

A Review of the Active Management of Norway's Government Pension Fund Global

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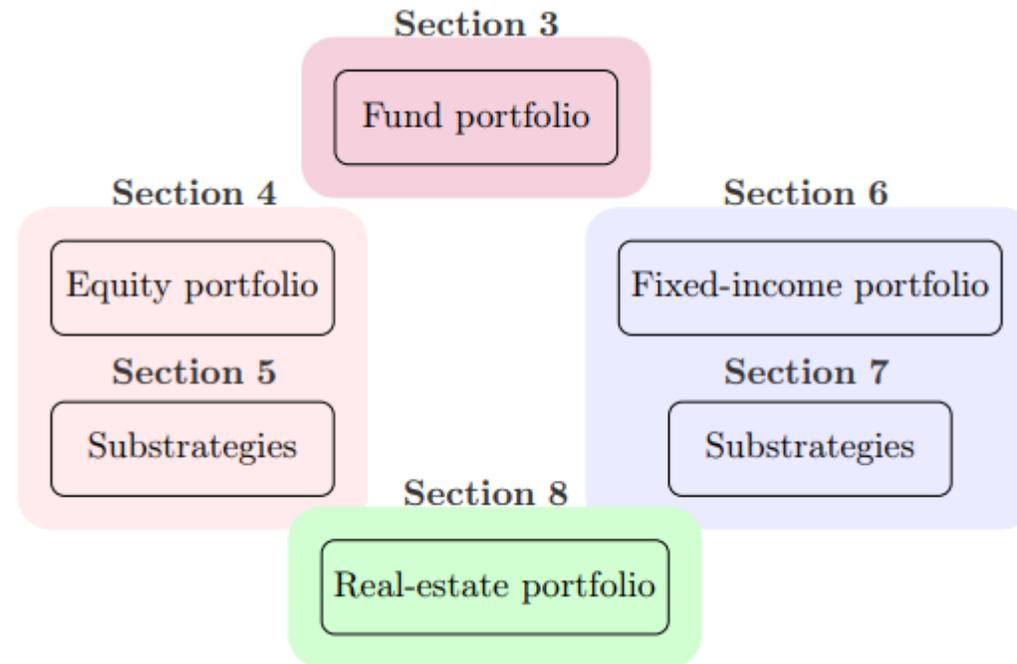
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<https://ssrn.com/abstract=4003433>

We focus on three main questions in the assessment:

- What is the Fund's realized value creation?
- Why and how is this result achieved?
- How can the Fund's value creation be improved?

Roadmap



Fund portfolio realized active return

- Active return is total portfolio minus benchmark return.
- Benchmark given in the mandate
- We do adjust benchmark for cost
 - Best estimate: Income = cost, see Section 2.3.
- **Active annual return 0.28% before and 0.20% after cost.**
- Value added (VA): Active return multiplied with asset under management
 - NOK 228 billion before and NOK 170 billion after cost

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Return	VA	Return	VA
Gross	0.28	0.80	0.27	2.30
Costs	0.08	0.20	0.05	0.41
Net	0.20	0.60	0.22	1.89

Notes: The table shows the costs and the gross and net mean annualized active returns (USD) and value added (NOK). Returns expressed in percent, value added in NOK billion.

Table 2: Fund realized mean active returns

Why and how result achieved?

- Skill vs. luck:
 - Skill = true active return is larger than zero
 - Observe a sample of returns, but is this signal “strong enough” to reveal true skill?

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
Mean	0.28 (0.22)	0.20 (0.22)	0.27* (0.14)	0.22 (0.14)
<i>p</i> -value	.21	.36	.06	.13
<i>N</i>	285	285	57	57

Notes: The table shows the gross and net mean annualized active returns in percent. Newey and West (1987) standard errors in parentheses. *N* refers to the number of observations in the period. We denote by stars if the mean is significantly different from zero. ***/**/* indicates significance at the 1%/5%/10% level.

Table 4: Fund mean active returns

- Criterion for separating between skill and luck: *p*-value
- *P*-value is the likelihood of assuming skill based on observed return when there is no skill.
 - Analogy: Likelihood of assuming a medicine works while it does not.
 - Thus, with a low *p*-value, we are sure observed active return (the medicine) is larger than zero (works).
 - Common threshold for significance is *p*-value less than 5%
 - Then, in 1 out of 20 cases, we make an error (assume skill when there is no skill)
- **We observe *p*-value at 21% before and 36 % after cost.**
 - Then, in 1 out of 5 cases, we wrongly assume skill (before cost)
- Thus, at fund level, we cannot assume skill!

Risk-adjusted performance

- Fund's total return: No risk adjustment
- Active return (Fund's return minus benchmark): Risk-adjusted for benchmark risk.
 - Owner accept an active risk limited by tracking error at 1.25%.
- We examine two additional performance measures based on more sophisticated risk models
 1. CAPM adjusted active return
 - i.e., adjusted for beta exposure to benchmark
 2. Seven factor model adjusted active return
 - i.e., adjusted for Fama French 5-factor model + two fixed income factors

Problems with factor models

- These models are nice for risk management, but more skeptical to use them in performance evaluation.
- If risk model is wrong, then the estimate also become wrong!
- Potential problems:
 1. Not clear ex-ante what should be in the model, see for example factor zoo
 2. Static estimates do not pick up the dynamic changes in the factor exposures
 3. Hard to account for costs implementing the factor exposures
 4. Factor investability, the manager might have restrictions such that it cannot replicate the factor portfolios
 5. The return of the benchmark differs from the market portfolio. Therefore, the portfolios estimated alpha can include an effect associated with the benchmark index
 6. Factor returns differ substantially depending on when the data are collected, the data's vintage

Two risk models: CAPM and seven factor model

- Both models:
 - Positive alpha, but high p-value

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.14 (0.20)	0.06 (0.21)	0.19 (0.13)	0.14 (0.13)
p -value	.50	.78	.13	.27
β	1.03*** (0.01)	1.03*** (0.01)	1.01*** (0.003)	1.01*** (0.003)
p -value	.01	.01	.01	.01
N	285	285	57	57
R^2	1.00	1.00	1.00	1.00
AR	0.24	0.10	0.64	0.47

Notes: The table shows the estimated annualized α and β from Eq. (1) using gross and net returns. Returns expressed in percent. Newey and West (1987) standard errors in parentheses. R^2 is the explanatory power from the regression, and AR is the appraisal ratio. We denote by stars if α is significantly different from zero and if β is significantly different from one. ***/**/* indicates significance at the 1%/5%/10% level.

Table 5: Fund mean beta-adjusted active returns

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.14 (0.16)	0.06 (0.16)	0.38*** (0.11)	0.33*** (0.11)
p -value	.39	.71	.001	.004
MKT	0.01*** (0.003)	0.01*** (0.003)	0.001 (0.003)	0.001 (0.003)
p -value	.0003	.0003	.79	.79
SMB	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)
p -value	.0000	.0000	.0001	.0001
HML	0.01** (0.01)	0.01** (0.01)	0.01* (0.004)	0.01* (0.004)
p -value	.04	.05	.07	.07
RMW	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
p -value	.15	.15	.57	.57
CMA	-0.03 *** (0.01)	-0.03 *** (0.01)	0.003 (0.01)	0.003 (0.01)
p -value	.01	.01	.71	.71
$TERM$	-0.01 ** (0.004)	-0.01 ** (0.004)	-0.01 (0.01)	-0.01 (0.01)
p -value	.02	.02	.34	.34
DEF	0.02* (0.01)	0.02* (0.01)	0.004 (0.005)	0.004 (0.005)
p -value	.08	.06	.37	.37
N	285	285	57	57
Adjusted R^2	0.47	0.47	0.46	0.46

Notes: The table shows the estimated coefficients from the factor model in Eq. (2). α is annualized. Returns expressed in percent. Newey and West (1987) standard errors in parentheses. N refers to the number of observations in the period, and R^2 is the explanatory power from the regression. We denote by stars if α or factors are significantly different from zero. ***/**/* indicates significance at the 1%/5%/10% level.

Table 6: Fund factor model risk adjustment

Equity portfolio

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
Mean	0.47*** (0.18)	0.36* (0.18)	0.40** (0.20)	0.34* (0.20)
<i>p</i> -value	.01	.06	.05	.10
<i>N</i>	284	284	57	57

Notes: The table shows the estimated annualized mean active returns in percent. [Newey and West \(1987\)](#) standard errors in parentheses. *N* refers to the number of observations in the period. We denote by stars if the mean is significantly different from zero. ***/**/* indicates significance at the 1%/5%/10% level.

Table 9: Equity mean active returns

- Realized positive active return
- Low *p*-value

Risk models: CAPM and F&F five factor

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.37** (0.16)	0.25 (0.16)	0.24* (0.14)	0.18 (0.14)
p -value	.03	.13	.09	.20
β	1.02*** (0.004)	1.02*** (0.004)	1.01*** (0.002)	1.01*** (0.002)
p -value	.00	.00	.00	.00
N	284	284	57	57
R^2	1.00	1.00	1.00	1.00
AR	0.54	0.37	0.75	0.57

Notes: The table shows the estimated α and β from Eq. (1) for the gross and net returns in the full and latest sample periods. Returns expressed in percent. Newey and West (1987) standard errors in parentheses. N is the number of observations in the sample period, R^2 is the explanatory power from the regression, and AR is the appraisal ratio. We denote by stars if α is significantly different from zero and if β is significantly different from one. ***/**/* indicates significance at the 1%/5%/10% level.

Table 10: Equity mean beta-adjusted active returns

- Positive alpha
- Relative low p -value

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.37** (0.15)	0.25 (0.15)	0.31** (0.15)	0.25* (0.15)
p -value	.02	.11	.04	.09
MKT	0.01*** (0.003)	0.01*** (0.003)	0.01** (0.003)	0.01** (0.003)
p -value	.0001	.0001	.02	.02
SMB	0.04*** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.03*** (0.01)
p -value	.00	.00	.0003	.0003
HML	-0.01 (0.01)	-0.01 (0.01)	0.01** (0.01)	0.01** (0.01)
p -value	.51	.48	.04	.04
RMW	0.004 (0.01)	0.004 (0.01)	0.01 (0.01)	0.01 (0.01)
p -value	.70	.70	.45	.45
CMA	-0.03*** (0.01)	-0.03*** (0.01)	-0.02 (0.01)	-0.02 (0.01)
p -value	.01	.01	.11	.11
N	284	284	57	57
Adjusted R^2	0.37	0.37	0.49	0.49

Notes: The table shows the estimated coefficients from the factor model in Eq. (3). α is annualized. Returns expressed in percent. Newey and West (1987) standard errors in parentheses. N refers to the number of observations in the period, and R^2 is the explanatory power from the regression. We denote by stars if α or the factors are significantly different from zero. ***/**/* indicates significance at the 1%/5%/10% level.

