OIL AND GAS STOCKS IN THE REFERENCE INDEX

IMPLICATIONS OF A WIDER WEALTH PERSPECTIVE
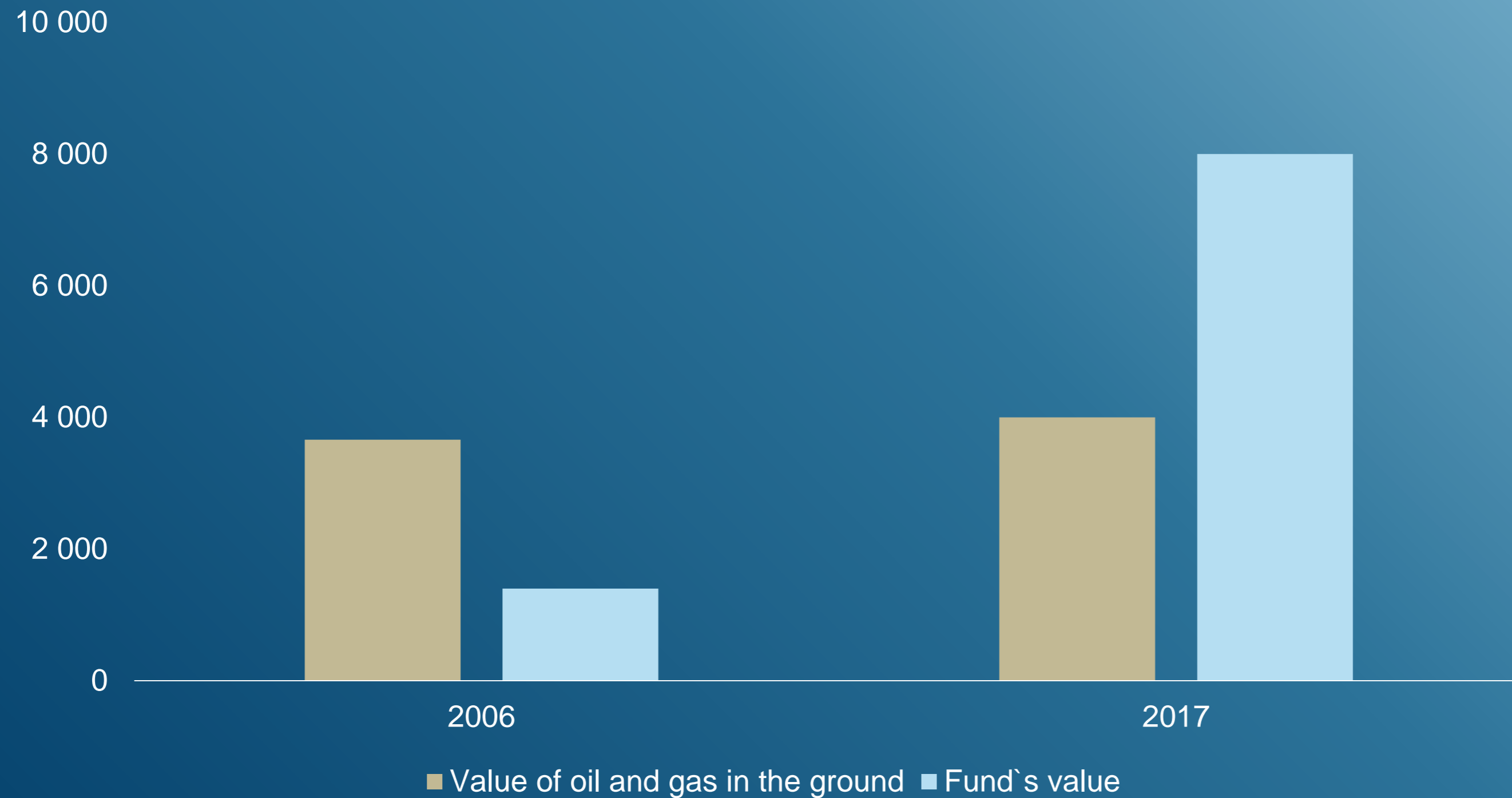
A large fund
2.5 times Norwegian GDP

