
Real Estate Investment: A Strategic Approach
Fourth Edition, 2023

Andrew Baum

Chapter Thirteen
Introduction to performance measurement

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1

Property performance measurement

- Why measure?
 - success or failure?
 - attribution and staff rewards
 - track records win business
- How to measure
 - objectives?
 - standards
- Technical issues
 - return measure – the maths
 - risk?

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2

Delivered return

- Single period returns
- Income return
 - income received over period/value at beginning of period
- Capital return
 - capital gain over period/value at beginning of period
- Total return
 - income return + capital return
- Multi-period returns
 - TWRR or IRR?

3

Total return: 1

- Income return = Y^{0-1}/CV^0
- Capital return is the change in value over the measurement period divided by the value at beginning of the period
- $CR = [CV^1 - CV^0]/CV^0$
- Total return is the sum of income return and capital return
- $TR = [Y^{0-1} + CV^1 - CV^0]/CV^0$

4

Total return: 2

- $CV^0 = \text{£}100,000$
- $CV^1 = \text{£}105,000$
- $Y^{0-1} = \text{£}10,000$
- $TR = [Y^{0-1} + CV^1 - CV^0]/CV^0$
- $TR = [\text{£}10,000 + \text{£}105,000 - \text{£}100,000]/\text{£}100,000$
- $TR = \text{£}15,000/\text{£}100,000$
- $TR = 15\%$
- $IR = 10\%; CR = 5\%$

The optimal portfolio? UK, 1971-2010

	Return (%)	Risk (%)	CV
Equities	16.2	29.8	0.54
Gilts	10.9	13.3	0.82
Property	11.5	11.5	1.00

Source: IPD, PFR 2011
Returns are geometric means, annual data
CV = coefficient of variation

Delivered return

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- Total return
 - income return + capital return

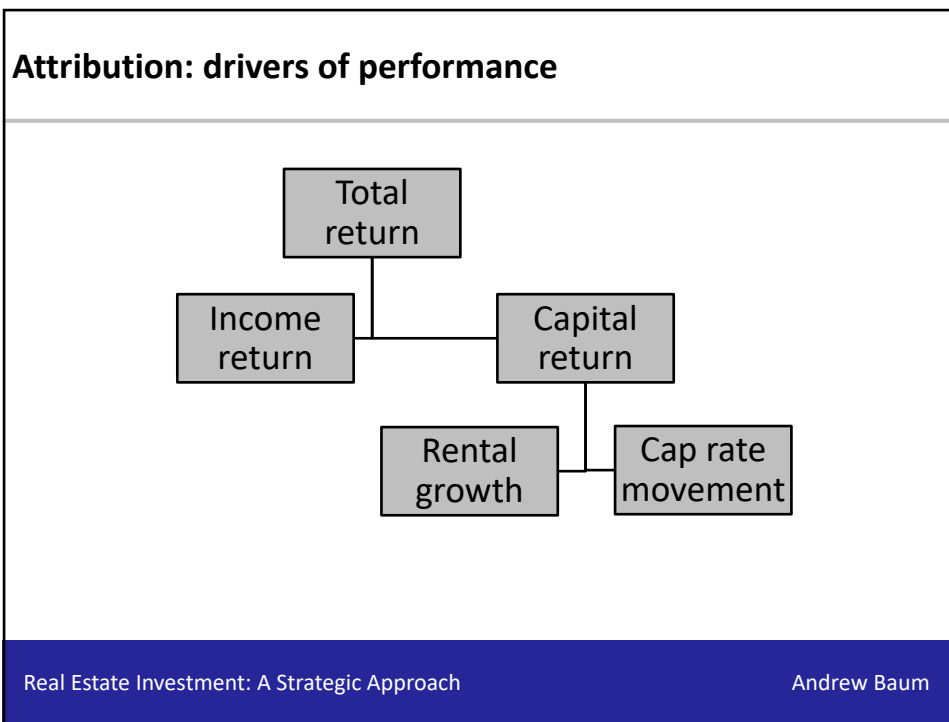
- Multi-period returns
 - TWRR or IRR?