Table 11: Equity factor model risk adjustment

Substrategies

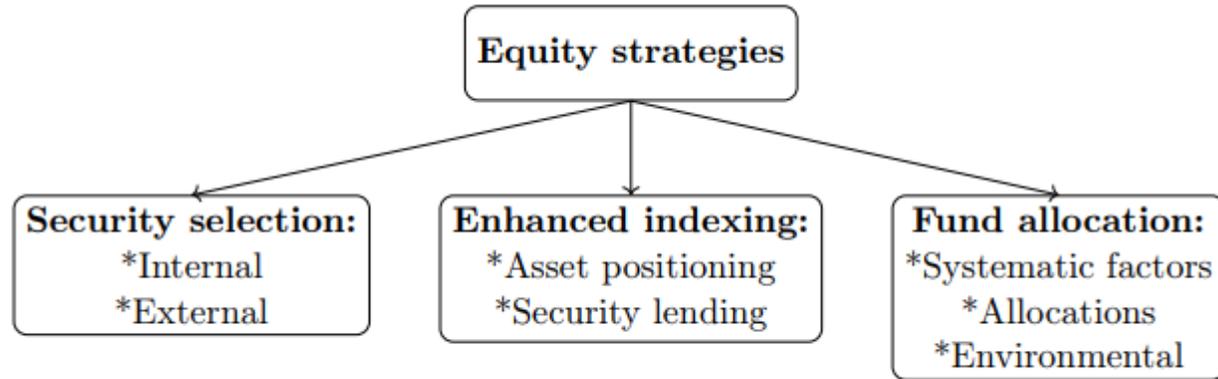


Figure 15: Equity substrategies

	Equity management	Fixed-income management	Real estate	Fund
Security selection	1.27			
<i>p</i> -value	0.04			
Internal	0.93	0.36		
<i>p</i> -value	.20	.24		
External	2.15			
<i>p</i> -value	.00			
Enhanced indexing	0.20	0.28		
<i>p</i> -value	.00	.00		
Asset positioning	0.13	0.25		
<i>p</i> -value	.00	.00		
Lending	0.07	0.03		
<i>p</i> -value	.00	.00		
Fund allocation	-0.05	-0.18		
<i>p</i> -value	.66	.11		
Systematic factors	-0.04			
<i>p</i> -value	.59			
Environmental	3.85	0.28		
<i>p</i> -value	.08	.17		
Allocations	-0.05	-0.18		
<i>p</i> -value	.55	.11		
Unlisted real estate			-0.29	
<i>p</i> -value			.91	
Listed real estate			-3.85	
<i>p</i> -value			.48	
Total	0.30	0.04	-1.64	0.18
<i>p</i> -value	.11	.78	.56	.14

Notes: The table summarizes the results from various other tables, showing the annualized means of the net active returns. For enhanced indexing and fund allocation, we report gross active returns to avoid the allocation errors of the net returns. Returns expressed in percent. Value added is in NOK billion. Darker green indicates positive returns at or the 5% significance level, with lighter green for $p > .05$. Similarly, red indicates negative returns. Sample period: 2013–2021, except fixed income security selection (Oct 2014–2021), fixed income security lending (Nov 2015–2021), fixed income environmental (Jan 2016–Jun 2020) and real estate (2017–2021).

Table 38: Fund summary of substrategies' value creation

Fixed-income portfolio

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
Mean	0.17 (0.45)	0.13 (0.45)	0.24 (0.15)	0.21 (0.15)
<i>p</i> -value	.71	.78	.13	.18
<i>N</i>	285	285	57	57

Notes: The table shows the estimated annualized mean active returns in percent. [Newey and West \(1987\)](#) standard errors in parentheses. *N* refers to the number of observations in the period. We denote by stars if the mean is significantly different from zero. ***/**/* indicates significance at the 1%/5%/10% level.

Table 22: Fixed-income mean active returns

- Positive active return, high *p*-value
- Risk-adjustment, see backup slides

Real-estate portfolio

	Portfolio gross	Benchmark	Gross active	Net active	Gross VA	Net VA
Mean	6.62	8.11	-1.50	-1.61	-1.63	-1.72
Std. dev./TE	7.67	8.28	5.04	5.03		
Sharpe ratio/IR	0.72	0.85	-0.30	-0.32		
Standard error			3.23	3.22		
<i>p</i> -value			0.64	0.62		
<i>N</i>	19	19	19	19	19	19

Notes: The table shows statistics for the annualized returns and quarterly gross value added. Quarterly returns are annualized by multiplying by 4. Returns expressed in percent. Mean value added is in quarterly NOK billion. *N* refers to the number of observations in the period. Sample period 2017–2021.

Table 63: Total-real-estate summary statistics

- Data issues: Few data points, not market values
- Hard to evaluate active return
- Negative active return, but benchmark is combination of equity and fixed-income
- Come back to real estate

We focus on three main questions in the assessment:

- What is the Fund's realized value creation?
- Why and how is this result achieved?
- How can the Fund's value creation be improved?

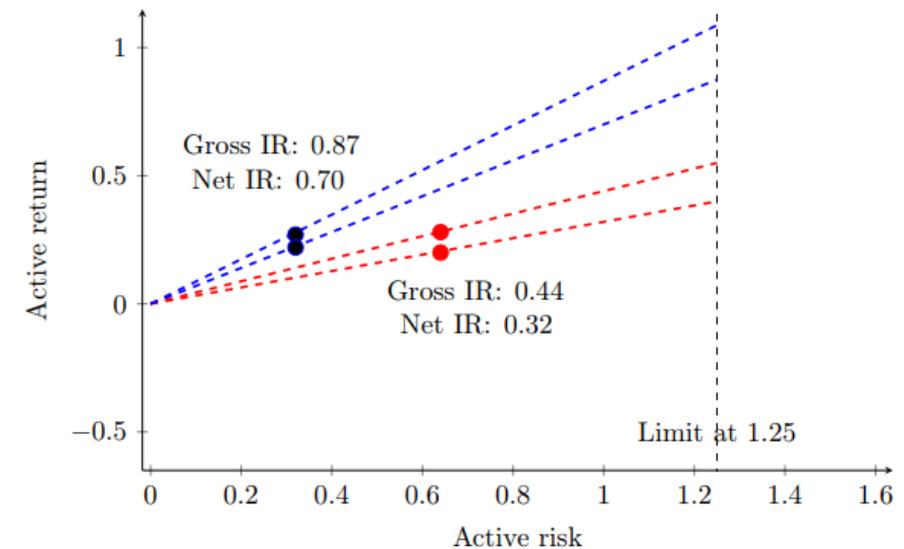
Observations and suggestions (section 9 in report):

- Five issues
 1. Active management
 2. Risk-adjusted performance evaluation
 3. Complex structure
 4. Potential conflicts of interest in NBIM's mandate
 5. Active ownership and active management

- Three levels:
 1. Ministry of Finance (MoF) – mandate
 2. Board of Norges Bank
 3. NBIM

Active management

- Suggest that strategy and bonuses should be linked to a target for active management
 - In mandate: Highest possible return
 - At board level; how to evaluate the active performance? Above zero? When to give bonuses?
 - In report we implicit compare with zero
- Examine why not take full advantage of its tracking-error limit
 - Even with decreasing IR (skill) over time, there might be more value to create
 - If you have Haaland on your team, he should not be on the bench!
- Further investigation of the underlying reasons for the consistent success (very high monthly hit ratios) of the enhanced-indexing strategies in equity and fixed income.



Realized active risk vs. ex-ante limit. Red: Jan 1998–Sep 2021, Blue: Jan 2017–Sep 2021.

Figure 10: Fund active return–active risk space

Risk-adjusted performance evaluation

- Evaluate the active management with simple, understandable, and widely accepted performance-evaluation models
- *Impossible task* to choose a risk model that encompasses the Fund's full set of investment strategies and substrategies and the underlying historical dynamics (such as recent benchmark changes, starting and stopping factor-tilting strategies, and investing outside the Fund's benchmark universe in various asset categories) in the period under investigation.
- The MoF should consider updating Section 2.4 (7) in mandate: "The equity portfolio and the fixed-income portfolio shall be sought composed in such a way that the expected **excess return is exposed to several systematic risk factors**"

A complex structure

- Despite its low active risk profile, NBIM's organization runs more than 200 investment strategies and substrategies.
- The internal benchmarking process (especially for but not restricted to substrategies) is unclear to us, especially for real estate
 - Active returns for real estate based on total portfolio approach misleading
 - Internal benchmarking also complicated
 - See next slide

Potential conflicts of interest in NBIM's mandate

- Being a «relative investor», can create tension between total and active performance
- Avoid conflict of interest, follow Tinbergen rule: One goal and one instrument (portfolio)
- Example 1: Real estate
 - Two objectives:
 1. To invest in real estate as a diversifier (in the total return–risk space)
 2. To develop real-estate investment strategies as a source of active return versus the mandate's benchmark (in the active return–risk space)
- If real estate is expected to be in the portfolio for strategic reasons, it also needs to be represented in the strategic benchmark
- NBIM can better attract and retain human capital able to deliver on this strategic objective.
- In principle, the same logic holds for infrastructure investments.

Active ownership and active management

- Potential conflict of interest between active ownership and active returns:
 - Example 2: An active portfolio manager that underweights a stock (i.e., is short relative to benchmark) loses when the engagement is successful.
 - Example 3: Having a target of zero emissions and active returns
 - What if attractive returns of a company but failed engagement regarding reaching net zero goal?
 - Provide clarity in the mandate regarding objectives and prioritization of active-ownership strategies, as well as clarity on what is delegated to NBIM and what is contained in its mandate.

Concluding comments

- The Fund's key attributes on risk and return show that it is, in essence, an (enhanced) index fund.
- The performance of the Fund at the total level is 0.20% after cost. However, this positive active return is not statistically significant.
- Some substrategies at lower aggregation levels seem to provide significantly positive active returns, such as enhanced indexing (both equity and fixed income) and external equity security selection.
- Risk-adjusting the active return series does not lead to materially new insights on NBIM's performance.
- The current benchmark gives rise to some potential conflicts of interest as some objectives target active returns (trying to achieve a positive alpha) and others target total returns (diversification of the whole portfolio).

Backup

FI: Risk-adjusted performance

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.09 (0.42)	0.05 (0.42)	0.24 (0.16)	0.21 (0.16)
p -value	.83	.91	.14	.19
β	1.03 (0.02)	1.03 (0.02)	1.00 (0.01)	1.00 (0.01)
p -value	.14	.14	.84	.84
N	285	285	57	57
R^2	.98	.98	1.00	1.00
AR	0.10	0.05	0.78	0.69

Notes: The table shows the estimated annualized α and β from Eq. (1) using gross and net returns in percent. Newey and West (1987) standard errors in parentheses. R^2 is the explanatory power from the regression, and AR is the appraisal ratio. We denote by stars if α is significantly different from zero and if β is significantly different from one. ***/**/* indicates significance at the 1%/5%/10% level.

