Risk adjusted returns on real estate in NBIM

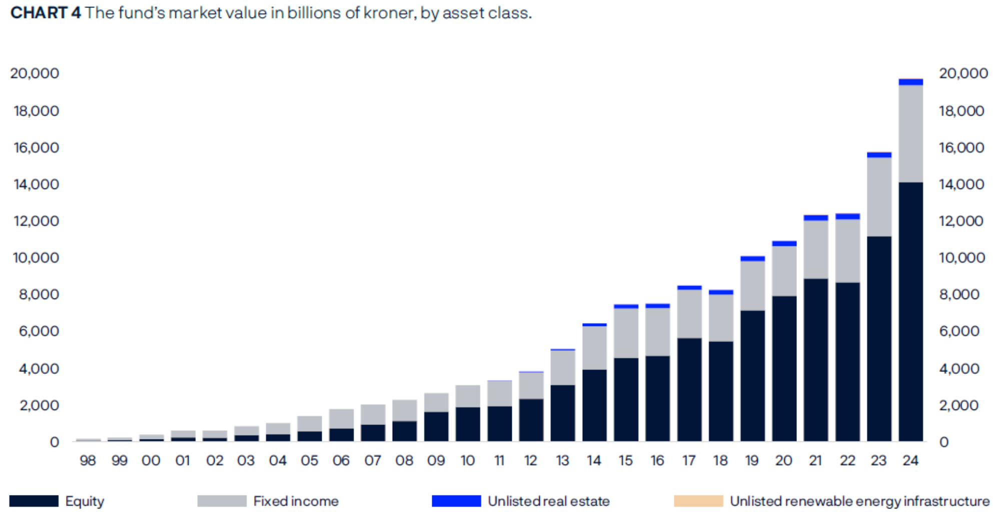
Updated 17 November 2025 with perspectives from NBIM's letter of 3 November 2025

2 November 2025

Agenda

The make-up of the fund

- Unlisted real estate was first introduced in 2011



- Until 2017, unlisted real estate was considered by the MoF to represent 50 % equity and 50 % bonds, and the benchmark equity-allocation was adjusted from the then prevailing target of 60 % to that following from whatever the allocation to unlisted real estate entailed

- Since 2017 unlisted real estate has been treated as an active position against the benchmark, which does not hold any unlisted real estate
  - The benchmark is 70 % equities and 30 % bonds
    - Varies slightly over time in accordance with variations in market prices and is reset on a monthly basis
  - NBIM makes an assessment in each case what amount and type of equities and bonds that will be sold in order to finance the purchase of the property
    - E.g. a purchase of a UK property for mGBP 500 may be financed by selling mGBP 200 of UK equities and mGBP 300 in GBP bonds that the fund already holds
    - Active returns on real estate are measured against this "funding"

This change of management policy means that performance since 2017 is the relevant metric for performance measurement under current regime

Unlisted real estate – from 2024 annual report

Unlisted real estate

The fund's investments in unlisted real estate had a market value of 364 billion kroner at the end of the year, equivalent to 1.8 percent of the fund and 50.4 percent of our total real estate investments.

The fund's unlisted real estate investments are primarily in office, retail and logistics properties. Office properties account for around half of the portfolio, and investments in office and retail premises are concentrated in a limited number of major cities.

The management mandate from the Ministry of Finance to Norges Bank sets an upper limit for unlisted real estate investments of 7 percent of the fund's value. The fund has a long-term investment strategy and limited borrowing needs, which means that we can also invest selectively when market corrections create attractive opportunities.

Real estate markets stabilised somewhat in 2024 after several turbulent years. Transaction activity was still low but increased in most markets.

We capitalised on the uncertainty and lack of liquidity in the market to make a number of purchases. Purchase volumes have generally been low since 2015 but increased considerably in 2024. Several ongoing transactions will be completed in the first quarter of 2025.

Unlisted: Portfolio constituents per the 2016 annual report

Breakdown by cities and countries

Table 18 The fund's largest unlisted real estate investments in office and retail as at 31 December 2016 by city. Percent

City	
New York	25.2
London	22.1
Paris	17.1
Boston	9.3
San Francisco	7.1
Zurich	5.9
Washington, D.C.	5.8
Sheffield	3.6
Berlin	1.4
Munich	1.3

Table 19 The fund's largest unlisted real estate investments in logistics as at 31 December 2016 by country. Percent

Country	
US	57.9
UK	12.5
France	7.3
Spain	4.2
Poland	4.0
Netherlands	3.9
Czech Republic	3.1
Italy	2.8
Germany	1.5
Hungary	1.4

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Breakdown by currencies and sectors

Chart 13 The fund's real estate investments by currency as at 31 December 2016. Percent

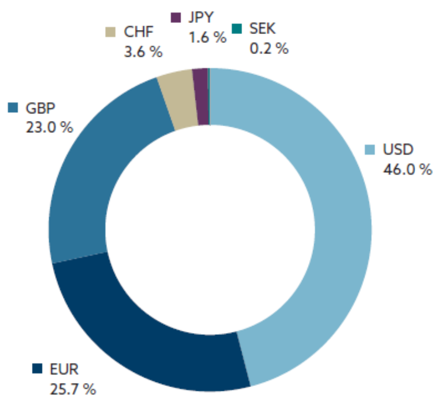
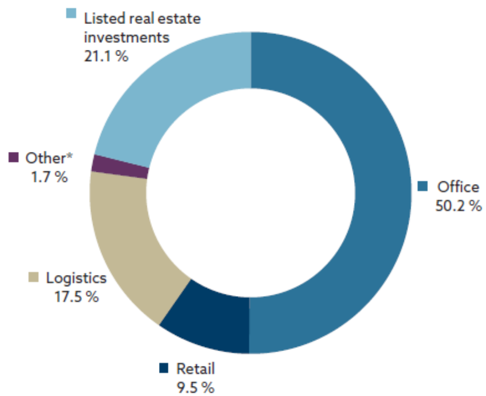


Chart 14 The fund's real estate investments by sector as at 31 December 2016. Percent



*Other sectors, bank deposits and other claims

- 2,5 % of the fund, NOK 191 bn
  - Dominated by prime properties in predominantly prestigious cities
  - No exposure to emerging markets
- A significant tilt of the country/currency-mix relative to the benchmark
  - E.g. UK/GBP massively overweight
  - 22,1% + 3,6% = 25,7% vs. 9,1%
  - 0,7% / 9,1% = 7,7% of UK assets in real estate (no disc. betw. listed and unlisted)
  - Same with France

The entire fund

Table 8 The fund's ten largest country holdings as at 31 December 2016. Percent

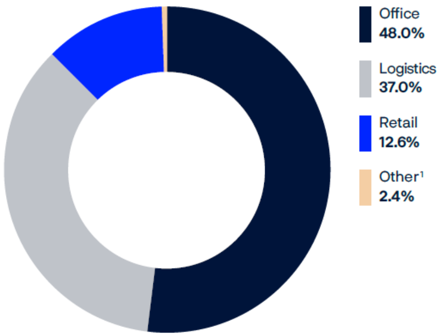
Country	Total	Equity	Fixed income	Real estate
US	37.2	23.2	12.5	1.5
UK	9.1	6.1	2.3	0.7
Japan	8.3	5.7	2.6	0.0
Germany	6.8	3.3	3.3	0.2
France	5.2	3.2	1.5	0.5
Switzerland	3.7	3.0	0.6	0.1
Canada	2.8	1.3	1.5	0.0
Australia	2.1	1.3	0.8	0.0
China	2.0	1.7	0.3	0.0
South Korea	1.9	1.0	0.9	0.0

Unlisted: Portfolio constituents per the 2024 annual report

Introduction

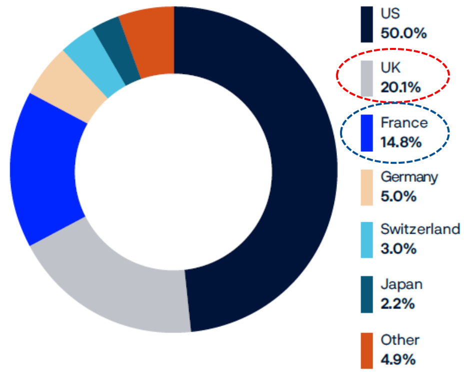
Breakdown by currencies and sectors

CHART 15 The fund's unlisted real estate investments by sector as at 31 December 2024.



[1] Other sectors, bank deposits and other claims.

CHART 16 The fund's unlisted real estate investments by country as at 31 December 2024.



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The entire fund

TABLE 2 The fund's ten largest holdings in percent as at 31 December 2024, by country.

Country	Total	Equity	Fixed income	Unlisted real estate	Unlisted infrastructure
US	53.4	40.0	12.5	0.86	0.00
Japan	6.2	4.7	1.5	0.04	
UK	5.5	3.7	1.4	0.33	0.04
Germany	4.5	2.2	2.2	0.09	0.01
France	3.4	2.1	1.0	0.26	
Canada	3.1	1.4	1.7		
Switzerland	2.7	2.2	0.4	0.05	
China	2.2	2.2	0.0		
Netherlands	2.0	1.3	0.7	0.02	0.06
India	1.7	1.7	0.0		

- 1,8 % of the fund, NOK 364 bn
- Much the same picture, though slightly smaller UK/GBP overweight, but still massive
  - 20% vs 5,5%
  - 0,33% / 5,5% = 6% of UK assets in unlisted real estate
- Same with France

Breakdown by cities, countries and regions

TABLE 12 The fund's largest unlisted real estate investments as at 31 December 2024.