Total return: 1

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- Total return is the sum of income return and capital return
- $TR = [Y^{0-1} + CV^1 - CV^0]/CV^0$

- $CV^0 = Y^0/K^0$ (rental value / cap rate)
- $CV^1 = Y^1/K^1$



9

Total return: 2

- $CV^0 = £100,000$
- $CV^1 = £105,000$
- $Y^{0-1} = £10,000$
- $TR = [Y^{0-1} + CV^1 - CV^0]/CV^0$
- $TR = [£10,000 + £105,000 - £100,000]/£100,000$
- $TR = £15,000/£100,000$
- $TR = 15\%$
- $IR = 10\%$; $CR = 5\%$

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10

The IPD single period return

- Total return for the period

$$= [(Y^{0-1}) + (CV^1 - CV^0 + S - (P+CI))] / [CV^0 + (P + CI)]$$
- Let $P + CI = CX$
- $TR = [(Y^{0-1}) + (CV^1 - CV^0 + S - CX)] / [CV^0 + CX]$
- $TR = [Y^{0-1} + CV^1 - CV^0] / CV^0$ for a single property

Time-weighted return

- (Roughly) a geometric mean of returns over more than one period
 - ignores timing of cash injection and removal
 - not appropriate where manager responsible for cash
- Example:
 - period 1 return: 5%
 - period 2 return: 10%
 - period 3 return: 15%
- Accumulated value

$$= (1.05) * (1.10) * (1.15) = 1.3285$$
- Average rate of accumulation?

$$= 1.3285^{(1/3)} - 1 = 0.099$$
- TWRR = 9.9%

The IPD annual return

- IPD single period return

$$= [(Y_{0-1}) + (CV_1 - CV_0 + S - CX)] / [CV_0 + CX]$$
- Create index as follows:

$$(1 + TR_1) * (1 + TR_2) \dots * (1 + TR_{12})$$
- Annual total return

$$= [\text{Index at month 12} / \text{index at month 0}] - 1 * 100$$
- This is the TWRR

Internal rate of return

- Not a mean of annual returns
- Appropriate for funds where manager has discretion over cash flow
- The most accurate and complete description of fund performance

Internal rate of return

- Example: £100 invested; earns 5%, 10%, 15%
- What is the cash flow?
 - -£100
 - £5
 - £10
 - £115
- What is the IRR? 9.69%
 - compare TWRR at 9.90%
- Why lower?
 - front loading of lower rates of return

Time-weighted return and IRR

- Example: £100 invested; earns 15%, 10%, 5%
- Extra £100 invested in year 3 (end of year 2)
- What is the cash flow?
 - -£100
 - £15
 - -£90
 - £210
- What is the IRR? 9.05%
 - compare TWRR at 9.90%
- Why lower?
 - investing more in low return market

Total return and IRR

- Property rent is paid quarterly in advance
- This reduces capital employed and improves cash flow
- $CV^0 = £100,000$; $CV^1 = £105,000$; $Y^{0-1} = £10,000$
- $TR = 15\%$; $IR = 10\%$; $CR = 5\%$
- $IRR = 15.98\%$

Equity multiple

- What equity did you put in? (1)
- What equity did you take out? (2)
- Divide 2 by 1: this is the equity multiple
- Pros and cons



Equity multiple and IRR

Year	Cash Flow 1	Cash Flow 2	Cash Flow 3	Cash Flow 4	Cash Flow 5	Cash Flow 6	Cash Flow 7	Cash Flow 8	Cash Flow 9	Cash Flow 10
0	-100000	-100000	-100000	-100000	-100000	-100000	-100000	-100000	-100000	-100000
1	150000	10000	10000	10000	10000	10000	10000	10000	10000	10000
2		150000	10000	10000	10000	10000	10000	10000	10000	10000
3			150000	10000	10000	10000	10000	10000	10000	10000
4				150000	10000	10000	10000	10000	10000	10000
5					150000	10000	10000	10000	10000	10000
6						150000	10000	10000	10000	10000
7							150000	10000	10000	10000
8								150000	10000	10000
10									150000	10000
Hold period	1	2	3	4	5	6	7	8	9	10
IRR	50%	28%	21%	18%	16%	15%	14%	13%	13%	12%
Equity multiple	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4

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19

TVPI (total value paid in)

- The ratio of the current value of all remaining investments within a fund, plus the total value of all distributions received to date, divided by or relative to the total amount of capital paid into the fund to date
- What equity did you put in? (1)
- What equity did you take out? (2)
- What value have you left in? (3)
- Divide (2+3) by 1: this is the TVPI

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20