Table 23: Fixed-income mean beta-adjusted active returns

	Full sample (1998–Sep 2021)		Latest sample (2017–Sep 2021)	
	Gross	Net	Gross	Net
α	0.12 (0.31)	0.08 (0.31)	0.27* (0.14)	0.24* (0.14)
p -value	.70	.81	.07	.10
$TERM$	-0.02 ** (0.01)	-0.02 ** (0.01)	-0.01 ** (0.01)	-0.01 ** (0.01)
p -value	.03	.03	.02	.02
DEF	0.06* (0.03)	0.06* (0.03)	0.002 (0.003)	0.002 (0.003)
p -value	.06	.06	.57	.57
N	285	285	57	57
Adjusted R^2	0.21	0.21	0.04	0.04

Notes: The table shows the estimated coefficients from the factor model in Eq. (4). α is annualized. Returns expressed in percent. Newey and West (1987) standard errors in parentheses. N refers to the number of observations in the period, and R^2 is the explanatory power from the regression. We denote by stars if α is significantly different from zero and if β is significantly different from one. ***/**/* indicates significance at the 1%/5%/10% level.

Table 24: Fixed-income factor model risk adjustment

FI: Substrategies

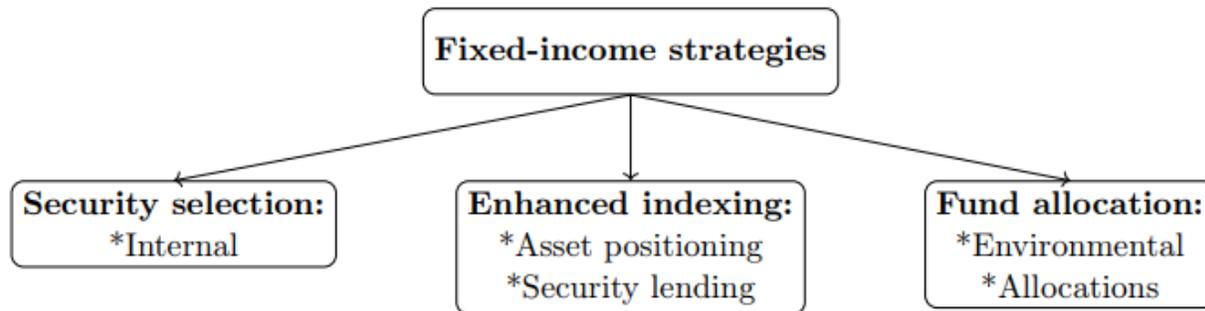


Figure 22: Fixed-income substrategies

	Equity management	Fixed-income management	Real estate	Fund
Security selection	1.27			
<i>p</i> -value	0.04			
Internal	0.93	0.36		
<i>p</i> -value	.20	.24		
External	2.15			
<i>p</i> -value	.00			
Enhanced indexing	0.20	0.28		
<i>p</i> -value	.00	.00		
Asset positioning	0.13	0.25		
<i>p</i> -value	.00	.00		
Lending	0.07	0.03		
<i>p</i> -value	.00	.00		
Fund allocation	-0.05	-0.18		
<i>p</i> -value	.66	.11		
Systematic factors	-0.04			
<i>p</i> -value	.59			
Environmental	3.85	0.28		
<i>p</i> -value	.08	.17		
Allocations	-0.05	-0.18		
<i>p</i> -value	.55	.11		
Unlisted real estate			-0.29	
<i>p</i> -value			.91	
Listed real estate			-3.85	
<i>p</i> -value			.48	
Total	0.30	0.04	-1.64	0.18
<i>p</i> -value	.11	.78	.56	.14

Notes: The table summarizes the results from various other tables, showing the annualized means of the net active returns. For enhanced indexing and fund allocation, we report gross active returns to avoid the allocation errors of the net returns. Returns expressed in percent. Value added is in NOK billion. Darker green indicates positive returns at or the 5% significance level, with lighter green for $p > .05$. Similarly, red indicates negative returns. Sample period: 2013–2021, except fixed income security selection (Oct 2014–2021), fixed income security lending (Nov 2015–2021), fixed income environmental (Jan 2016–Jun 2020) and real estate (2017–2021).

Table 38: Fund summary of substrategies' value creation

RE: Unlisted and listed real estate

	Portfolio gross	Benchmark	Gross active	Net active	Gross VA	Net VA
Mean	7.04	7.17	-0.13	-0.29	-0.32	-0.42
Std. dev./TE	3.90	6.97	6.22	6.21		
Sharpe ratio/IR	1.53	0.87	-0.02	-0.05		
Standard error			2.44	2.43		
<i>p</i> -value			0.96	0.91		
<i>N</i>	19	19	19	19	19	19

Notes: The table shows statistics for the annualized returns and quarterly gross value added. Quarterly returns (%) are annualized by multiplying by 4. Mean value added is in quarterly NOK billion. [Newey and West \(1987\)](#) standard errors. *N* refers to the number of observations in the period. Sample period: 2017–2021.

Table 64: Unlisted-real-estate summary statistics

	Portfolio gross	Benchmark	Gross active	Gross VA
Mean	6.53	10.35	-3.81	-0.46
Std. dev./TE	18.66	9.77	12.29	
Sharpe ratio/IR	0.29	0.95	-0.31	
Standard error			5.08	
<i>p</i> -value			0.45	
<i>N</i>	57	57	57	57

Notes: The table shows statistics for the annualized returns and monthly gross value added. Returns expressed in percent. Value added is in NOK billion. [Newey and West \(1987\)](#) standard errors. *N* refers to the number of observations in the period. Sample period: 2017–2021.

Table 65: Listed-real-estate summary statistics

Gjennomgang av Norges Banks aktive forvaltning

Seminar 21. mars 2022

Bakgrunn

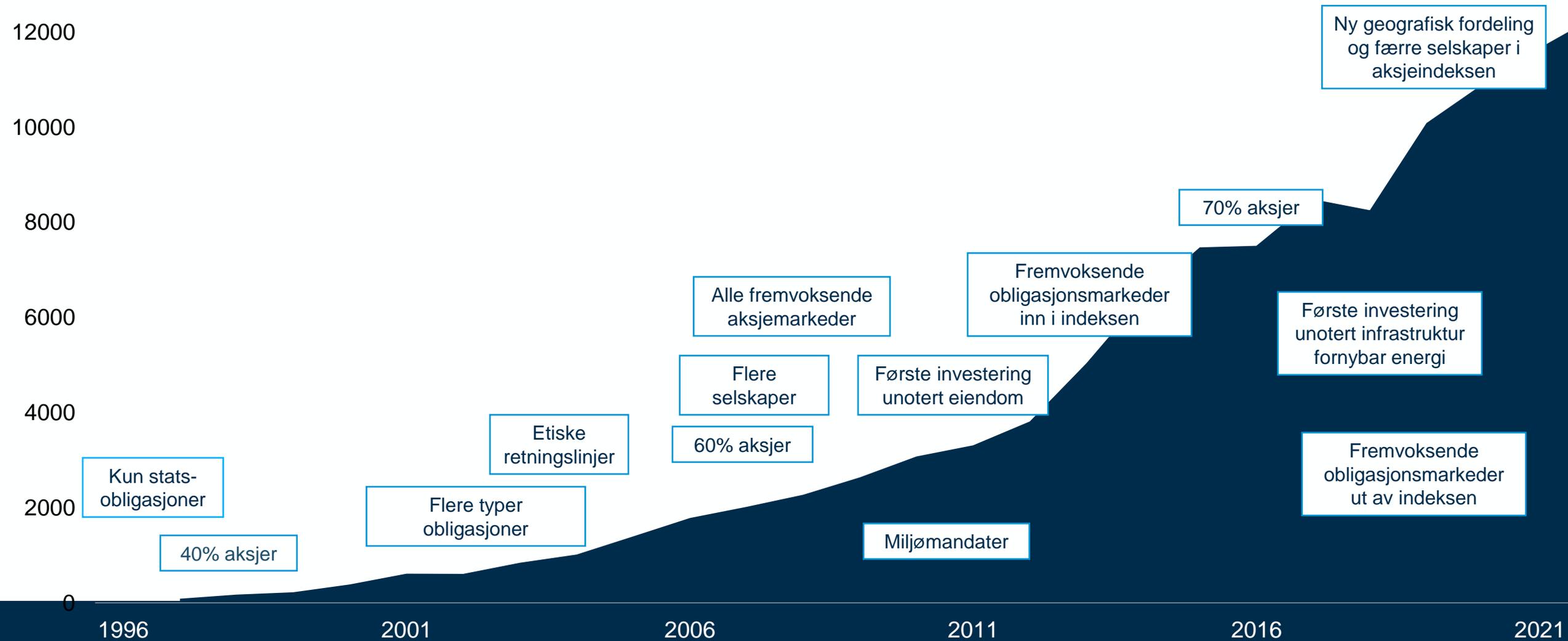
Hovedstyret sendte sin vurdering 1. desember 2021

- Relativ avkastning
- Relativ risiko
- Unoterte investeringer



Forvaltningsoppdraget

Investeringsstrategien er utviklet over tid



Forvaltningsoppdraget

Per 31.12.2021

Fondet investerer i mer enn 9 000 selskaper og 5 000 obligasjoner

Nord-Amerika

2 236 selskaper
2 549 obligasjoner
446 eiendommer

Resten av verden

552 selskaper
105 obligasjoner



Europa

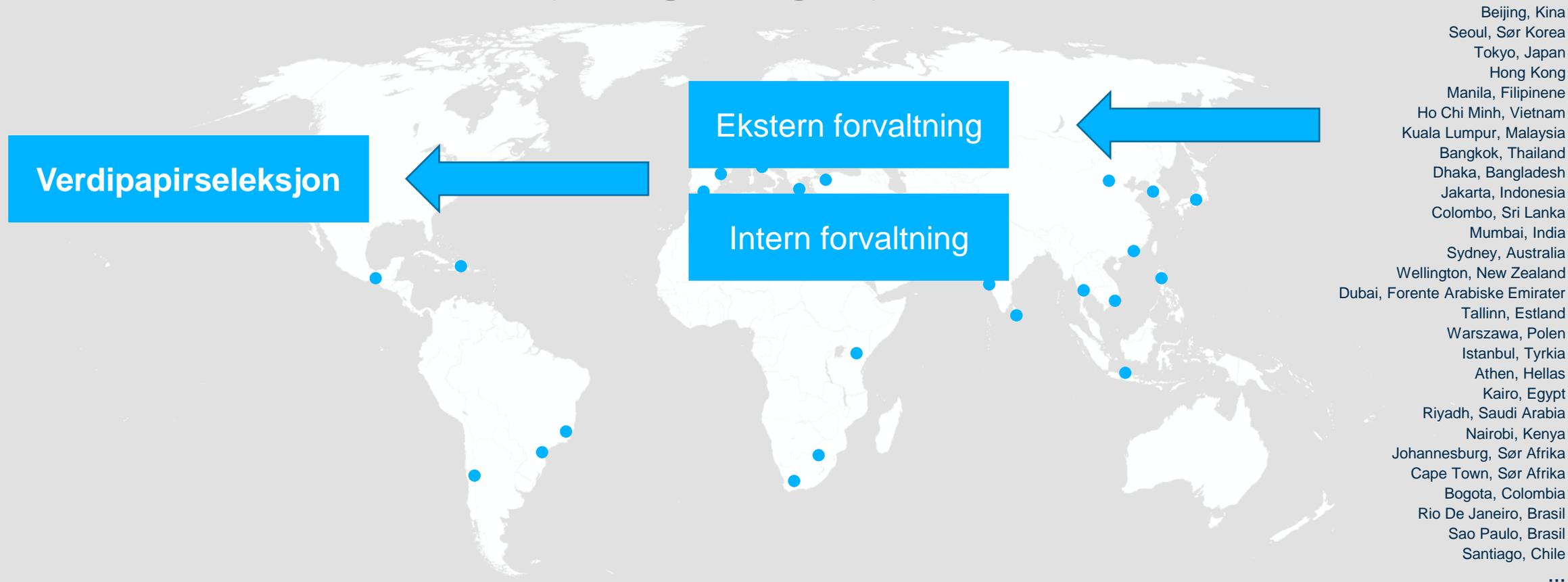
1 866 selskaper
2 027 obligasjoner
433 eiendommer
1 havvindpark

