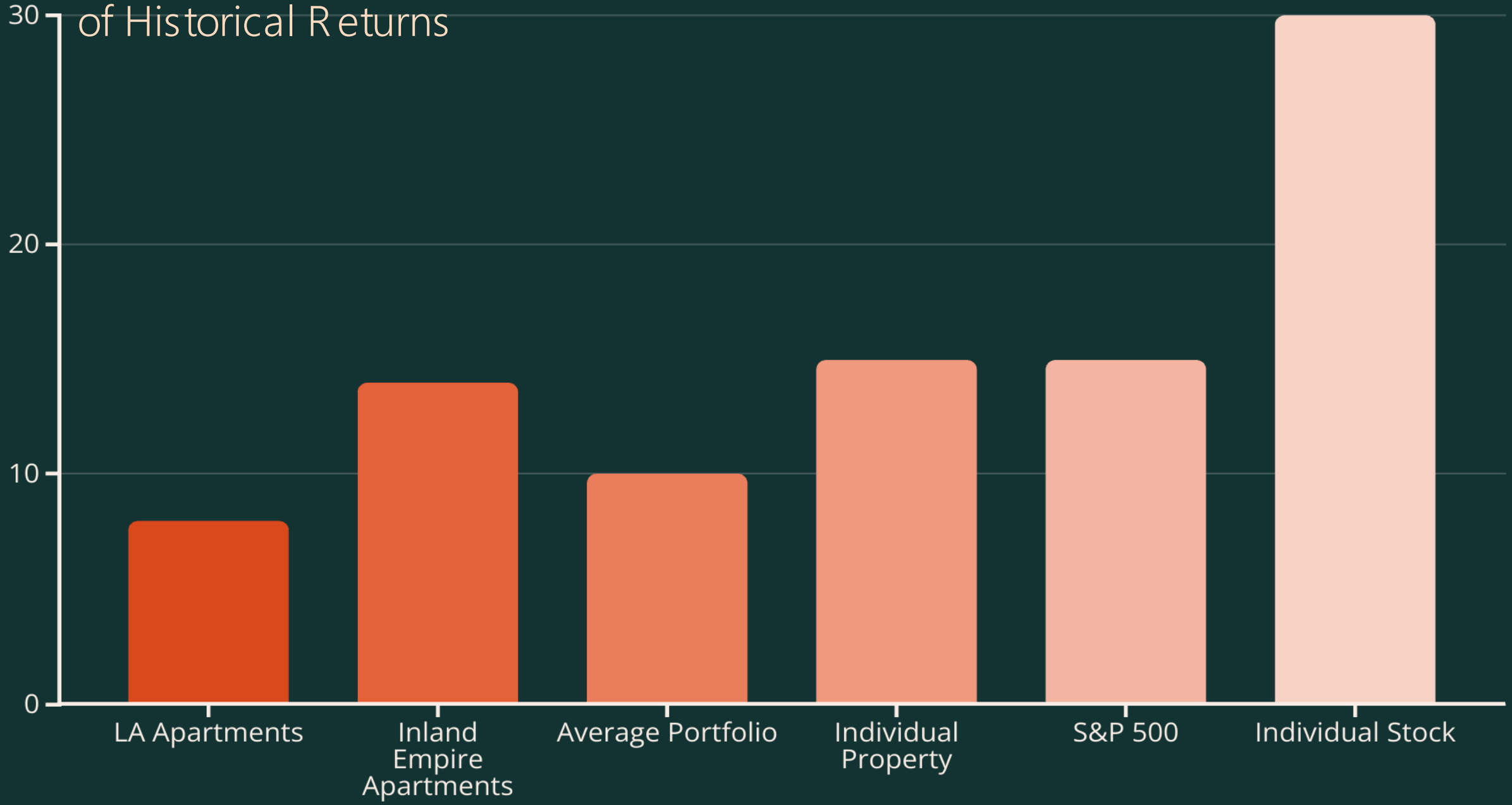
Risk Premiums: Capital Market Line



Risk Distribution Examples: Where Asset A has no risk and Asset C has high risk.



Volatility in Commercial Real Estate Based on Standard Deviations of Historical Returns



