

**Real Estate Investment: A Strategic Approach
Fourth Edition, 2023**

Andrew Baum

Chapter Five
Portfolio Theory and Risk

Real Estate Investment: A Strategic Approach

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How do you prefer to invest in real estate?

- Buy buildings or land directly?
- Joint ventures?
- Clubs?
- Listed securities?
- Funds?
- Funds of funds?

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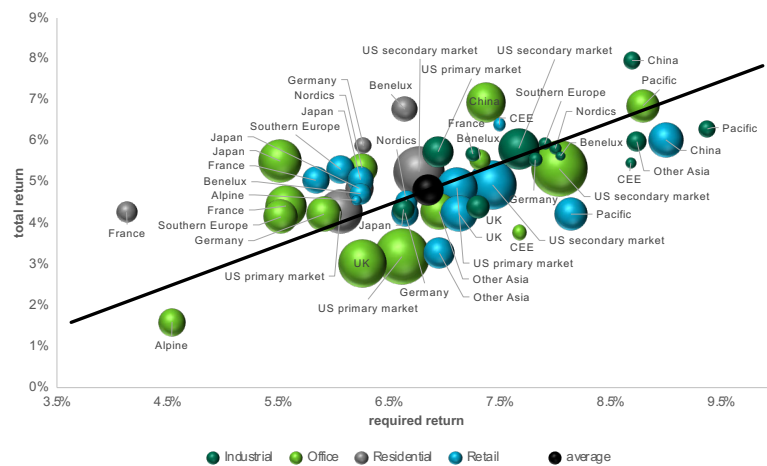
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Why do you prefer buildings/direct?

- You are better than professionals at stock selection
- You don't trust advisers
- You don't like paying fees
- You don't believe in the benefits of diversification
 - (Markowitz should give back his Nobel prize)
- You don't want to go through KYC or money laundering checks
- You have unique tax-based structuring issues
- You have at least \$500bn of investable assets
 - (10% into real estate means you have \$50bn to invest – enough to diversify)

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Thinking about markets



Source: CBRE Investment Management

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Portfolio risk and return

- Risk is a well-known concept
- Don't put all your eggs in one basket: diversify risk
- This is a third investment indicator
- Most investors hold portfolios of assets, so return and risk of individual assets are important only because these impact on portfolio risk and return
- Portfolio return
 - Expected portfolio return = weighted average of the expected returns of the component assets
- Portfolio risk
 - Portfolio risk is not normally the weighted average
 - It is determined by the covariance structure of the component assets

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Portfolio risk and return

- For a two asset portfolio:

w_A and w_B are the weights (proportions) in A and B
So $w_A + w_B = 1$

- Portfolio expected return is:

$$E(P) = w_A \cdot E(A) + w_B \cdot E(B)$$

- In general form

$$E(P) = \sum w_i E(A_i)$$

- Portfolio risk is:

$$\sigma^2(P) = w_A^2 \cdot \sigma^2(A) + w_B^2 \cdot \sigma^2(B) + 2 \cdot w_A \cdot w_B \cdot \sigma(A) \cdot \sigma(B) \cdot r_{AB}$$

E is the expected return
 σ^2 is the variance
r is the correlation coefficient

- In general form

$$\sigma^2(P) = \sum \sum w_i^2 w_j^2 \sigma^2(A_i) \sigma^2(A_j) \rho_{ij}$$

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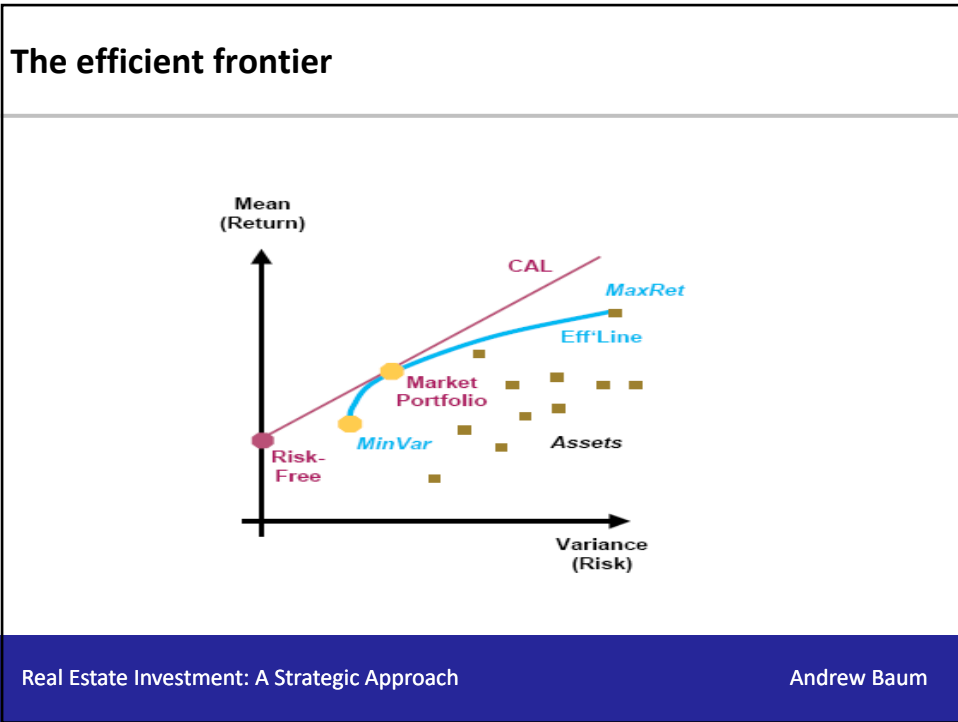
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Modern portfolio theory