Retail, office and other by city[1]	Percent
Paris	13.4
London	12.4
Boston	9.0
New York	7.4
Washington, D.C.	4.0
Berlin	3.9
San Francisco	3.7
Zurich	2.9
Tokyo	2.2
Sheffield	1.6
Cambridge	0.3
Logistics by country	**Prosent**
US	25.0
UK	4.4
France	1.4
Germany	1.1
Netherlands	1.1
Spain	1.0
Italy	1.0
Czech Republic	0.7
Other countries	1.1

[1] Excluding investments in logistics

TABLE 13 Return on the fund's unlisted real estate investment by market as at 31 December 2024. In percent.

Market	Return	Share of portfolio
Europe	3.8	47.8
US	-5.9	50.0
Japan	2.5	2.2

Unlisted: About valuation

From "Extended report on unlisted real estate investments 2018"

https://www.nbim.no/contentassets/b2884f1802524acfa07c7e84186f4096/spu_real_estate_2018_web.pdf

We obtain external valuations and report the value of our real estate investments on a quarterly basis.

The value of a real estate portfolio is the net sum of its assets and liabilities. The fair value is the estimated price that would have been obtained from the sale of a property or transfer of a liability between two market participants.

Valuing real estate

The value of a property before it is sold will always be subject to a degree of uncertainty, because real estate is an asset class with less frequent trading than listed equities and bonds. Having a diverse base of different valuers helps increase the quality of estimated values. Valuations are performed in accordance with internationally recognised standards. We quality-assure the information on which valuers base their valuations.

Valuing debt

At the end of 2018, the portfolio's financial leverage was 7.0 percent, compared to 7.5 percent at the end of 2017. As with the properties themselves, debt is measured at fair value. Where there are no observable prices, debt is valued by external valuers or by using various relevant models.

Valuation uncertainty

Property valuations are based on forward-looking judgements. The estimates generally reflect comparable recent transactions for properties with similar characteristics.

These estimates of property values are particularly sensitive to changes in discount rates and assumptions that affect future income. This uncertainty can be measured by looking at the effect of changes in these variables. An increase in the discount rate of 0.2 percentage point and a decrease in expected rental income of 2.0 percent, will reduce the estimated value of the portfolio at the end of 2018 by around 6.0 percent, compared to 6.0 percent at the end of 2017. Similarly, a decrease in the discount rate of 0.2 percentage point and an increase in expected rental income of 2.0 percent will raise the estimated value by 7.3 percent, compared to 6.9 percent at the end of 2017.

We review the value of the investments at the end of each quarter. This includes documenting the results of controls and analyses and presenting the most important sources of valuation uncertainty.

Unlisted: Costs

9,3 bp of current value NOK 364 bn is NOK 328 mill in management costs

17,2 bp is the long run average, extremely high, but must be considered in the context of a time-varying asset value and is obviously tainted by start-up-costs

However, disproportionately high costs, regardless

In 2024, unlisted real estate accounts for almost 5 % of total costs (=0,2/4,1) while constituting less than 2 % of assets (1,8%)

And - excluding stock-picking - it accounts for 13 % of costs [= 0,2/(4,1-2,5)], while still only representing less than 2 % of assets

The level of costs must be considered in the context of the potential excess return, which is much smaller in unlisted real estate than in stock picking

TABLE 33 Management costs in basis points per investment strategy in 2024. Costs reimbursed by the Ministry of Finance.

2024	Contribution to the fund's management costs	Management costs based on assets under management
Market exposure	1.4	1.9
Securities selection	2.5	11.0
Internal security selection	0.6	3.7
External security selection[1]	1.8	35.9
Fund allocation	0.3	
of which unlisted real estate	0.2	9.3
Total	**4.1**	

[1] Includes all externally managed capital.

TABLE 34 Management cost in basis points per investment strategy 2013–2024. Costs reimbursed by the Ministry of Finance.

2013–2024	Contribution to the fund's management costs	Management costs based on assets under management
Market exposure	2.0	2.6
Security selection	2.5	14.1
Internal security selection	0.7	5.1
External security selection[1]	1.8	41.9
Fund allocation	0.3	
Unlisted real estate[2]	0.4	17.2
Total	**5.1**	

[1] Includes all externally managed capital.
[2] Unlisted real estate is part of the Fund allocation strategy from 2017, but is presented on a separate line for 2013–2024.

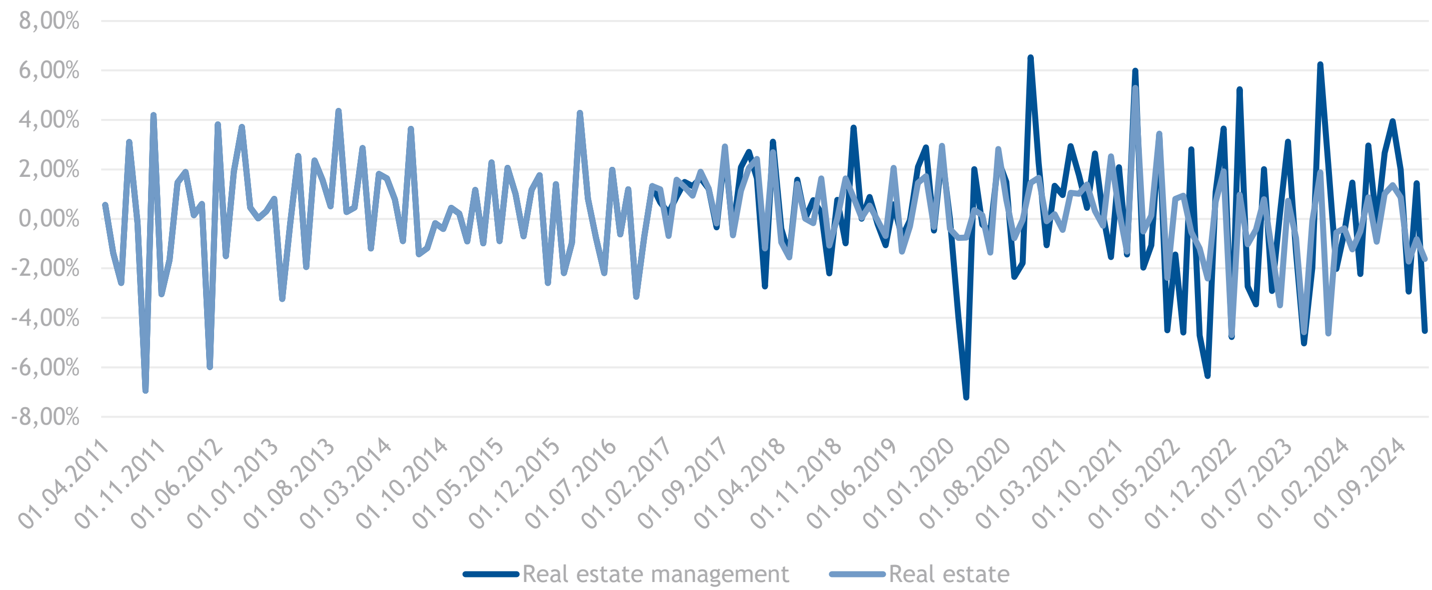
Available absolute return data

- NBIM publishes monthly historical returns, both absolute and relative
  - For various parts of the fund, and various strategies within the fund
  - In USD, NOK and the currency basket that constitutes the base currency for the fund
    - This basket is made up of all currencies weighted in accordance with the benchmark allocation

- For real estate, NBIM publishes two sets of absolute return series
  - "Blended" returns since inception in 2011
    - Labelled "Real Estate Management" in NBIM's reporting
    - This is the total return on both unlisted real estate, and listed real estate shares the fund holds that are part of the real estate mandate
      - The latter represents a pure overweight towards listed real estate shares
      - The benchmark allocation to real estate shares are not part of this reporting – this amounts to traditional stock picking
  - Returns on unlisted real estate, but only since 1 Jan 2017
    - Labelled "Real estate" in NBIM's reporting
    - These returns are based on **quarterly appraisal values** for the underlying properties, in addition to realised returns in the form of rental income, transaction costs, property tax, insurance, maintenance costs and realised profit/loss from actual sales of properties held
    - Importantly, these returns represent **nearly unlevered returns**, as opposed to returns on listed equities with a great degree of leverage

The reported absolute returns

Reported returns over time



- Returns are here in USD
- Identical "Real estate" and "Real estate management" returns up until 2017, from which "Real estate" is unlisted only
  - Importantly though, even if monthly returns are reported, the appraisal values are updated on a quarterly basis
    - For the intermediate months values are largely kept constant in local currency terms
    - The primary volatility observed in unlisted returns in intermediate months in the above is thus due to exchange rate variation on real estate assets not held in USD