Asia og Oseania

4 687 selskaper
735 obligasjoner
6 eiendommer

Forvaltningen av fondet

Over 200 individuelle aksje- og obligasjonsmandater



97 eksterne aksjeforvaltere

4,7% av fondets totale investeringer

Forvaltningen av fondet

Over 200 individuelle aksje- og obligasjonsmandater

- FI Eurozone
- FI EUR Liquidity provisioning
- FI Europe x Eurozone
- FI Europe X EUR Liquidity provisioning
- FI North America
- FI North America Liquidity provisioning
- FI North America New Issues
- FI North America Government Related
- FI Asia DM Govt
- FI Asia DM Liquidity provisioning
- EQ Factor
- EC LC America
- EQ SC America
- EQ LC Europe
- EQ SC Europe
- EQ LC Pacific
- EQ SC Pacific
- EQ China
- EQ Taiwan
- EQ India
- EQ EM Completion



Posisjonering

Verdipapirutlån



Markedseksposering



...

Forvaltningen av fondet

En delegert mandatsstruktur

... for å kunne gjøre alle investeringene i tråd med målet for forvaltningen

... for å opparbeide inngående kunnskap om markeder og selskaper

... for å sette fondet i stand til å være en bedre ansvarlig investor

... for å muliggjøre presis måling styring og kontroll med risiko, avkastningsmåling, kostnader og insentiver for hvert enkelt mandat



Relativ avkastning

Mandatene er gruppert etter hovedstrategi

	Aksje- forvaltningen	Rente- forvaltningen	Realaktiva	Allokering	Totalt
Markedseksposering	0,11	0,07		0,00	0,19
Posisjonering	0,07	0,07		0,00	0,14
Utlån av verdipapirer	0,05	0,01			0,05
Verdipapirseleksjon	0,17	0,01			0,18
Intern verdipapirseleksjon	0,07	0,01			0,08
Ekstern verdipapirseleksjon	0,10				0,10
Allokering	-0,03	-0,07	-0,02	0,01	-0,12
Systematiske faktorer	-0,03				-0,03
Eiendom			-0,03		-0,03
Unotert eiendom			0,00		0,00
Notert eiendom			-0,03		-0,03
Miljørelaterte mandater	0,03	0,00	0,00		0,03
Allokeringsbeslutninger	-0,03	-0,07	0,00	0,01	-0,10
Totalt	0,25	0,02	-0,02	0,01	0,25

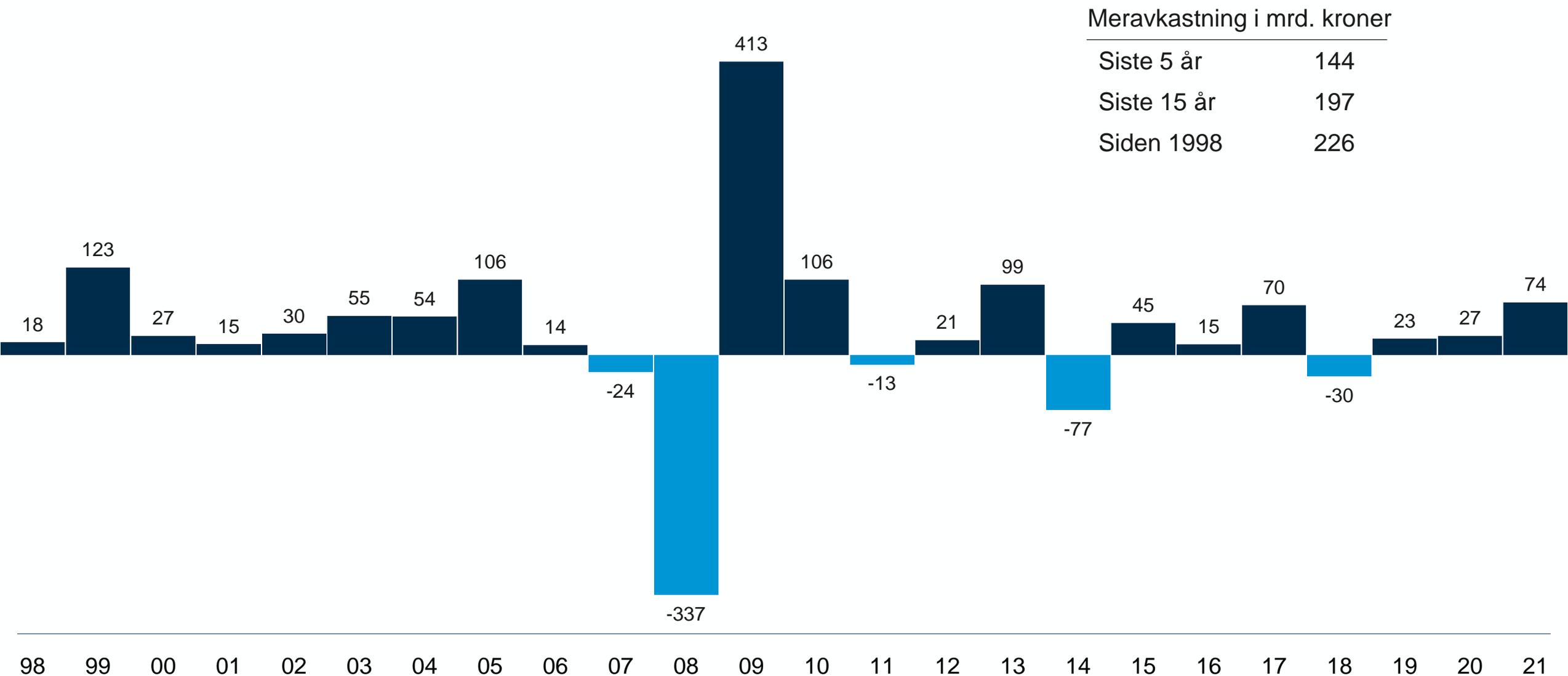
Bidrag fra investeringsstrategiene til fondets relative avkastning fra 2013 til 2021. Annualisert. Prosentpoeng. Målt i fondets valutakurv



Relativ avkastning

Meravkastning i 19 av 24 år

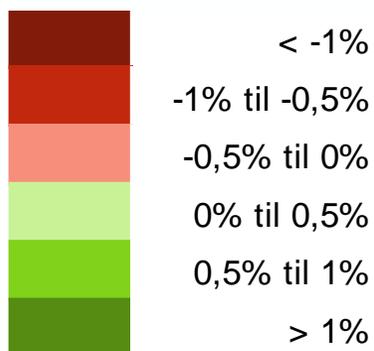
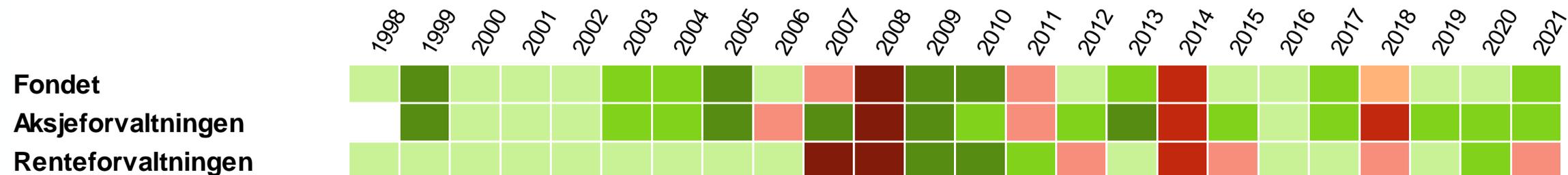
Basispunkter. Målt i fondets valutakurv



Relativ avkastning

Basis. Målt i fondets valutakurv

Meravkastning for både aksje- og renteforvaltningen



- Aksjeforvaltningen: Meravkastning i 18 av 23 år
- Renteforvaltningen: Meravkastning i 17 av 24 år

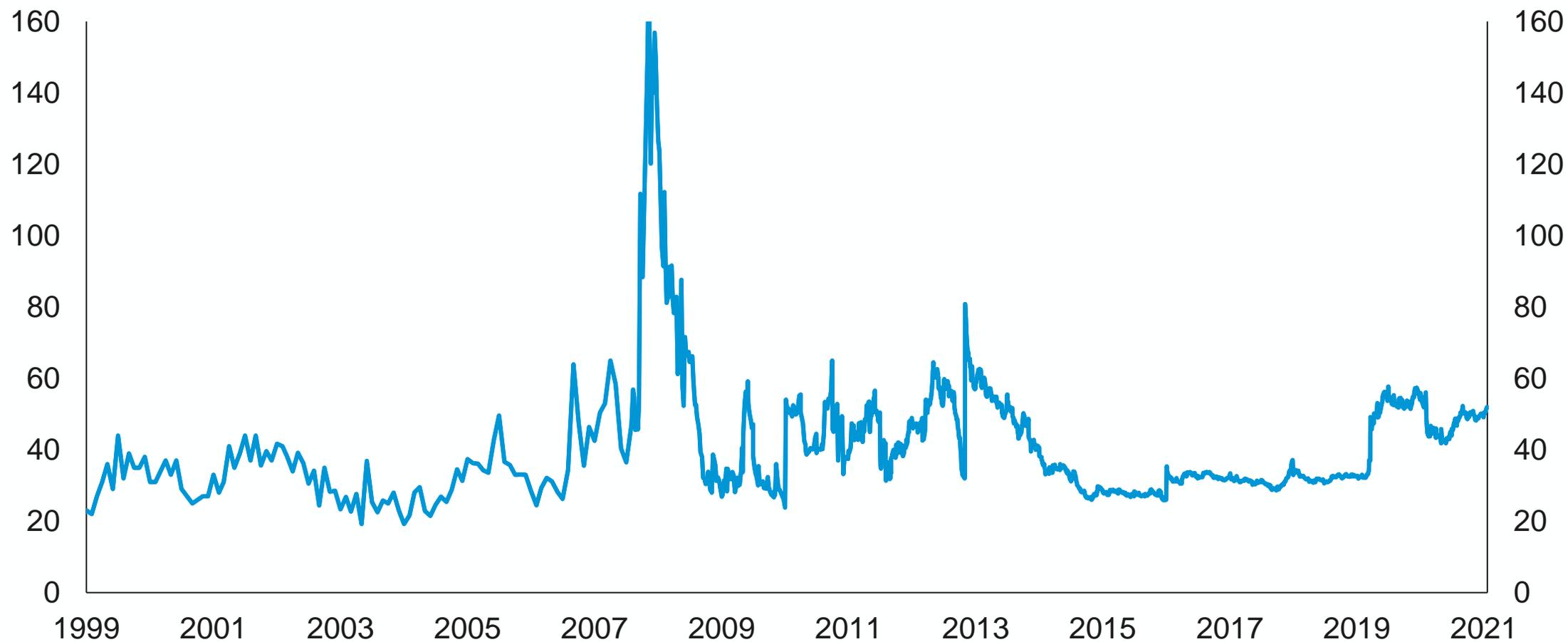




Relativ risiko

Relativ risiko

Fondet har en ramme for avvik på 125 basispunkter



Relativ risiko

- Kapasitetsbegrensninger for flere av strategiene
- Strategiene har historisk diversifisert hverandre
- Buffer i urolige markeder, men også for å utnytte fondets særtrekk
- Unoterte investeringer er en del av beregningen