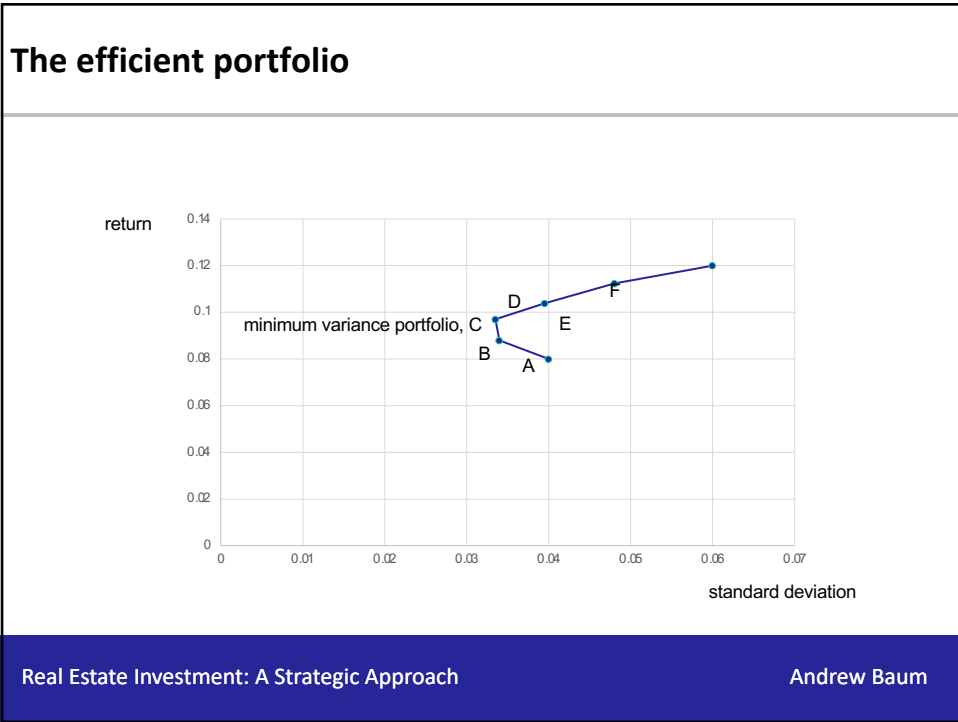
- Selecting assets which have low or negative correlation is a central aspect of MPT
- The objective of MPT is either
 - For a given level of risk, to achieve the maximum return
 - or
 - For a given return, to achieve the minimum risk
- The output of the analysis is the proportion of funds to be invested in each asset, and a measure of the expected return and the risk

Modern portfolio theory

- Some possible combinations of assets are sub-optimal: it is possible to get better risk/return combinations
- By eliminating the sub-optimal points it is possible to construct the *efficient frontier*
- The decision of which combination of risk and return to choose along the efficient frontier depends on the investor's trade-off, or indifference, between risk and return



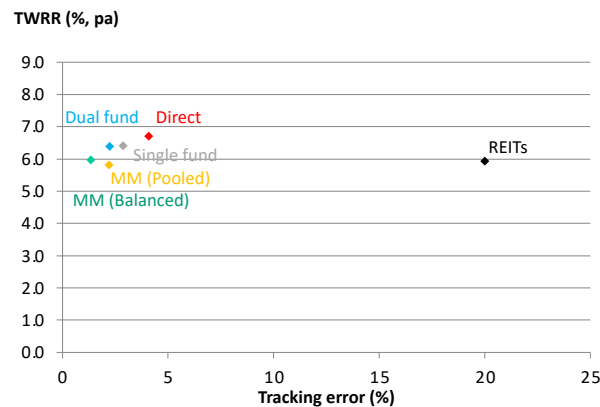
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Investing £100m: best risk/return?

The benchmark is unleveraged UK direct real estate



Source: PFR, IPD, AREF, IPF, EPRA

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Problems with the mean variance approach

- High sensitivity to inputs leads to potentially extreme allocations
 - Corner solutions
- Extrapolates the past into the future....
 - Need ex-ante estimates
- Risk is characterised by variance
- One period approach i.e. is not dynamic
- Approaches such as the Black Litterman model potentially overcome these issues

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Risk and return

UK assets risk and return, 1971-2018

	Return (%)	Risk (%)
Equities	11.7	27.5
Gilts	9.3	12.8
Property	10.6	10.5

US assets risk and return, 1979-2018

	Return (%)	Risk (%)
Equities	11.6	16.0
Treasuries	7.0	6.2
Property	9.0	7.4

Source: MSCI annual index, FTSE all-share index, FTSE 15-year gilt index NCREIF property index, S&P 500, Barclays Capital U.S. 10-year treasury 10-year index