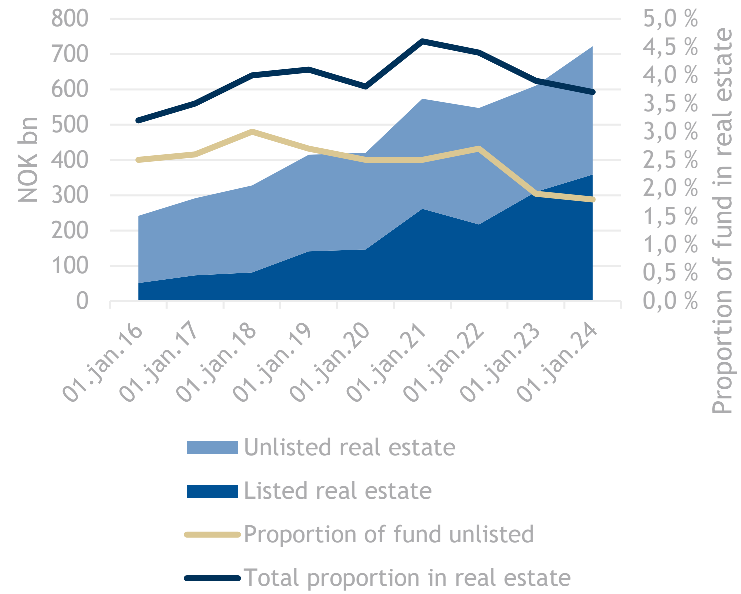
High-level characteristics of reported absolute returns

High-level return characteristics

	2011-2016	Blended since 2017	Unlisted since 2017	MSCI real estate** since 2017
Annualised average	2,9 %	2,9 %	2,3 %	7,0 %
Annualised volatility	7,6 %	9,3 %	5,7 %	18,0 %
Avg. risk free rate*	0,1 %	2,1 %	2,1 %	2,1 %
Sharpe ratio	0,37	0,08	0,04	0,27

- For comparison, we also include the return on a relevant MSCI index
  - Which is a levered return
  - Average Debt/Equity-ratio for companies in this index in the period 2017-2024 has been 90 %
- Returns for listed real estate are not reported on a monthly basis, only in periodic fund reports (annual and interim)
  - Based on blended returns and returns on unlisted real estate, one may endeavour backing out an estimate of the return on listed real estate
  - However, the blended returns are the weighted average of unlisted and listed returns, and we do not know the relative values of the two parts of the portfolio on a monthly basis
  - Shown right are the periodic values of the two parts of the portfolio, but deducing listed monthly returns based on an assumption of stable evolution in relative value in each period, does not provide quarterly and annual returns that match those reported in interim and annual reports

Listed and unlisted real estate since the end of 2016



Listed and unlisted real estate since the end of 2016

NOK bn	Listed real estate	Unlisted real estate	Proportion of fund unlisted	Total proportion in real estate
31.des.16	51	191	2,5 %	3,2 %
31.des.17	73	219	2,6 %	3,5 %
31.des.18	81	246	3,0 %	4,0 %
31.des.19	141	273	2,7 %	4,1 %
31.des.20	147	273	2,5 %	3,8 %
31.des.21	262	312	2,5 %	4,6 %
31.des.22	217	330	2,7 %	4,4 %
31.des.23	309	301	1,9 %	3,9 %
31.des.24	359	364	1,8 %	3,7 %

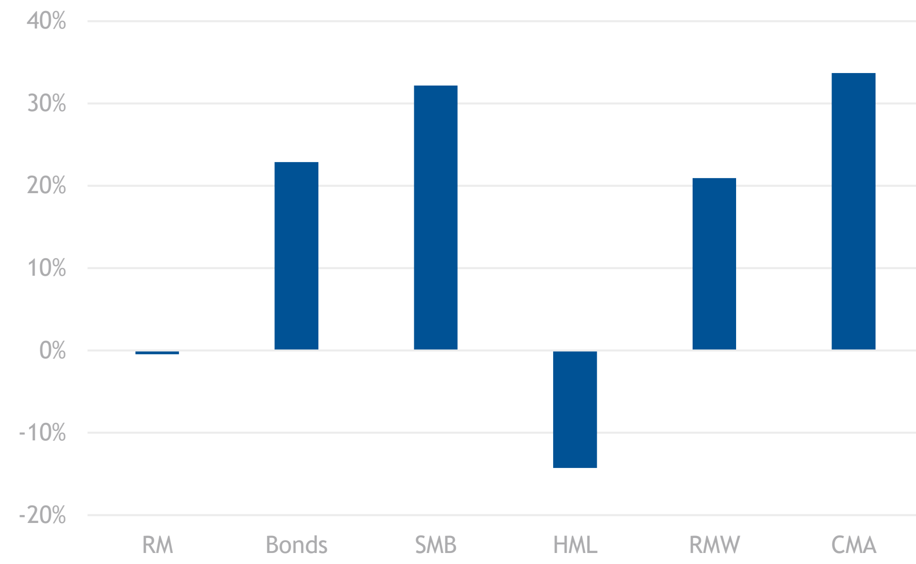
*Annualized risk-free rate in USD as reported by prof. Kenneth French
**MSCI World Equity Real Estate Investment Trusts Gross Total Return USD

Agenda

The natural starting point for risk adjustment

- We have data from 2017 onwards
- We know that unlisted returns are based on quarterly appraisal values
  - Therefore, we consider quarterly data, with one obvious caveat being that we are then left with only 31 periods since 2017, increasing the estimation error compared with monthly data
- We also know that there is zero emerging markets exposure
  - Thus, we consider only developed markets factors
- Bonds is the Bloomberg Aggregate global bond index
- Observations
  - Positive annualized alpha of 118 bp
  - But the factor loadings seem strange
    - Zero to mainstream equities? Inconsistent with existing research
  - The regression has absolutely zero explanatory power – adj. R2 of 4%

Estimated beta-factors



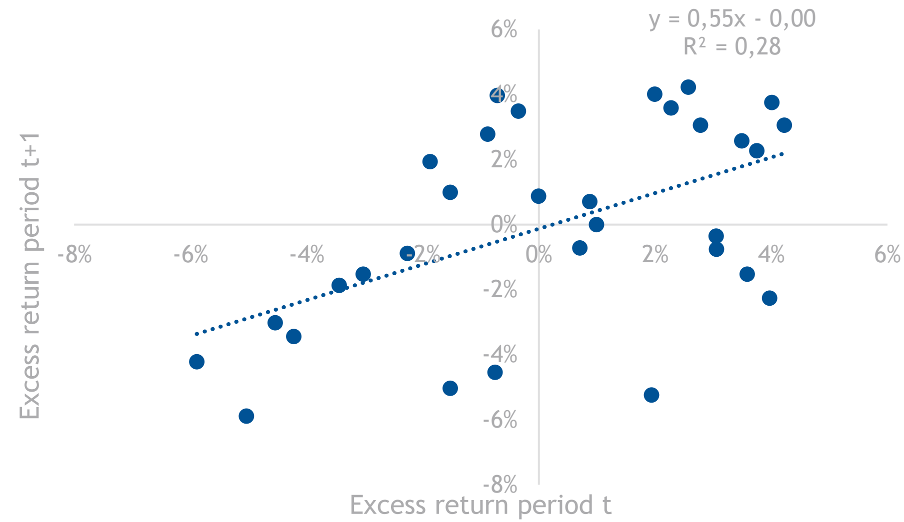
Regression summary

	Alpha (annualized, bp)	RM	Bonds	SMB	HML	RMW	CMA
Coefficient	118	0 %	23 %	32 %	-14 %	21 %	34 %
p-val	67 %	96 %	28 %	17 %	56 %	47 %	33 %
Adj. R2	4 %						
F-test p-val	23 %						

We know that appraisal values are smooth

- NBIM's unlisted real estate returns are strongly serially correlated
- Confirms smoothness
- We should perhaps include a lagged return in our analysis

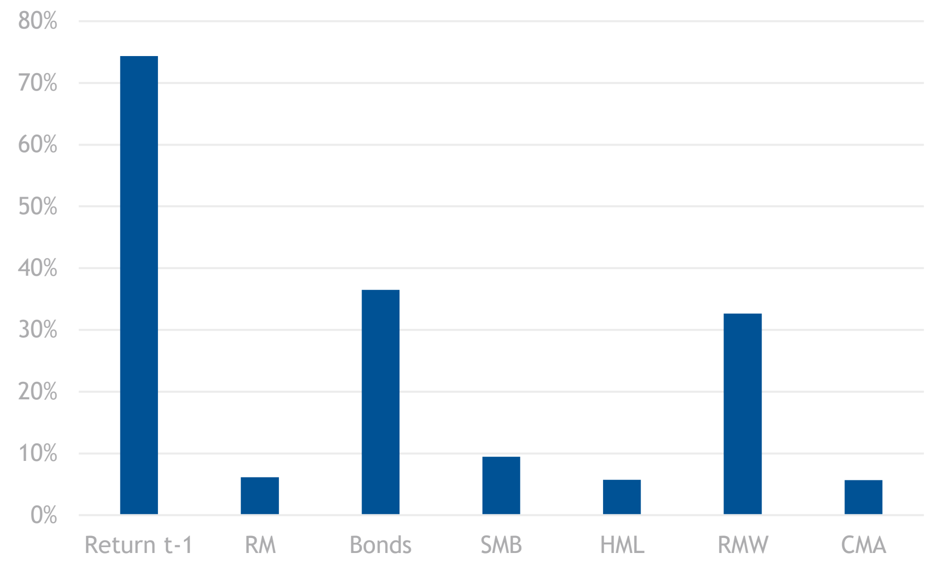
Estimated beta-factors



An adjusted model

- Now the adj. R2 is meaningful at 51 %
- Previous return and bonds are significant factors
- Relatively high beta towards the robustness factor, which perhaps makes sense
    - And the factor is almost significant with a p-value of 13 %
- Alpha is now negative at -137 per year