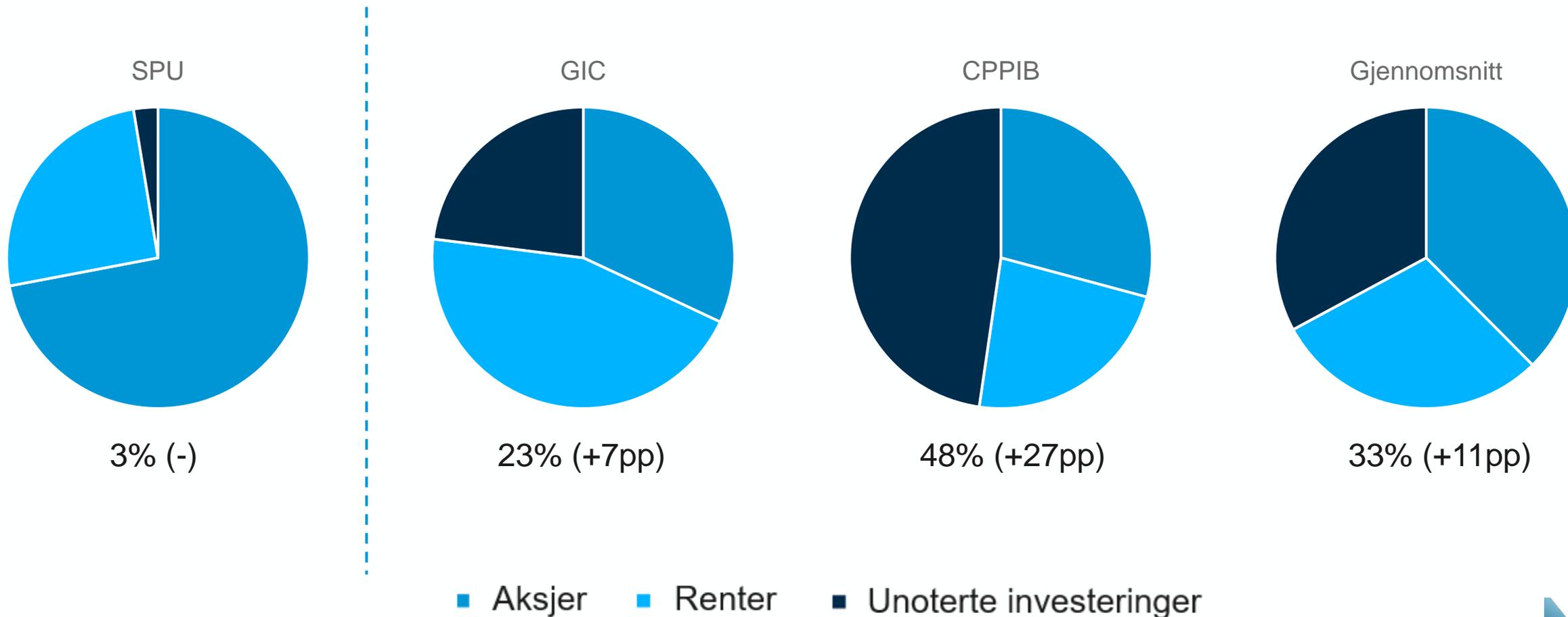




Unoterte investeringer

Unoterte investeringer

Fondet investerer mindre enn andre investorer...



Kilde: GIC, CPPIB og GPFPG utgangen av 2021. Gjennomsnitt for tilsvarende investorer CEM benchmarking 2020. Endring i parentes siden 2017.



Unoterte investeringer

...men er likevel en stor eiendomsinvestor

#	Investor	Land	Verdi eiendom (\$'000s)	Verdi total (\$'000s)	% i eiendom
1	Allianz	Tyskland	82.043.000	890.289.000	9,2 %
2	APG	Nederland	53.359.000	599.486.000	8,9 %
3	China Investment Corporation	Kina	51.850.000	940.600.000	5,5 %
4	ADIA	UAE	43.471.584	579.621.120	7,5 %
5	TIAA	USA	43.429.000	266.840.000	16,3 %
6	CalPERS	USA	40.900.000	370.000.000	11,1 %
7	AXA	Frankrike	36.974.400	874.475.000	4,2 %
8	CPPIB	Canada	36.008.000	309.126.000	11,6 %
9	Swiss Life	Sveits	35.903.500	234.881.000	15,3 %
10	QIA	Qatar	35.000.000	320.000.000	10,9 %
11	CalSTRS	USA	35.000.000	243.200.000	14,4 %
12	PGGM	Nederland	34.324.000	287.000.000	12,0 %
13	Generali	Italia	33.170.000	720.589.000	4,6 %
14	Statens pensjonsfond utland	Norge	30.998.700	1.145.470.000	2,7 %
15	GIC	Singapore	30.800.000	440.000.000	7,0 %

Kilde: IPE Real Estate, 2020



New Bond Street, London

Unoterte investeringer

Ikke en del av referanseindeksen

70% aksjer

30% renter



FTSE



68% aksjer

5%
eiendom

27% renter

Review of the Active Management of the Norwegian Government Pension Fund Global

20 January, 2014

Andrew Ang
*Ann F. Kaplan Professor of Business
Columbia Business School*

Michael W. Brandt
*Kalman J. Cohen Professor of Business Administration,
Fuqua School of Business, Duke University*

David F. Denison
Former President and CEO of the Canada Pension Plan Investment Board



Unoterte investeringer

Formålet er å bedre bytteforholdet mellom avkastning og risiko

- Langsiktige avkastningstall må benyttes for å måle diversifiseringseffekten
- Diversifiseringseffekten kommer ikke frem i gode tider i aksjemarkedet
- Det må et par nedgangskonjunkturer til for å måle diversifiseringseffekten til fondets eiendomsportefølje



Oppsummering

- Forvaltningsoppdraget er omfattende
- Hovedstyret er tilfreds med at avkastningen har vært god over tid
- Risikobudsjettet er tilstrekkelig i dag
- Eiendomsporteføljen må evalueres over en lang tidshorisont



Takk for oppmerksomheten!

NHH



REPORT ON THE ACTIVE MANAGEMENT OF
NORWAY'S GPFG
BY BAUER, CHRISTIANSEN, AND DØSKELAND

COMMENTS BY KARIN S. THORBURN

RESEARCH CHAIR PROFESSOR OF FINANCE

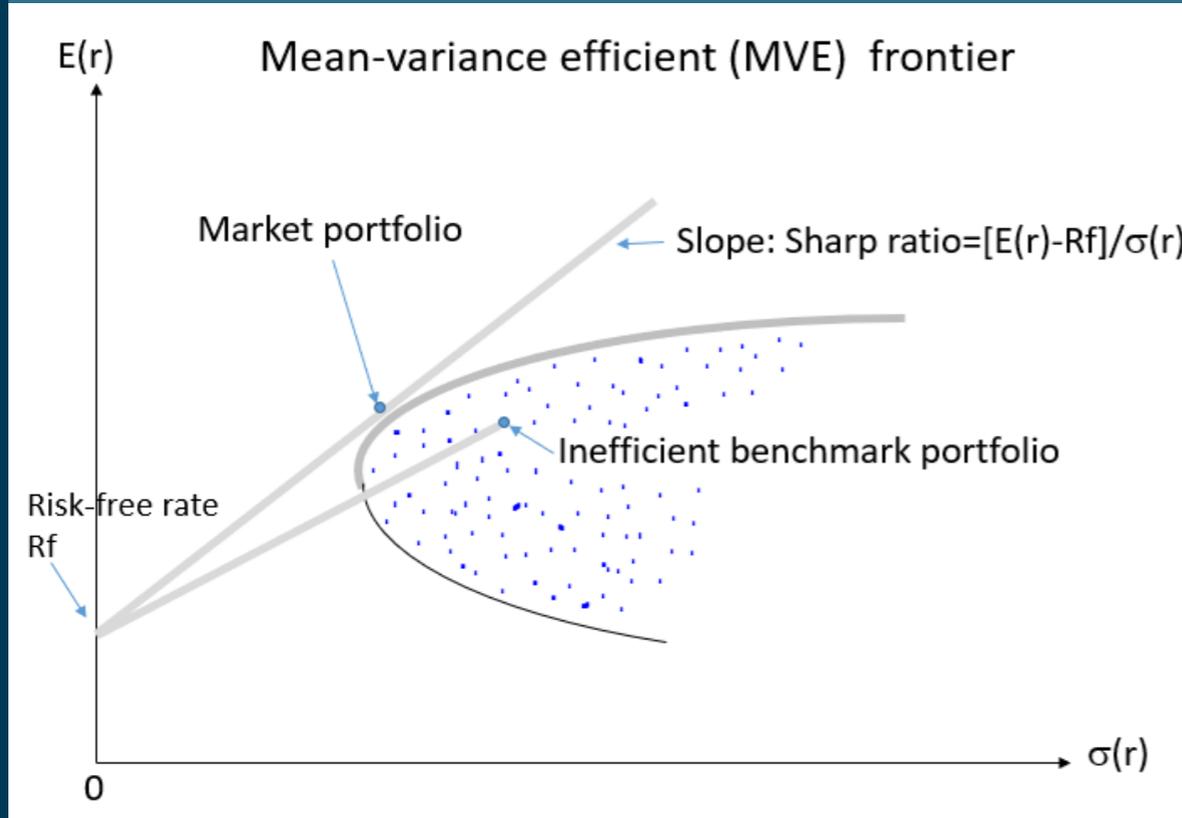
NHH NORWEGIAN SCHOOL OF ECONOMICS

OSLO, MARCH 21, 2022



Is the current benchmark index optimal? No!