Correlations

UK asset class correlations, 1971-2018

	Gilts	Property
Equities	0.55	0.27
Property	0.04	

US asset class correlations, 1979-2018

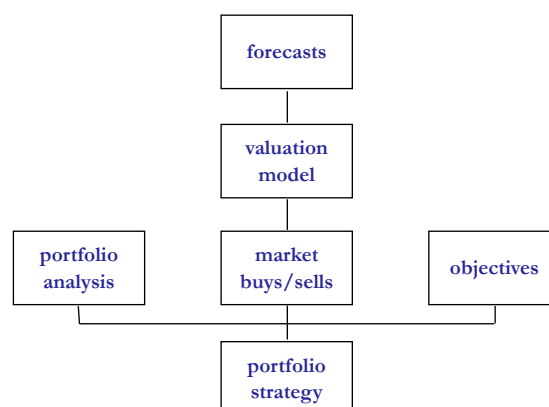
	Treasuries	Property
Equities	0.02	0.14
Property	-0.03	

Source: MSCI annual index, FTSE all-share index, FTSE 15-year gilt index NCREIF property index, S&P 500, Barclays Capital U.S. 10-year treasury 10-year index

Strategy: aims

- The aim of strategy is: to allocate capital to the best performing markets, sectors, and asset level strategies on a risk adjusted basis i.e. to deliver the maximum return for a given risk constraint
- A good strategy produces management value-added or alpha
- In practice, strategy requires a blend of judgement and quantitative analysis
- Key requirements are views on expected returns and risks
- Portfolio construction is not as straightforward in property as it is in other asset classes: the nature of the asset class presents unique challenges

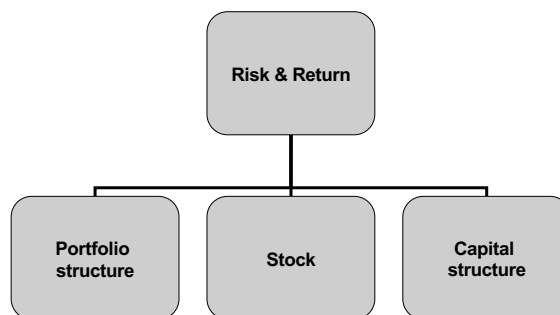
The top-down investment strategy process



Definitions: market buys/sells

- Forecasts
 - Rent growth, depreciation, cap rates
 - Some (rent growth, depreciation) are more reliable than others (cap rates)
- Valuation model
 - Discounts the cash flows to present value: requires discount rate or produces IRR
- Market buys / sells
 - Positive NPV, or IRR exceeds target
 - Target = $RFR + R_p$
 - Market buy: $IRR > RFR + R_p$ before leverage
- The capital structure decision should follow the investment decision
 - Does it make sense to buy this with 100% equity?
 - If yes, should we use leverage?
 - If yes, how much?

Sources of risk and return



Top down, bottom up?

Stock selection skills	Market forecasting ability	
	Good	Poor
Good	<i>Active management</i>	<i>Active management</i>
	concentrate on a few buildings	concentrate on a few buildings
	shift sector weights based on forecasts	hold market weights
Poor	<i>Active management</i>	<i>Passive management</i>
	diversify	diversify
	shift sector weights based on forecasts	hold market weights

Style: manager types

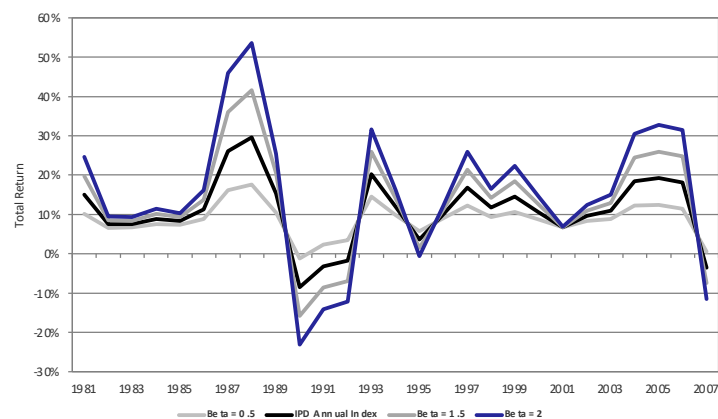
- Manager A: 'we are good at forecasting sectors'
 - Top down
- Manager B: 'we are good at picking buildings'
 - Bottom up
- Manager C: 'we are good at picking buildings in the sectors we know best'
 - Bottom up, specialist

What is risk? Where does it come from?

- Potential variability of total return
 - Around the market average?
 - In absolute terms?
 - Can we avoid being affected by the market?

- Sources
 - Concentration of structure: all London, all offices, all £50-150m
 - Concentration of stock: 1-5 buildings
 - Leverage: > 40%
 - Development/value-add
 - Low income

Impact of increased risk / higher beta



Source: IPD

What do we know?

- Current portfolio
- Objectives?
- Market buys/sells?