Estimated beta-factors

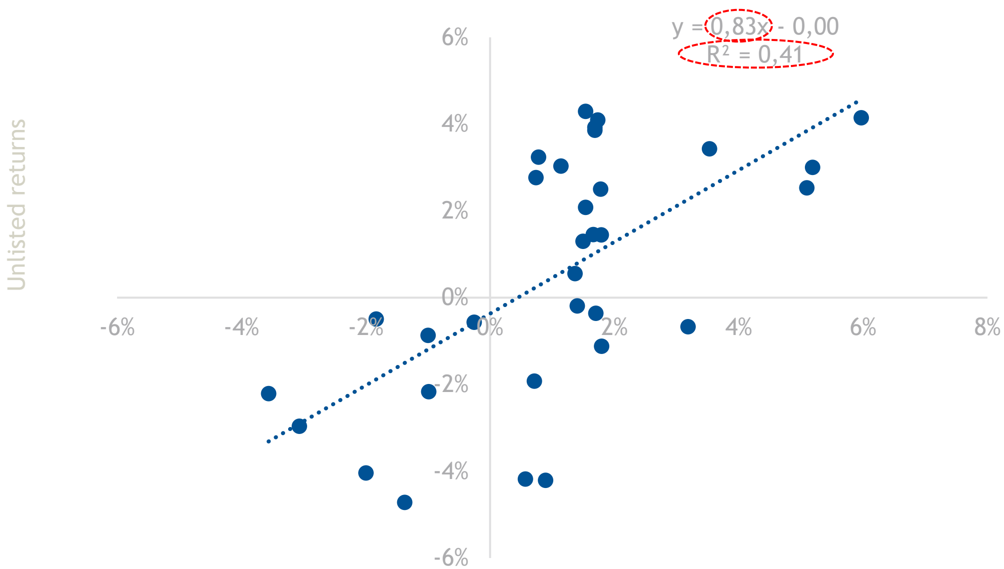


Regression summary

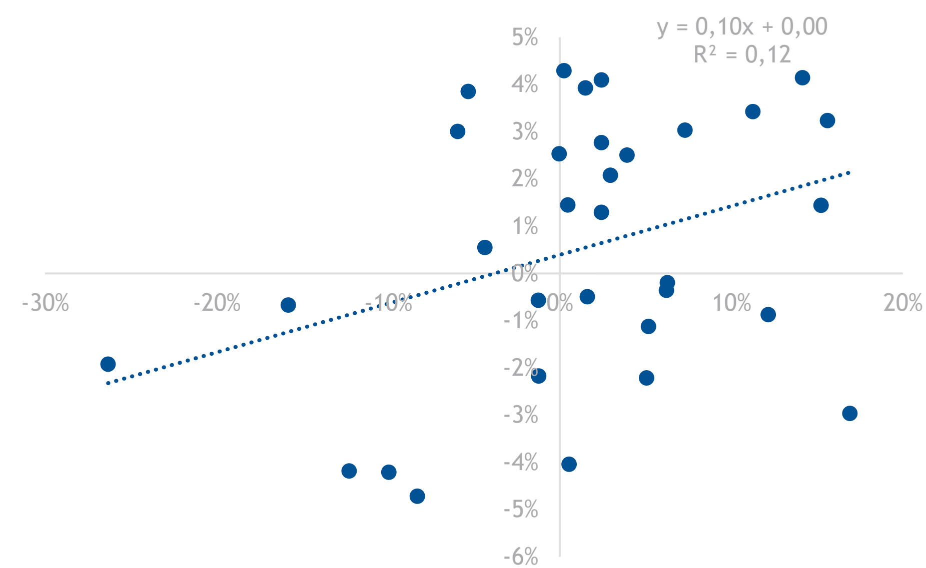
	Alpha (annualized, bp)	Return t-1	RM	Bonds	SMB	HML	RMW	CMA
Coefficient	-137	74 %	6 %	36 %	9 %	6 %	33 %	6 %
p-val	51 %	0 %	41 %	3 %	59 %	75 %	13 %	51 %
Adj. R2	51 %							
F-test p-val	0 %							

Some perhaps interesting perspectives (1/2)

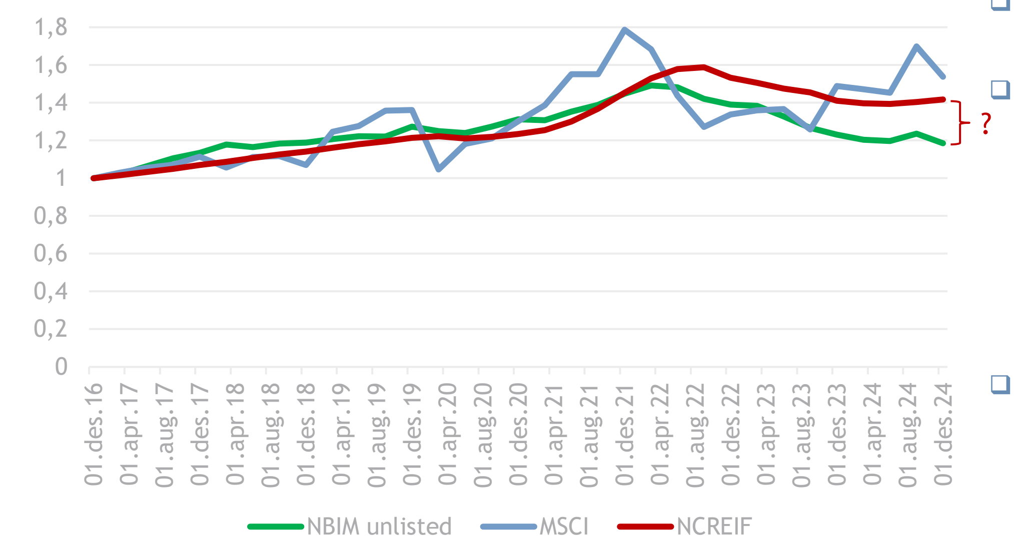
Quarterly log returns: y-axis: NBIM unlisted, x-axis: NCREIF



Quarterly log returns: y-axis: NBIM unlisted, x-axis: MSCI REITS



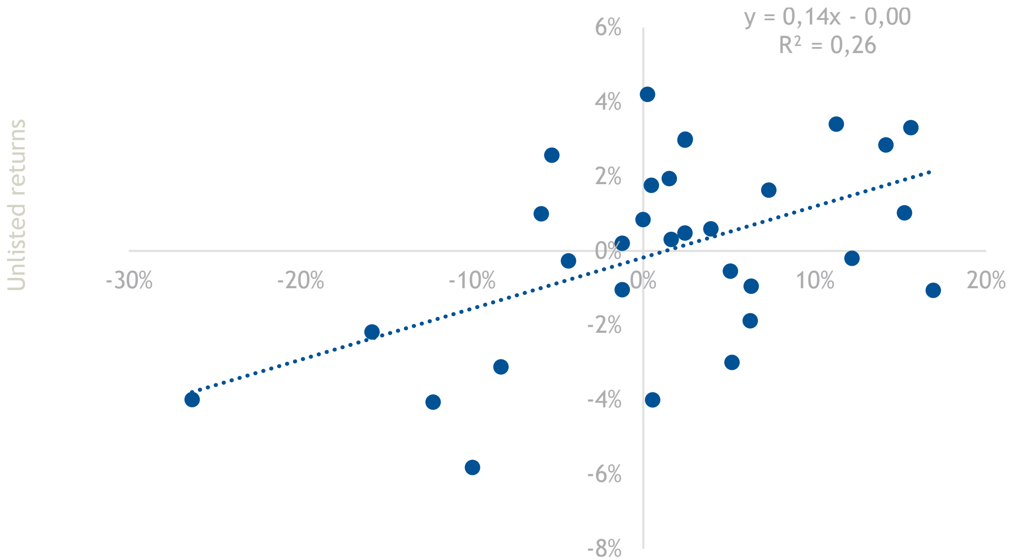
Total return indices



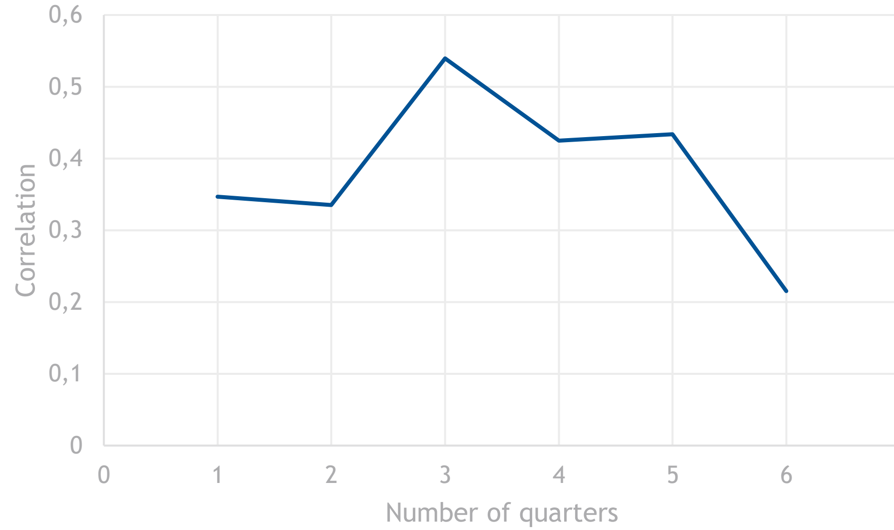
- A very weak relationship to listed real estate
- Apparently a relatively strong correlation to NCREIF
  - But NCREIF is not tradable
  - NCREIF is an index based on appraisal values of US office and retail properties
    - Valuations used by pension funds etc.
- NBIM has, however, significantly underperformed relative to this index