Relationship Between Risk and Return

Risk-Free Rate

Return from riskless assets like government bonds

Risk Premium

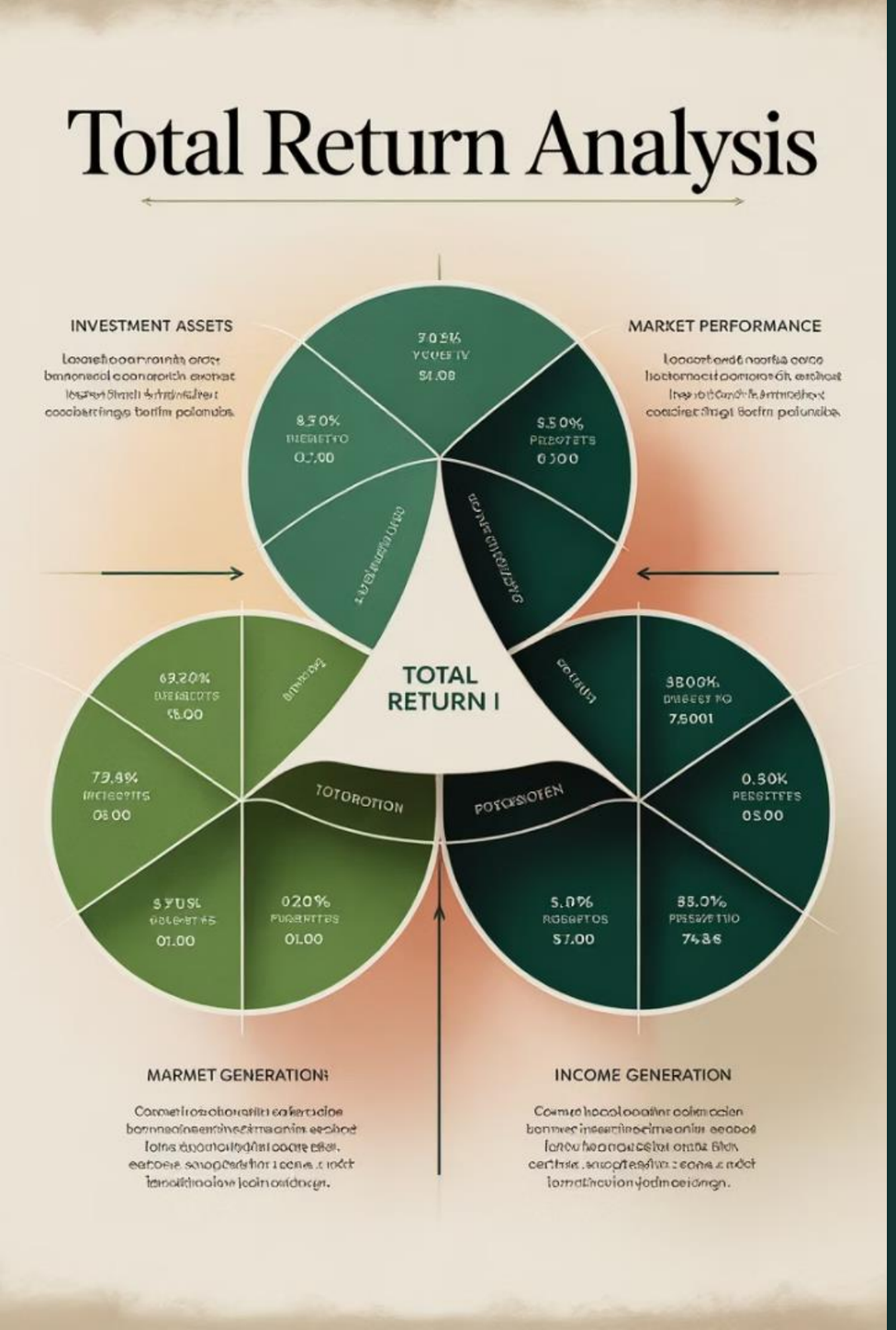
Additional return required for taking on risk

Risk-Return Tradeoff

Higher expected returns come with higher risk

$$E[r_t] = r_{f,t} + E[RP_t]$$

This fundamental principle of financial economics states that expected returns are greater for riskier assets. Investors require compensation for taking additional risk.



Three Ways to Break Down Total Return

1 **Income + Growth**

$r = y + g$

Total return equals income return plus appreciation return

2 **Risk-Free Rate + Risk Premium**

$r = rf + RP$

Total return equals risk-free rate plus risk premium

3 **Real Return + Inflation**

$r = R + i$

Total return approximately equals real return plus inflation

These three breakdowns provide different perspectives on investment returns, helping investors understand the sources of their returns and make better decisions.

Time-Weighted Average Return

Arithmetic Mean

Simple average of periodic returns

- Best for forecasting future returns
- Components sum to total return
- Affected by volatility