- Effect of diversification
 - Maximizes expected return for given risk



- GPFG's benchmark index does not have **market-value weights**
 - Free float weights for equities, underweighting US equities vs. Europe, etc.

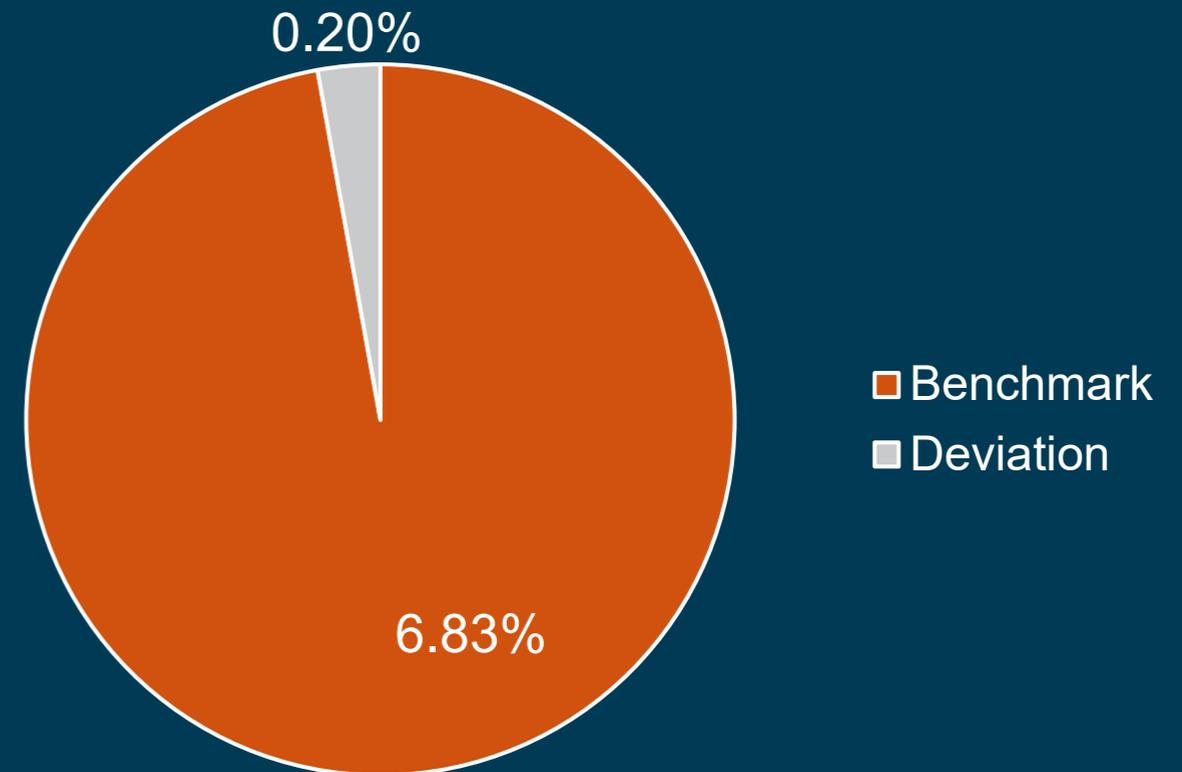
Why is this important?

1. Inefficient portfolio
 - Takes on additional risk without reward
2. Requires costly rebalancing through trading

97% of GPFG's returns come from holding the benchmark

- GPFG closely tracks the benchmark index, set by the MoF
- GPFG is permitted to deviate from the benchmark
 - To minimize costs of tracking the index
 - To take active bets against the market
- The deviation is limited by a maximum tracking error
- This report tries to address whether the deviation creates value

Annual average returns net of cost
1998-2021





Where does the remaining 3% of the returns come from?

- Most likely explanation:

Risk exposure

- GPFM has higher exposure to priced risk than the benchmark index
- Tilting the portfolio towards higher risk exposure increases the expected returns
- Tilting can be done towards known risk factors, but also by chance towards unknown factors

- Least likely explanation:

Superior information

- Thousands of investors constantly examine firms to try to become better informed than the market
- This price discovery activity is very expensive and specialized to funds holding concentrated portfolios (20-30 stocks)
- Zero-sum game between active investors
- All owners benefit from the price discovery by others - also passive owners
- Talking to firms does not provide private information – it would be illegal!



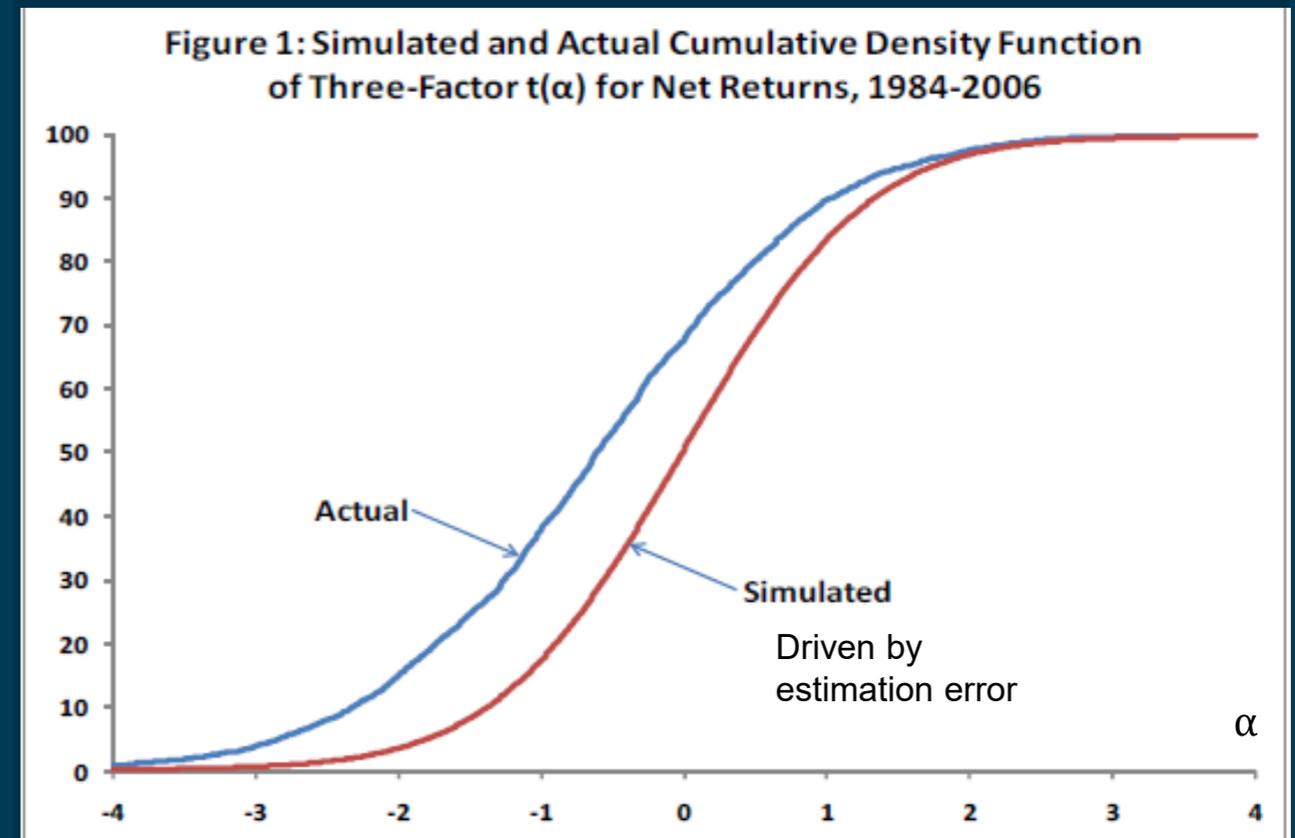
Other sources of the 3% return: enhanced indexing

- **Securities lending**: rent from lending securities to short sellers
 - A passive fund strategy maximizes the potential for securities lending
 - Nearly risk-free gain: Counterparty risk is small and non-priced
 - This income is attributable to passive holding of the benchmark portfolio
- **Asset positioning**: minimize transaction costs of tracking the benchmark
 - Timing of rebalancing decisions
 - Exploit price-differences in securities with similar characteristics
 - Benefit from scale in capital-markets transactions

Finding alpha? $\alpha \equiv \bar{R} - (\hat{R}|\text{risk-factor regression model})$

- Alpha is model-specific
- If the model is wrong, alpha is wrong
- Don't forget statistical significance
 - All alpha estimates are different from zero, but few are **significantly** different from zero
 - Many tend to report an insignificant alpha estimate as if it is different from zero
 - Even a significant alpha estimate does not mean that the portfolio manager beat the market

Fama and French (JF 2011): Luck vs. skill





The findings of the report

- Enhanced indexing creates value
 - This is not alpha
- Security selection (stocks and bond) and fund allocation do **not** add value
- Except the external mandates, which have a positive alpha estimate
 - Emerging markets and small stocks
 - Can be the results of poor risk-models
 - No basis for expecting excess risk-adjusted returns in the future

Recommendations I find questionable

1. Provide **clear active-return targets**
 - Requires exposure to more systematic risk than the benchmark index
 - Obtained at lower cost by adjusting the benchmark index
 - Ask GPFG to exploit its scale advantages
2. **Use the full tracking-error limit**
 - Unused tracking error permits cost-efficient rebalancing
 - Portfolio tilting is costly but does not generate an expected alpha



Real estate

- The 2015 report on real estate found **no diversification effect**
 - The risk-return profile of real estate (listed and unlisted) can be replicated with a portfolio of stocks and bonds
 - No need for a separate real estate benchmark
- MoF removed real estate from the benchmark in 2017
 - Allowed to invest up to 5% of GPFG in real estate
- The report recommends introduction of a separate real estate index
- I see no reason to change the real estate mandate
 - No new evidence that real estate adds diversification
 - Unlisted real estate is very costly to manage
 - Have become legacy investments
- A similar logic applies to the unlisted infrastructure investments



Concluding reflections on the management of GPFG

- **Active ownership** is critical to the political legitimacy of GPFG
 - It has little, if any, return implications
 - The conflict with security selection is exaggerated in the report
- Performance evaluation reports that estimates alpha are **meaningless**
 - Better to provide portfolio weights on a granular level and a detailed break-down of costs
- GPFG is primarily a passive index-fund
 - An investment strategy supported by finance theory
 - Global trend of capital moving in this direction
- Deviations necessary to minimize costs of tracking the benchmark index
 - No reason to expect that NBIM's bets against the market will generate value
 - Enhanced indexing improves on the returns from a passive index strategy