Some perhaps interesting perspectives (2/2)

Residuals of AR1 adjusted NBIM-returns vs. MSCI REITS



Correlation NBIM unlisted to MSCI REITS



- Given the high degree of autocorrelation, it is perhaps interesting to consider the residuals of an AR1-adjusted model on NBIM's unlisted return
  - The R2 rises from 0,12 (previous page) to 0,26, but still not a very strong relationship to market returns

- Perhaps looking over longer horizons reveals a relationship to market returns
  - Top right shows the Pearson correlation as a function of interval length
    - 2 = semi-annual, 4 = annual
  - Reveals a stronger relationship for periods up to a year, then dropping
    - Caveat: Fewer observations for longer intervals - at annual intervals we have only 8 observations
  - Results consistent with Ang (shown later)

We have tried a host of different models

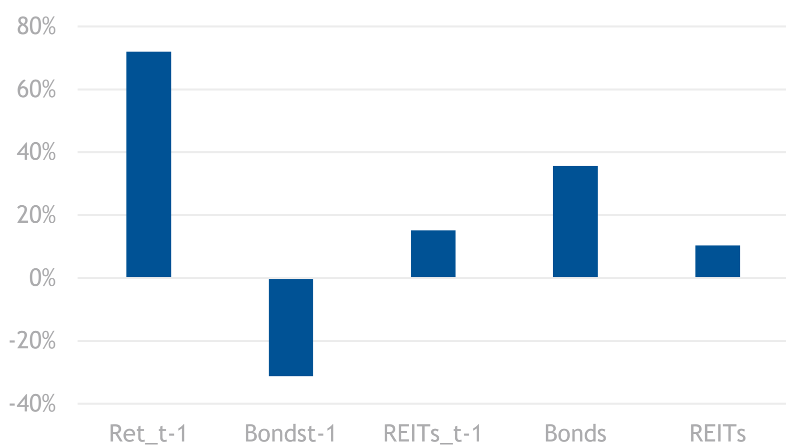
- Given that it is primarily in the UK, France and the US the unlisted assets are, we tried using country equity and bond indices as factors, with and without global factors and with and without French-factors – no luck

- We've tried lagging these, including also lagged NBIM unlisted returns – no luck
  - We've also experimented by dynamically altering the lags, to maximize R2, but no luck

- We've tried including exchange rates – largely not significant

- The model with the highest adj. R2 we were able to identify is shown below – but a short-position in bond returns the previous period?
  - We get a very similar result using French's RM instead of MSCI's REITs
    - In that version the alpha is significantly negative at minus 3,2 %, but adj. R2 is weaker

Factor loadings



Regression summary

	Alpha (annualized, bp)	Ret_t-1	Bondst-1	REITs_t-1	Bonds	REITs
Coefficient	-177	72 %	-31 %	15 %	36 %	10 %
p-val	25 %	0 %	3 %	1 %	1 %	5 %
Adj. R2	61 %					
F-test p-val	0 %					

From Andrew Ang's book "Asset Management", 2014 (1/2)

6.1. DIRECT OR INDIRECT?

I concentrate my analysis on institutional direct real estate investment and indirect real estate investment through REITs. REITs are mutual fund-like vehicles allowing broad ownership of real estate assets. Many REITs are publicly traded. REITs have to satisfy many restrictions: most notably, they are required to distribute at least 90% of their taxable income each year to shareholders as dividends. REITs are one of the few ways retail investors can access commercial real estate markets and were created by Congress in 1960 through the Real Estate Investment Trust Act. Congress did not have the high-minded intention of allowing the masses access to the diversification benefits of commercial real estate; the REIT Act was originally a rider attached to An Act to Amend the Internal Revenue Code with Respect to the Excise Tax on Cigars and was passed after adept lobbying by the real estate industry so that developers could tap the equity market for additional funds.[31]

Since direct real estate and REITs both involve buildings and land that generate cash flows, one would think the returns of these two approaches would be highly correlated.[32] Surely direct and indirect physical holdings of real estate must be driven by common fundamentals in the long run. But they are not, and this is called the *REIT puzzle*.

Table 11.11 reports means, standard deviations, autocorrelations, and cross-correlations of direct and indirect real estate returns along with equity returns from the beginning of 1978 to the end of 2011 at the quarterly frequency. The direct property returns are from the National Council of Real Estate Investment

Table 11.11

	Mean	*Stdev*	*Autocorrelation*
NCREIF	0.0221	0.0225	0.7806
REIT	0.0347	0.0918	0.1070
S&P 500	0.0301	0.0823	0.0711

Correlation Matrix

	NCREIF	REIT	S&P 500
NCREIF	1.0000	0.1520	0.0900
REIT		1.0000	0.6265
S&P 500			1.0000

[31] See Brandon (1998) and Graff (2001).

[32] For a theoretical basis of this proposition, see Carlson, Titman, and Tiu (2010).

Fiduciaries (NCREIF), which collects property data from its members. NCREIF computes a value-weighted index based on appraisals on a quarterly basis. The indirect property returns are the FTSE NAREIT All Equity returns, also at the quarterly frequency. I compare these property returns with S&P 500 equity returns.

Table 11.11 shows that NCREIF returns are very smooth (the quarterly autocorrelation is 78% and volatility is just 2.2%) compared to REIT and equity returns, which have autocorrelations close to zero and volatilities around 8% to 9%. Notably, the correlation between REIT and equity returns is high, at 63%, while the correlation between NCREIF and REIT returns is low, at 15%. Thus REITs resemble equities more than they resemble direct real estate. Hartzell and Mengden, who were industry practitioners at Salomon Brothers, were the first to document this phenomenon in 1986, and they generated substantial discussion about the underlying nature of real estate returns. Was real estate indeed a separate asset class, or was it just a different version of equity (and debt)?

This debate continues in real estate economics today. My takeaways for asset owners from this long literature are:

Direct Real Estate Returns Are Not Returns

The NCREIF series (and the corresponding widely used Investment Property Databank series in Europe) have many data biases because the values are not based on market transactions. REIT returns, in contrast, are investable returns. There are two important and large biases:[33]

1. Smoothing bias

   Using appraisals (done at most once or twice a year) artificially induces smoothness,[34] which is why the autocorrelation of the NCREIF series is so much higher than REITs or equities in Table 11.11.

2. Selection bias

   The properties that you see sold are not representative of the entire stock. For example, perhaps only the best properties are sold because those are the ones a developer is sprucing up, while the foreclosed crummy ones are not being sold.[35]

[33] There are two minor biases in addition to these two main ones. The first is an index construction bias, which is that repeat-sales indexes, which are developed to deal with appraisal bias, are equal-weighted cross-sectional estimators. But returns of equal-weighted portfolios are arithmetic averages of cross-sectional individual asset returns. I warned you that this was technical! The second is that the time a property is on the market differs in "hot" versus "cold" real estate markets. A paper that deals with all four biases is Fisher et al. (2003).

[34] See Geltner (1991) and Ross and Zisler (1991).

[35] See Munneke and Slade (2000).

From Andrew Ang's book (2/2): "Direct real estate returns are not returns!"

In addition, REITs are levered while NCREIF returns are reported on an unlevered basis. Researchers have developed many methods to move from appraisals to transaction-level (and repeat-sales) indices, to desmooth real estate returns, to take into account selection bias, and to remove other illiquidity biases. The effects of these biases are enormous. Lin and Vandell (2012), for example, report that for a one-year holding period, the variance of direct real estate returns should be three times higher than the raw variance reported in Table 11.11. Pagliari, Scherer, and Monopoli (2005) argue that there is no difference in direct and indirect real estate returns after adjusting for leverage and sector composition and also adjusting direct real estate returns for appraisal smoothing.

Smoothing and selection biases are shared by all illiquid assets—including private equity—and I discuss methods of dealing with them in chapter 13. I use NCREIF returns for now, but you've been warned: these are not actual returns.