Example: (10% + 10% + 13%) ÷ 3 = 11%

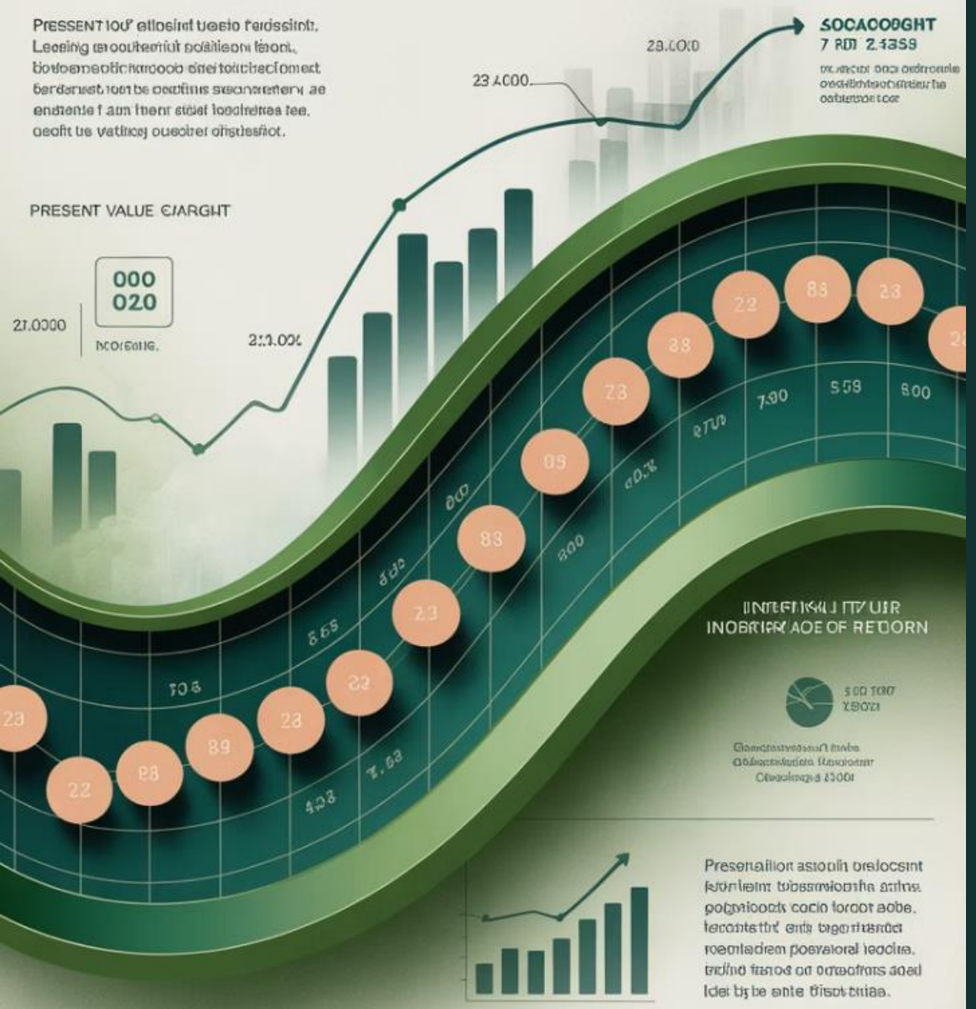
Geometric Mean

Reflects compounding of returns

- Better represents growth rate over time
- Independent of volatility
- Components don't sum to total

Example: (1.10 × 1.10 × 1.13)^ (1/3) - 1 = 10.99%

Calculating Your Future: Internal Rate of Return



Internal Rate of Return (IRR)

The IRR is the discount rate that makes the net present value of all cash flows equal to zero:

$$PV = \frac{CF_1}{1 + IRR} + \frac{CF_2}{(1 + IRR)^2} + \ldots + \frac{CF_T}{(1 + IRR)^T}$$

Classical Measure

Traditional performance measure in real estate investment

No Intermediate Values

Doesn't require knowing property values between purchase and sale

Timing Sensitive

Captures effect of capital flow timing on performance

Money-Weighted

Reflects amount of capital invested during each period

IRR Example: Timing Impact

Year 1: 10% Return

Initial $100 investment grows to $110

1

Year 2: 10% Return

$110 grows to $121

2

Year 3: 13% Return

Different scenarios based on cash flow timing

3

11.69%

Add $200 in Year 3

IRR exceeds time-weighted return

10.60%

Withdraw Half in Year 3

IRR below time-weighted return

10.99%

No Changes

IRR equals geometric mean

IRR Characteristics

Internal Measure

Includes only returns earned while capital is invested in the project

Cash Flow Based

Based purely on cash flows, not differentiating between investment and return

Timing Blind

Doesn't indicate when return was generated within the overall time span

Special Case

Equals time-weighted return when no intermediate cash flows occur

In real estate appraisal, IRR is often called "total yield." The expected IRR when investing is called the "going-in IRR."

Choosing the Right Return Measure

Purpose

What are you trying to measure?

Available Data

What information do you have?

Comparability

What are you comparing against?

Control

Who controls capital flow timing?

The choice between TWR and IRR depends on your specific situation. Consider who controls capital flows, what data is available, and what you're trying to measure.

Real Estate Return Volatility Drivers

Income Return Stability

Income returns are typically more stable than appreciation returns.

Example: A 20% drop in income ($100,000 to $80,000) on a $2M property only reduces income return from 5% to 4%.

Appreciation Return Volatility

A 20% drop in property value directly translates to a 20% decrease in appreciation return.

Asset values are the primary driver of return volatility in normal markets.

And leveraged property will result in more sensitivity to appreciation or depreciation.

A property with 75% leverage that declines in value by 25% will wipe all 100% of the equity.

Key Takeaways

1 **Two Return Types**

Periodic returns (HPR) and multiperiod returns (IRR) serve different purposes.

2 **Return Components**

Total return can be broken down into income and appreciation, risk-free rate and risk premium, or real return and inflation.

3 **Risk-Return Relationship**

Higher expected returns come with higher risk - the fundamental principle of financial economics.

4 **Measure Selection**

Choose between TWR and IRR based on purpose, available data, control over cash flows, and comparability needs.