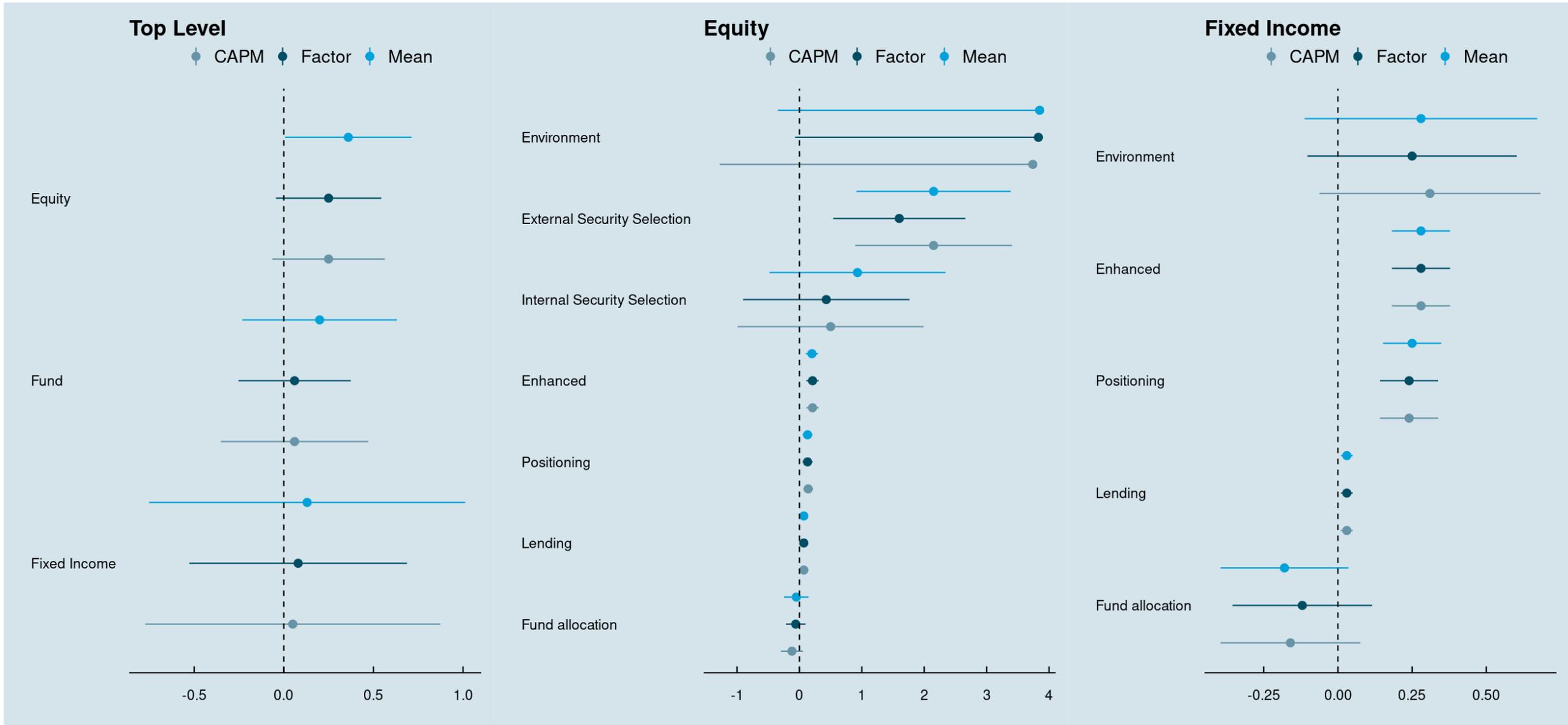
Comments on "A Review of the Active Management of Norway's
Government Pension Fund Global"

by Rob Bauer, Charlotte Christiansen, and Trond Døskeland

Lars Qvigstad Sørensen
March 21, 2022

Alpha Point Estimates and 95% CI

Sorted by mean active return; reported as percent p.a. after costs; source report.



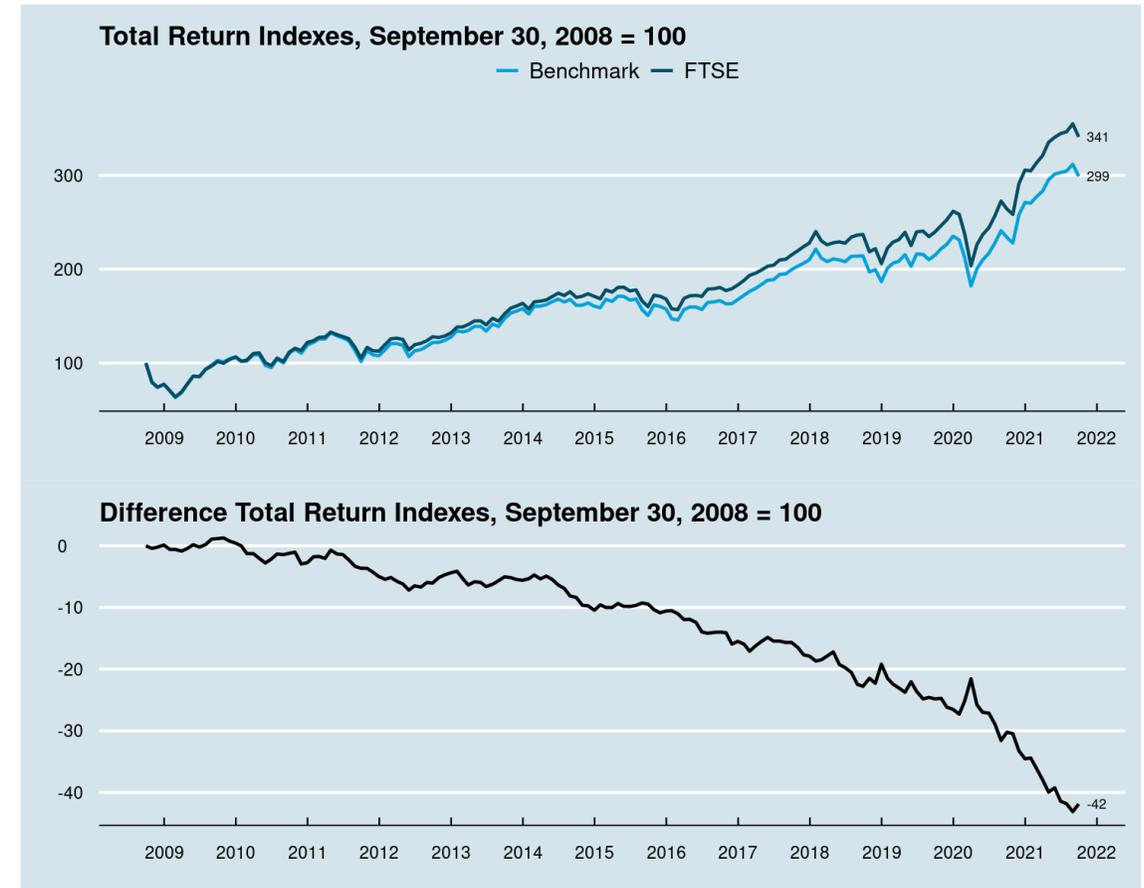
Benchmark efficiency

- Since September 2008, the equity benchmark index has included all markets in the FTSE Global All Cap.¹
- Substantial country deviations from index. Underweight U.S. and overweight Europe.
- Benchmark not ex post mean-variance efficient: Lower mean and higher volatility than FTSE Global All Cap in USD.

Equity mean and volatility from 2008 to 2021

Lower mean and higher vol means dominated by FTSE benchmark.

	FTSE	Benchmark	Active
Mean (p.a.)	10.9%	10.0%	-0.9%
Volatility	16.6%	17.3%	1.7%



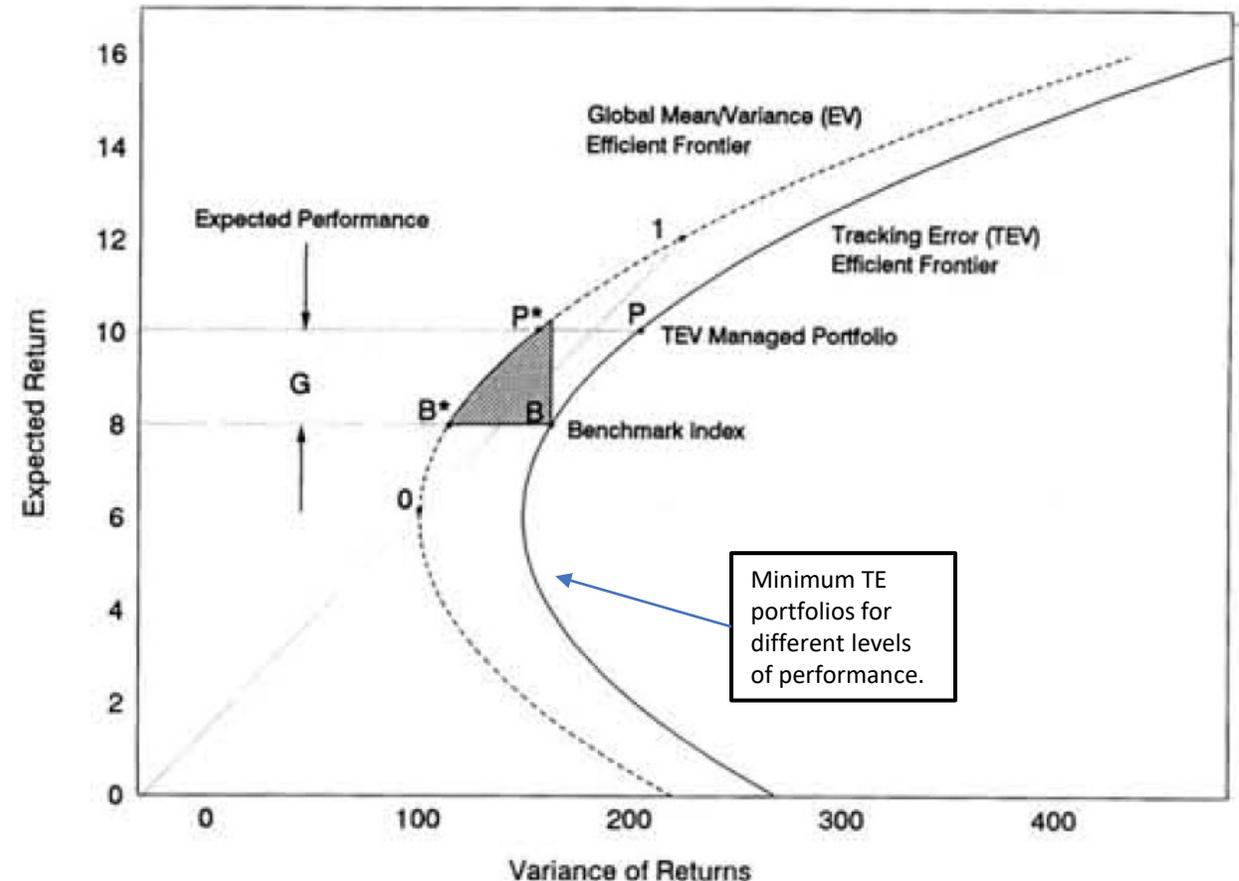
Source: NBIM and Bloomberg

1. <https://www.nbim.no/en/the-fund/news-list/2020/investing-with-a-mandate/>

Mean-Variance v. Tracking Error Efficient Frontier

Insights from Roll (1992)

- Minimizing tracking error for a given expected excess return will not produce a Markowitz MV efficient portfolio if benchmark not efficient.
- Roll shows: Tracking error-managed portfolios with positive expected excess returns have
 - beta > 1 and
 - higher volatility than benchmark
- Reality matches theory:
 - **Fund** beta: 1.03 v. 1.0 bm.
 - **Fund** volatility: 10.76 v. 10.45 bm.