In the Long Run, Direct and Indirect Real Estate Returns Move Together

Direct and indirect real estate returns are linked in the long run. Figure 11.12 graphs the correlation of long-horizon log NCREIF returns with long-horizon log REIT returns. At the one-quarter horizon, the correlation is around 0.22, which reflects the low correlation between NCREIF and REIT returns in Table 11.11. (Quarterly returns in Table 11.11 are arithmetic returns but I use log returns in Figure 11.12; see the appendix.) After twelve quarters, the correlation tapers to

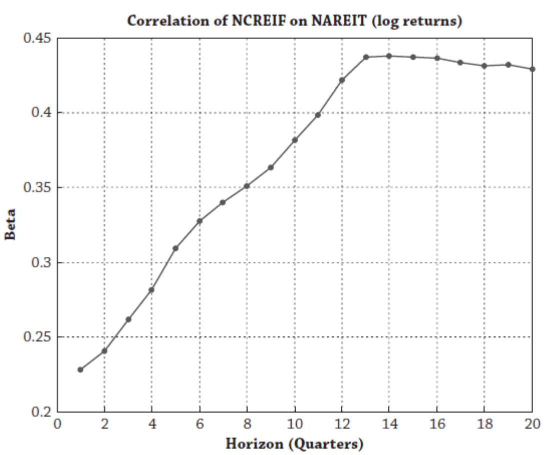


Figure 11.12

around 0.43. Thus there are some long-horizon common components in NCREIF and REIT returns. Econometric studies also document strong evidence that public real estate markets lead private real estate markets, which is to be expected since price discovery should happen in markets that are liquid.[36]

The astute reader will be wondering at this point, if direct and indirect real estate do move together in the long run, is real estate a separate asset class given that the correlation between REITs and equities is so high (63% in Table 11.11)? CPPIB, the manager of the CAN$162 billion Canada Pension Plan, does not consider real estate a separate asset class; CPPIB practices factor investing when it invests in real estate and thinks of real estate as comprising equity and debt characteristics.[37] In chapter 10, we also found that real estate did not seem to yield additional returns in excess of stocks, bonds, and REITs in factor benchmarks. But CPPIB is an exception: most investors regard real estate to be a separate asset class (or even factor). REITs cannot be the basis for this statement, given the high correlation of REIT returns with equities in Table 11.11. The statement is usually made using direct real estate returns—but as we know, direct real estate returns are not returns.[38] Although REIT and NCREIF returns do exhibit some commonality in the long run, the long-horizon correlations are far from one as Figure 11.12 shows. Thus:

Direct and Indirect Real Estate Are Different

Listed REITs seem to have one major advantage over direct real estate: they are liquid. But as of June 30, 2012, there were only 150 REITs traded on the New York Stock Exchange with a collective market capitalization of $545 billion. This is an average market capitalization of $3.6 billion for each REIT—smaller than many big real estate developments in the world's leading cities. The FTSE NAREIT All Equity REITs Index had a total market capitalization of $562 billion. In contrast, Florance et al. (2010) estimate that the (direct investment) commercial real estate market in the United States totaled over $9 trillion at the end of 2009, even though the market lost over $4 trillion from 2006 to 2010.

If REITs have such a big liquidity advantage, why is the amount of money invested through REITs well below one-tenth of the total commercial real estate market? Why aren't REITs more popular?

Structurally, REITs are different from direct real estate. Prior to the early 1990s, the REIT industry was very small because REITs were forced to retain external advisors to select and execute investment strategies. In 1986, REITs were allowed to select and manage their own assets and during the early 1990s many

[36] See Gyourko and Keim (1992), Barkham and Geltner (1995), and Oikarinen, Hoesli, and Serrano (2011).

[37] See the case "Factor Investing: The Reference Portfolio and Canada Pension Plan Investment Board," Columbia CaseWorks #120302. Assets under management as of March 31, 2012.

[38] See Mei and Lei (1994) and Ling and Naranjo (1997, 1999).

reorganized to bring these roles in-house.[39] The post-1990s is called the *new REIT era* for this reason.

Even today, however, the legal structure of REITs makes them different from direct real estate investment. Graff (2001) persuasively argues that there are still large agency costs associated with REITs imposed by their legal requirements.[40] (See Part III of this book for agency problems in delegated asset management.) The 75% income test (relaxed somewhat in 1986) requiring that proportion of REIT income to be derived from real estate investments gives REIT managers greater incentives to commit capital to overpriced acquisitions than managers of private real estate partnerships. In addition, REIT managers collect a perpetuity in the form of management fees, while closed-end funds are usually scheduled to liquidate after a prespecified term and open-ended funds are supposed to liquidate after requests from investors. The 5–50 test to preserve the exemption of REITs from double taxation where each group of five or few investors cannot own more than 50% of the voting stock means that REITs cannot be taken over to remove poorly performing incumbent management. That REITs have higher average returns than NCREIF returns in Table 11.11 is consistent with the notion that REITs are riskier than direct real estate, and their higher returns compensate for the extra risk.

The legal structure of REITs can also lead to differences with direct real estate even when there are no agency considerations. The requirement that REITs pay out 90% of their income each year means REIT managers gravitate to properties already generating quality cash flows rather than investing in developments that require cash today to create cash flows in the future. On the other hand, there has been tremendous innovation in REITs recently with an abundance of issues in many new sectors, like health care, data centers, and storage. NCREIF is traditionally wedded to the "core" sectors of apartment, retail, office, and industrial partly because these new sectors are small—the markets for self-storage centers and server farms are tiny compared to the office market.

Overall, however, I believe these agency and legal differences are secondary. There are more similarities, especially over the long run, between REITs and direct real estate. This is as expected from economic theory, where underlying both are buildings and land, and this is borne out in empirical tests. The large divergences in short-run returns between direct real estate and REITs are mostly due to direct real estate returns not being returns.

6.2. REAL ESTATE AND INFLATION

The literature is sharply divided on whether real estate is a good hedge for inflation. Fama and Schwert (1977) were the first to state that real estate was a perfect

[39] See Decker (1998) and Ambrose and Linneman (2001).

[40] See also Sagalyn (1996) who documents agency problems in REITs.

Agenda

Listed real estate

- NBIM holds listed real estate as part of the equity benchmark replication
- However, under the real estate mandate, allowing up to 7 % of the fund to be allocated to unlisted real estate, additional exposure can be taken towards not only unlisted real estate, but also listed real estate
  - NBIM shall not hold more than 10 percent of the voting shares of any one company, however *listed* and unlisted real estate companies are exempted from this
- As mentioned, NBIM does not provide monthly historical returns on this part of the portfolio, other than in written form in the periodic annual and interim reports for the fund
  - And then only in terms of the currency basket of the fund

Large ownership shares in listed real estate companies

TABLE 14 Owenship shares in percent for the 10 largest listed investments in real estate management as at 31. desember 2024.

Company	Country	Ownership share[1]
Shaftesbury Capital PLC	UK	25.2
Vonovia SE	Germany	14.7
Great Portland Estates PLC	UK	9.4
Alexandria Real Estate Equities Inc	US	9.4
Gecina SA	France	9.3
Equity Residential	US	9.1
Grainger PLC	UK	9.1
Regency Centers Corp	US	9.1
Vornado Realty Trust	US	9.1
UNITE Group PLC/The	UK	8.9

[1] The ownership shares also include holdings that are a part of the equity management.

An attempt

- We've reviewed all the periodic reports since 2016
  - History from before January 2017 is not relevant due to the policy change in real estate management
  - Until and including 2019, NBIM provided quarterly interim reporting
  - Since 2020, only semi-annual reporting

- Assuming relatively smooth asset values for listed and unlisted assets, one may bootstrap out from the blended and pure unlisted monthly returns a return series for listed real estate assets
  - Like this:

NOK bn	Listed real estate (NOK bn)	Unlisted real estate (NOK bn)	Unlisted return	Blended return	Estimated listed return	Reported Quarterly return	Estimated Quarterly return
31.des.16	51	191					
31.jan.17	52	192	1,20 %	0,66 %	-1,31 %		
28.feb.17	54	193	-0,69 %	0,25 %	3,58 %		
31.mar.17	55	194	1,59 %	0,90 %	-1,53 %	-0,70 %	0,66 %
30.apr.17	56	195	1,28 %	1,49 %	2,22 %		
31.mai.17	56	197	0,94 %	1,33 %	2,70 %		
30.jun.17	57	199	1,91 %	1,65 %	0,77 %	3,60 %	5,79 %

  - Of course, we may use an optimiser under certain more or less sensible constraints and try and bootstrap out a portfolio composition that provides matching returns, but this still has infinite possible solutions:

NOK bn	Listed real estate (NOK bn)	Unlisted real estate (NOK bn)	Unlisted return	Blended return	Estimated listed return	Reported Quarterly return	Estimated Quarterly return
31.des.16	51	191					
31.jan.17	39	191	1,20 %	0,66 %	-1,97 %		
28.feb.17	69	193	-0,69 %	0,25 %	2,87 %		
31.mar.17	55	194	1,59 %	0,90 %	-1,53 %	-0,70 %	-0,70 %
30.apr.17	551	0	1,28 %	1,49 %	1,49 %		
31.mai.17	751	0	0,94 %	1,33 %	1,33 %		
30.jun.17	57	199	1,91 %	1,65 %	0,77 %	3,60 %	3,63 %

Ridiculous implied asset mix

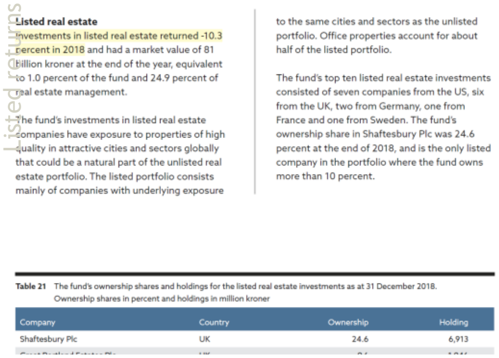
Perhaps the blended return is not just simply the weighted average of the two?

There is an issue here regarding the fact that stated returns are in fund basket currency units

So, let's use what we have from periodic reporting

- As mentioned, in annual and interim reports, NBIM documents as part of the written continuous text (no tables), the return generated on the listed real estate portfolio that is part of the real estate management mandate

Example from 2018-report


Listed returns

Listed real estate

Investments in listed real estate returned -10.3 percent in 2018 and had a market value of 81 billion kroner at the end of the year, equivalent to 1.0 percent of the fund and 24.9 percent of real estate management.

The fund's investments in listed real estate companies have exposure to properties of high quality in attractive cities and sectors globally that could be a natural part of the unlisted real estate portfolio. The listed portfolio consists mainly of companies with underlying exposure to the same cities and sectors as the unlisted portfolio. Office properties account for about half of the listed portfolio.

The fund's top ten listed real estate investments consisted of seven companies from the US, six from the UK, two from Germany, one from France and one from Sweden. The fund's ownership share in Shaftesbury Plc was 24.6 percent at the end of 2018, and is the only listed company in the portfolio where the fund owns more than 10 percent.

Table 21 The fund's ownership shares and holdings for the listed real estate investments as at 31 December 2018. Ownership shares in percent and holdings in million kroner

Company	Country	Ownership	Holding
Shaftesbury Plc	UK	24.6	6,913

We are comparing with "*MSCI World Equity Real Estate Investment Trusts Gross Total Return USD*"

Gross means before withholding taxes

We believe this to be fair, as NBIM's listed real estate assets are largely in countries in which NBIM gets most or all of the withholding tax paid reimbursed under bilateral tax agreements with the topical countries and Norway

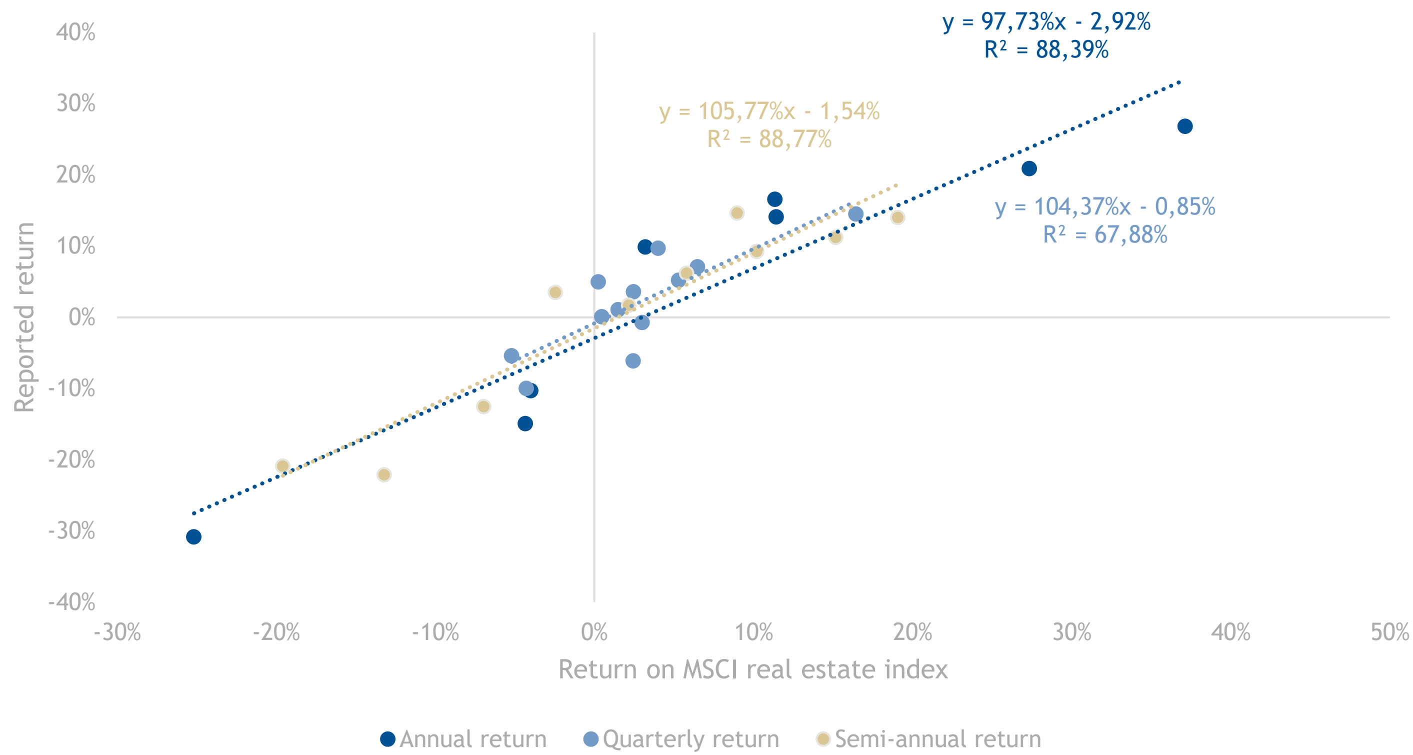
Reported returns on listed real estate vs. comparable market returns

NOK bn	Listed real estate (NOK bn)	Unlisted real estate (NOK bn)	Proportion of fund unlisted	Reported Quarterly return	Reported Semi-annual return	Reported Annual return	MSCI Quarterly return	MSCI Semi-annual return	MSCI Annual return	Excess ret. Quarterly return	Excess ret. Semi-annual return	Excess ret. Annual return
31.des.16	51	191	2,50 %									
31.mar.17	55	194		-0,70 %			3,00 %			-3,70 %		
30.jun.17	57	199		3,60 %	2,87 %		2,47 %	1,71 %		1,13 %		
30.sep.17	58	199		1,10 %			1,51 %			-0,41 %		
31.des.17	73	219	2,60 %	9,70 %	10,91 %	14,1 %	4,01 %	5,58 %	11,43 %	5,70 %		2,67 %
31.mar.18	73	217		-5,40 %			-5,20 %			-0,20 %		
30.jun.18	78	220		5,20 %	-0,48 %		5,30 %	-0,17 %		-0,10 %		
30.sep.18	77	226		0,10 %			0,46 %			-0,36 %		
31.des.18	81	246	3,00 %	-9,96 %	-9,87 %	-10,3 %	-4,27 %	-3,83 %	-3,99 %	-5,68 %		-6,31 %
31.mar.19	92	247		14,50 %			16,45 %			-1,95 %		
30.jun.19	95	247		-6,10 %	7,52 %		2,45 %	19,31 %		-8,55 %		
30.sep.19	115	268		7,10 %			6,48 %			0,62 %		
31.des.19	141	273	2,70 %	4,99 %	12,45 %	20,9 %	0,24 %		27,35 %	4,75 %		-6,45 %
30.jun.20	136	295			-22,10 %			-13,21 %			-8,89 %	
31.des.20	147	273	2,50 %		9,24 %	-14,9 %		10,21 %	-4,34 %		-0,97 %	-10,56 %
30.jun.21	212	281			14,00 %			19,09 %			-5,09 %	
31.des.21	262	312	2,50 %		11,23 %	26,8 %		15,17 %	37,15 %		-3,94 %	-10,35 %
30.jun.22	230	354			-20,90 %			-19,57 %			-1,33 %	
31.des.22	217	330	2,70 %		-12,52 %	-30,8 %		-6,95 %	-25,16 %		-5,57 %	-5,64 %
30.jun.23	246	345			1,70 %			2,17 %			-0,47 %	
31.des.23	309	301	1,90 %		14,65 %	16,6 %		8,99 %	11,35 %		5,67 %	5,25 %
30.jun.24	329	307			3,50 %			-2,45 %			5,95 %	
31.des.24	359	364	1,80 %		6,18 %	9,9 %		5,80 %	3,21 %		0,38 %	6,69 %
Mean / Sum				2,01 %	1,77 %	4,04 %	2,74 %	2,79 %	7,12 %			-3,09 %
Volatility				13,99 %	16,91 %	20,26 %	11,05 %	15,74 %	19,49 %			6,92 %
Excess return (annualized)				-2,92 %	-2,03 %	-3,09 %						

- Cells marked with a red triangle are not officially reported, but are imputed from shorter and longer-term reported returns

Risk adjusted return on listed real estate

Reported returns on listed real estate vs. comparable market returns



- The relationship is significant
  - But there is an issue regarding base currency – better reporting would remedy this
- Beta is approximately 1,0
- Alpha is about minus 3 % per annum

Agenda

The Ministry of Finance requested a report: The shocking reality

Tabell 2: Relativ avkastning unotert eiendom

	Siden oppstart	Siste 10 år	Siden 2017	Siste 3 år
Avkastning unoterte eiendomsinvesteringer (prosent)	4,12	2,90	2,92	-4,71
Avkastning på aksjer og obligasjoner som er solgt for å finansiere unotert eiendom (prosent)			4,72	9,87
Relativ avkastning unotert eiendom (prosentpoeng)			**-1,81**	**-14,54**

Note: Målt i fondets valutakurv. Annualisert. Per 30. september 2025. Oppstart for unotert eiendom er 1. april 2011.