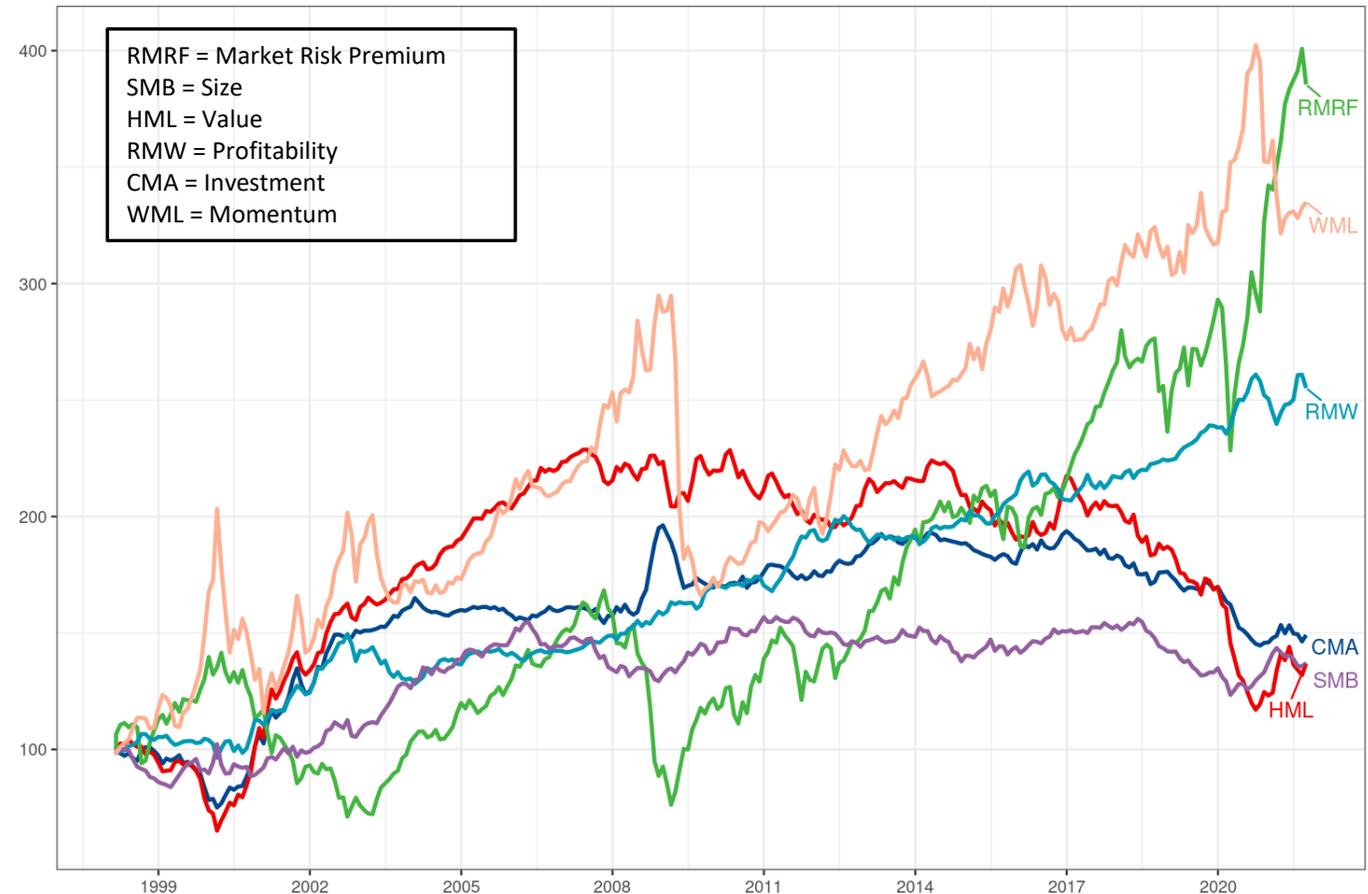


Source: Roll (1992), A Mean/Variance Analysis of Tracking Error
<https://jpm.pm-research.com/content/18/4/13>

Momentum is missing

- Fama & French's 5-factor model has been criticized for omitting momentum.^{1,2}
- In practice, momentum strategies are much more prevalent than asset growth (investment).
- It has also worked remarkably well: Best of factors after market risk premium.

Cumulative Factor Returns, January 31, 1998 = 100



Source: Kenneth French

https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

1. <https://www.aqr.com/Insights/Perspectives/Fama-on-Momentum>

2. <https://www.robeco.com/en/insights/2015/10/fama-french-5-factor-model-why-more-is-not-always-better.html>

Effect of including momentum

Considering gross returns

- Adding investment factor (CMA) makes value factor (HML) redundant.
- Equity portfolio has significant momentum exposure.
- Adjusting for momentum reduces alpha.
- Caveat: Results unreliable when factors do not span universe.

Correlation matrix

Factor	Active	RMRF	SMB	HML	RMW	CMA
RMRF	40%					
SMB	38%	4%				
HML	-26%	-11%	6%			
RMW	-24%	-40%	-26%	11%		
CMA	-43%	-42%	-3%	74%	23%	
WML	15%	-28%	16%	-32%	16%	-6%

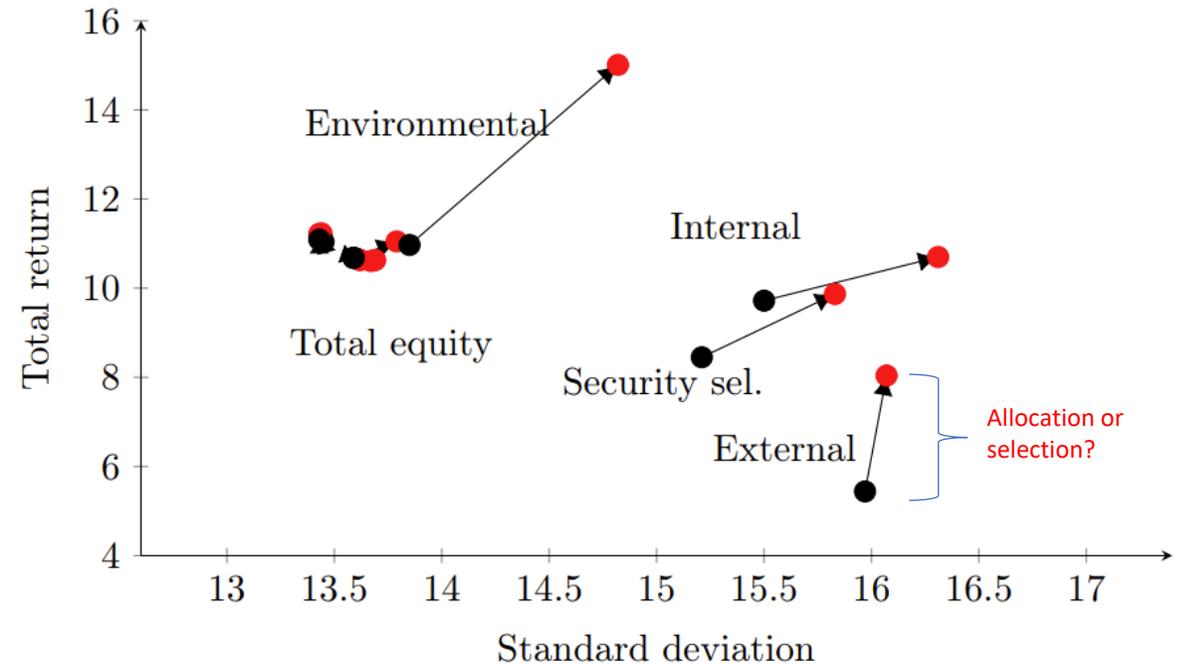
Active returns regressed on factors

Factor	Replicating report		Add momentum		Carhart	
	Estimate	T-stat	Estimate	T-stat	Estimate	T-stat
α	0.3657	2.36	0.3157	2.22	0.2575	1.92
RMRF	0.0128	3.92	0.0145	4.39	0.0190	5.26
SMB	0.0421	6.22	0.0370	6.12	0.0397	6.82
HML	-0.0050	-0.69	0.0027	0.43	-0.0151	-2.96
WML			0.0092	2.80	0.0077	2.08
RMW	0.0038	0.41	-0.0001	-0.01		
CMA	-0.0284	-2.70	-0.0329	-3.26		
R2-Adj	0.37		0.39		0.36	

T-statistics are computed using Newey-West standard errors with 5 lags.
Source: My calculations using NBIM & Kenneth French data.

Need for granularity and detailed analysis

- Fig. 16 shows substantial variation, but we get few insights.
- How and where have external security selection mandates outperformed?
 - Report (p. 81) points to active weights in China A shares v. EM benchmark.
 - Hoddevik and Priestley find that adjusting for EM and China A renders alpha insignificant.¹
 - China outperformed EM by >5% p.a. in sample period.



1. <https://www.dn.no/marked/nbim/norges-bank/kapitalforvaltning/oljefondets-kinasyndrom/2-1-301929>

Holdings-based attribution next

- Missing information regarding security selection outperformance:
"We suspect that this is because the part of the benchmark that involves a large degree of active management is the part with the lowest return. For example, it may be that a large part of the internal security selection has been in Europe, with a lower return relative to the total (and especially the US) portfolio"
- Shouldn't need to suspect or conjecture. Ask!
- Next report should do holdings-based attribution:
 - Separates allocation from selection effects
 - Highlights off-benchmark allocations
 - Harder and more time-consuming

Exploit uniqueness and advantages of NBIM

- Should research NBIM's **comparative advantages** in asset management and encourage active management there.
 - Not subject to **regulations**, unlike banks (Basel III) and insurance (Solvency II). Could hold assets that bind capital for others, e.g. **loans**.
 - NBIM is highly skilled in executing **index-tracking strategies**, creating significant outperformance. **Lending** is a prominent example.
 - NBIM is uniquely positioned to be **short liquidity**, e.g. ECA v. government bonds; KfW v. Bunds.

Public Service: Publish source code!

- Several reports have now done partly overlapping econometrics, presumably consuming much of the time devoted to the project.
- Why not share all the source code and the public part of the data?
- It will be a service to many Master's students (and the graders).
- Create R Markdown or Jupyter notebooks with code, tables, and figures.
- Could even create dynamic web pages (e.g. R Shiny or Python) where users can choose factors, sample period etc.

Appendix

China has outperformed Emerging Markets Index