Tabell 5: Relativ avkastning notert eiendom

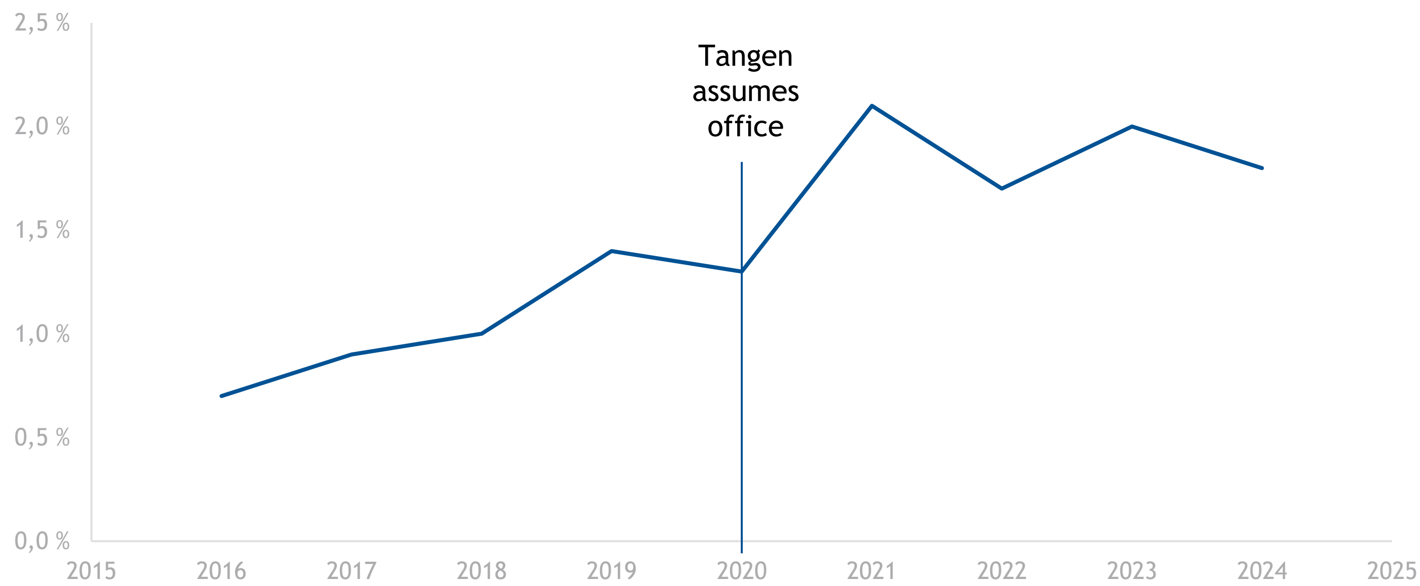
	Siden oppstart	Siden 2017	Siste 5 år	Siste 3 år
Avkastning noterte eiendomsinvesteringer (prosent)	2,55	1,92	4,84	8,28
Avkastning på aksjer og obligasjoner som er solgt for å finansiere notert eiendom (prosent)	8,30	8,38	9,03	15,36
Relativ avkastning notert eiendom (prosentpoeng)	**-5,75**	**-6,47**	**-4,19**	**-7,08**

Note: Målt i fondets valutakurv. Annualisert. Per 30. september 2025. Oppstart for notert eiendom er 1. november 2014.

Significance

- An annual loss of 1,81 % on unlisted real estate of NOK 364 bn amounts to an annual loss of NOK 6,6 bn per year
- An annual loss of 6,47 % on listed real estate of NOK 359 bn amounts to an annual loss of NOK 23 bn per year
  - This initiative has been greatly expanded during Nicolai Tangen's tenure

Proportion of fund overweighted towards listed real estate



The actual historical loss on listed real estate

- We may estimate a historical loss, based on periodic reporting, though acknowledging that returns are in basket currency units and fund values are in NOK
- We estimate an actual historical loss of about NOK 72 bn

Actual historical loss on listed real estate

				% of tot. Fund	
				Reported	Excess ret. vs. funding listed
NOK bn	Total fund (NOK bn)	Unlisted real estate (NOK bn)	Listed real estate (NOK bn)	A: Listed vs. funding	NOK bn
31.des.17	8 488	219	73	0,01 %	0,8
31.des.18	8 256	246	81	-0,05 %	-4,2
31.des.19	10 088	273	141	0,04 %	3,7
31.des.20	10 914	273	147	-0,39 %	-42,6
31.des.21	12 340	312	262	0,15 %	16,8
31.des.22	12 429	330	217	-0,35 %	-40,9
31.des.23	15 765	301	309	0,11 %	15,5
31.des.24	19 742	364	359	-0,13 %	-20,9
Mean / Sum					-72

Agenda

Conclusions

- Coming into 2025, NBIM had NOK 359 bn in listed real estate assets
  - A 3 % annual loss on this amounts to NOK 11 bn – per year
    - The reality is even worse – of the order of NOK 23 bn!
  - An actual loss of NOK 72 bn is already realised on listed real estate
  - Things would have been better had NBIM simply replicated the benchmark

- There is zero academic or empirical evidence to support an overweight of the portfolio towards real estate in the first place
  - Responsibilities must be distributed fairly
    - NBIM is responsible for managing in accordance with the mandate: Poor
    - The Ministry of Finance is responsible for deciding to overweight unlisted real estate, in direct contradiction with academic reports received: Poor

- And if the listed performance is a guide to actual, risk-adjusted unlisted performance, it's even worse – so it seems

- One may wonder why NBIM reports almost all kinds of return data, except from the return on listed real estate assets managed under the real estate mandate

- From January 2025 NBIM has merged the equity investment department with the real estate and infrastructure department into a single unit called "Active Strategies"
  - Supposedly to strengthen management by bringing together expertise across asset classes
  - But emphasizes that the investment strategy itself remains unchanged

Actual realised historical loss

Reported returns on listed real estate vs. comparable market returns

NOK bn	Listed real estate (NOK bn)	Unlisted real estate (NOK bn)	Proportion of fund unlisted	Reported Quarterly return	Reported Semi-annual return	Reported Annual return	MSCI Quarterly return	MSCI Semi-annual return	MSCI Annual return	Excess ret. Quarterly return	Excess ret. Semi-annual return	Excess ret. Annual return	Excess ret. NOK bn	Excess ret. NOK bn
31.des.16	51	191	2,50 %											
31.mar.17	55	194		-0,70 %			3,00 %			-3,70 %			-2,0	
30.jun.17	57	199		3,60 %	2,87 %		2,47 %	1,71 %		1,13 %			0,6	
30.sep.17	58	199		1,10 %			1,51 %			-0,41 %			-0,2	
31.des.17	73	219	2,60 %	9,70 %	10,91 %	14,1 %	4,01 %	5,58 %	11,43 %	5,70 %		2,67 %	3,7	1,6
31.mar.18	73	217		-5,40 %			-5,20 %			-0,20 %			-0,1	
30.jun.18	78	220		5,20 %	-0,48 %		5,30 %	-0,17 %		-0,10 %			-0,1	
30.sep.18	77	226		0,10 %			0,46 %			-0,36 %			-0,3	
31.des.18	81	246	3,00 %	-9,96 %	-9,87 %	-10,3 %	-4,27 %	-3,83 %	-3,99 %	-5,68 %		-6,31 %	-4,5	-4,8
31.mar.19	92	247		14,50 %			16,45 %			-1,95 %			-1,7	
30.jun.19	95	247		-6,10 %	7,52 %		2,45 %	19,31 %		-8,55 %			-8,0	
30.sep.19	115	268		7,10 %			6,48 %			0,62 %			0,7	
31.des.19	141	273	2,70 %	4,99 %	12,45 %	20,9 %	0,24 %		27,35 %	4,75 %		-6,45 %	6,1	-6,8
30.jun.20	136	295			-22,10 %			-13,21 %			-8,89 %		-12,3	
31.des.20	147	273	2,50 %		9,24 %	-14,9 %		10,21 %	-4,34 %		-0,97 %	-10,56 %	-1,4	-14,9
30.jun.21	212	281			14,00 %			19,09 %			-5,09 %		-9,1	
31.des.21	262	312	2,50 %		11,23 %	26,8 %		15,17 %	37,15 %		-3,94 %	-10,35 %	-9,3	-21,4
30.jun.22	230	354			-20,90 %			-19,57 %			-1,33 %		-3,3	
31.des.22	217	330	2,70 %		-12,52 %	-30,8 %		-6,95 %	-25,16 %		-5,57 %	-5,64 %	-12,5	-13,3
30.jun.23	246	345			1,70 %			2,17 %			-0,47 %		-1,1	
31.des.23	309	301	1,90 %		14,65 %	16,6 %		8,99 %	11,35 %		5,67 %	5,25 %	15,7	13,5
30.jun.24	329	307			3,50 %			-2,45 %			5,95 %		19,0	
31.des.24	359	364	1,80 %		6,18 %	9,9 %		5,80 %	3,21 %		0,38 %	6,69 %	1,3	22,2
Mean / Sum				2,01 %	1,77 %	4,04 %	2,74 %	2,79 %	7,12 %			-3,09 %	-19	-24
Volatility				13,99 %	16,91 %	20,26 %	11,05 %	15,74 %	19,49 %			6,92 %		
Excess return (annualized)				-2,92 %	-2,03 %	-3,09 %								

Between NOK 19 bn and NOK 24 bn lost vs. MSCI Reits