THE FUND'S MARKET VALUE

7,952,336,393,237 NOK

The fund's market value

Percent of GDP

A significant share of government wealth
The fund makes up 2/3 of petroleum wealth

	10 000
	8 000
	6 000
	4 000
	2 000
	0

2006   2017

■ Value of oil and gas in the ground   ■ Fund`s value

All numbers NOK bn.
Source: Ministry of Finance, NBIM

NBIM's strategy plan 2017 - 2019

Reflecting the rising importance of the fund

ADVICE

Norges Bank is required to advise the asset owner on the need for changes to the management framework. Our advice is founded on academic and market insights, and supported by our experience as the manager of the fund. We will broaden the scope of our advisory activities, and take national wealth considerations into account.

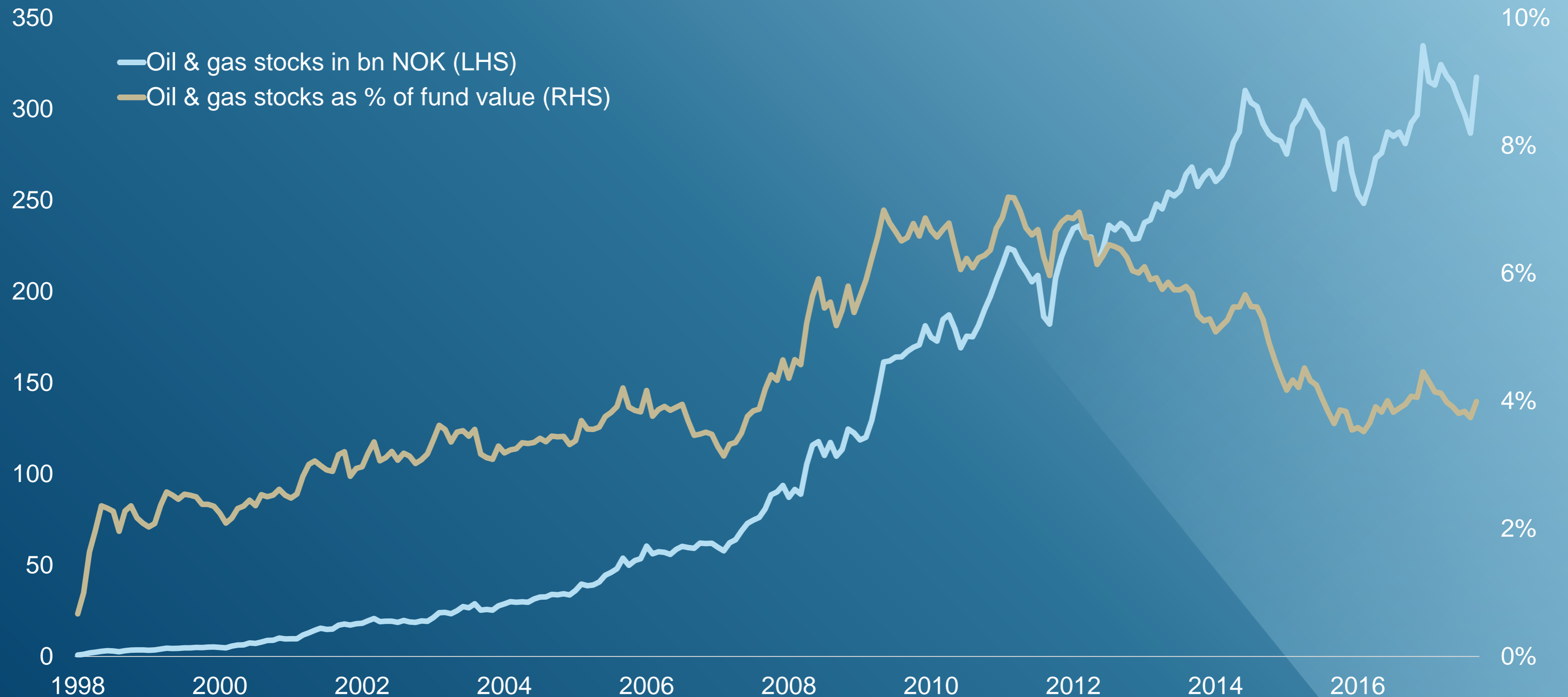# From oil and gas resources to financial wealth
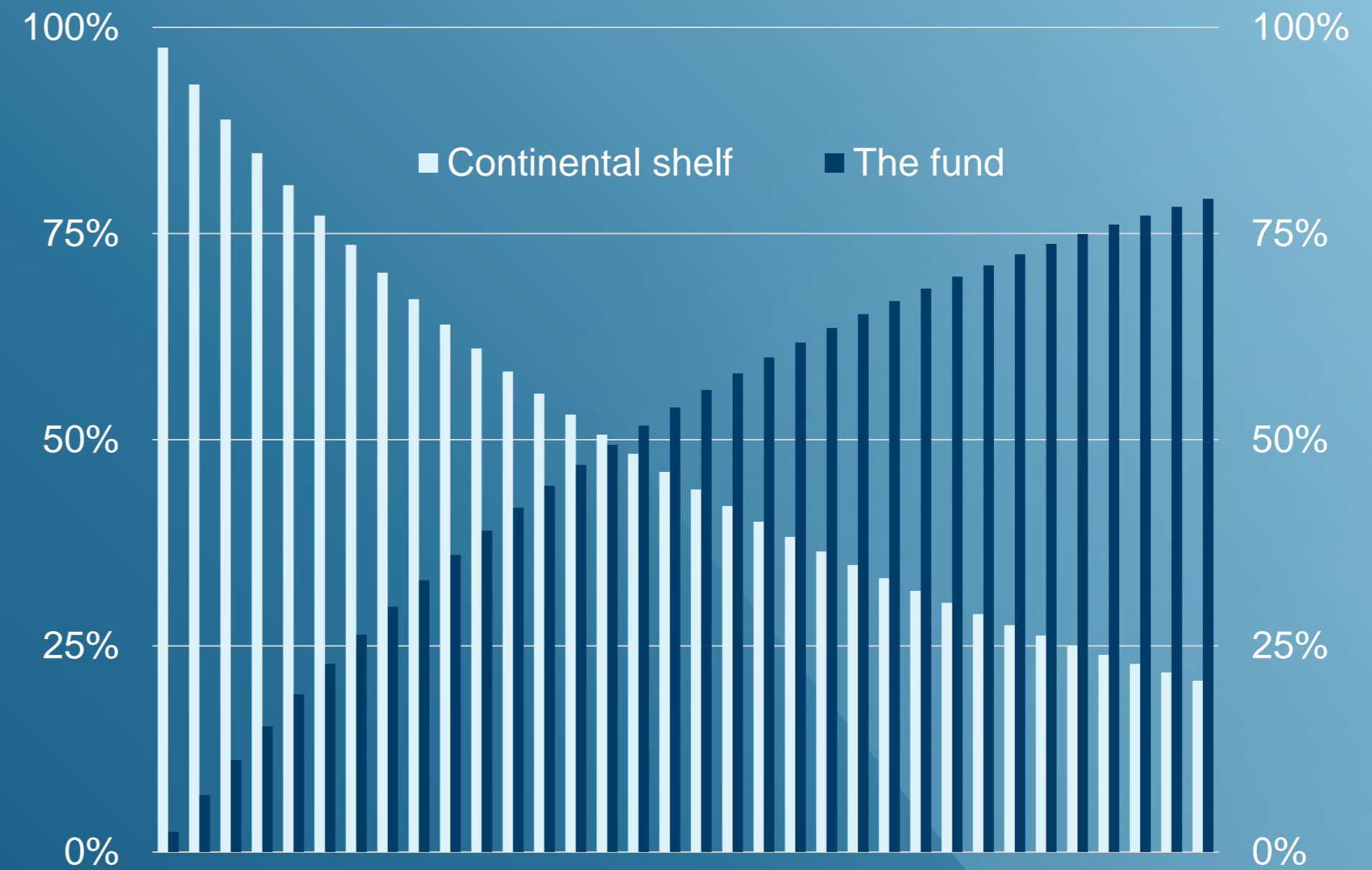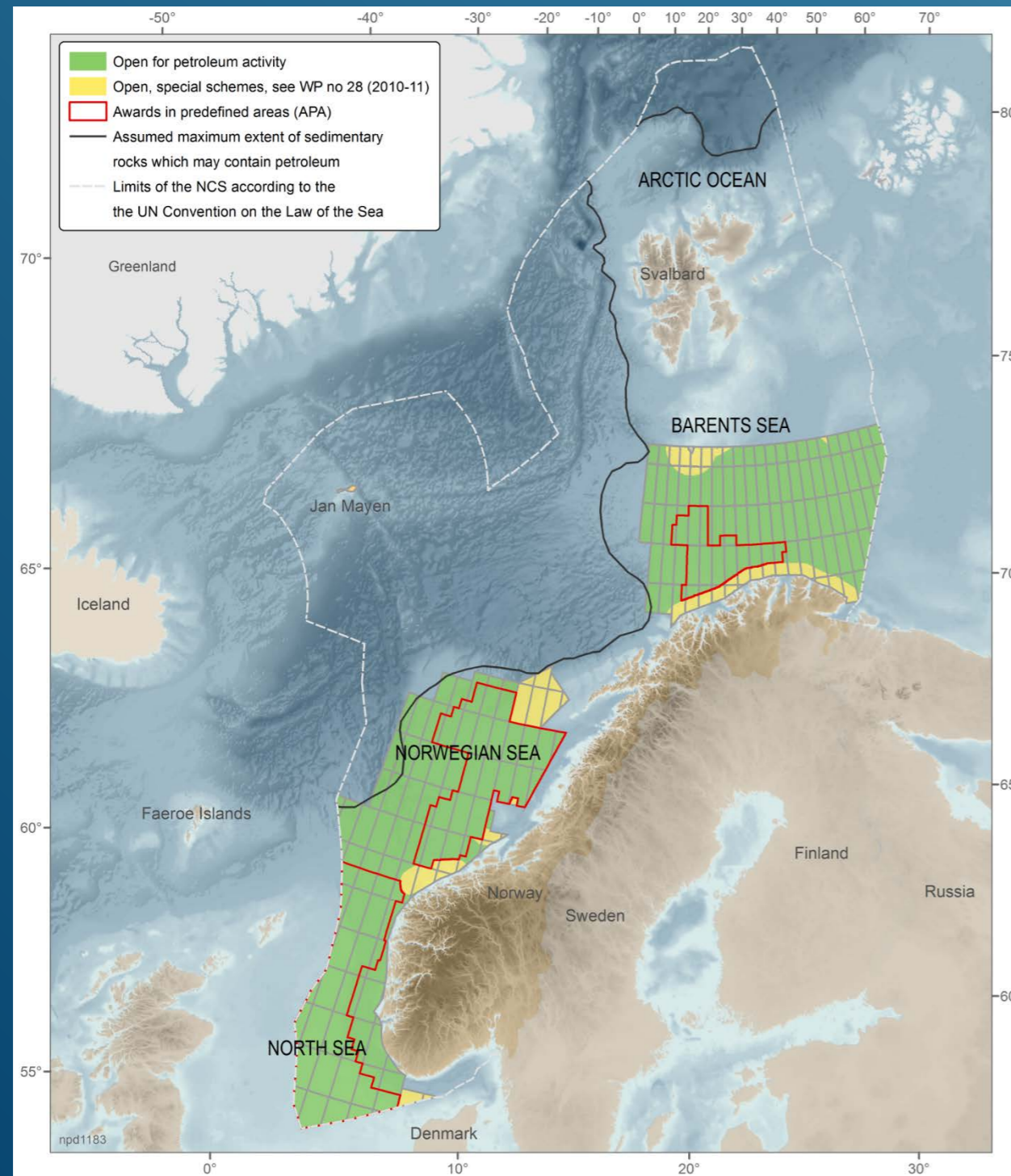
The graph shows smoothed proportion of the remaining value on the Norwegian continental shelf and the real value of the fund. Historical and estimated.
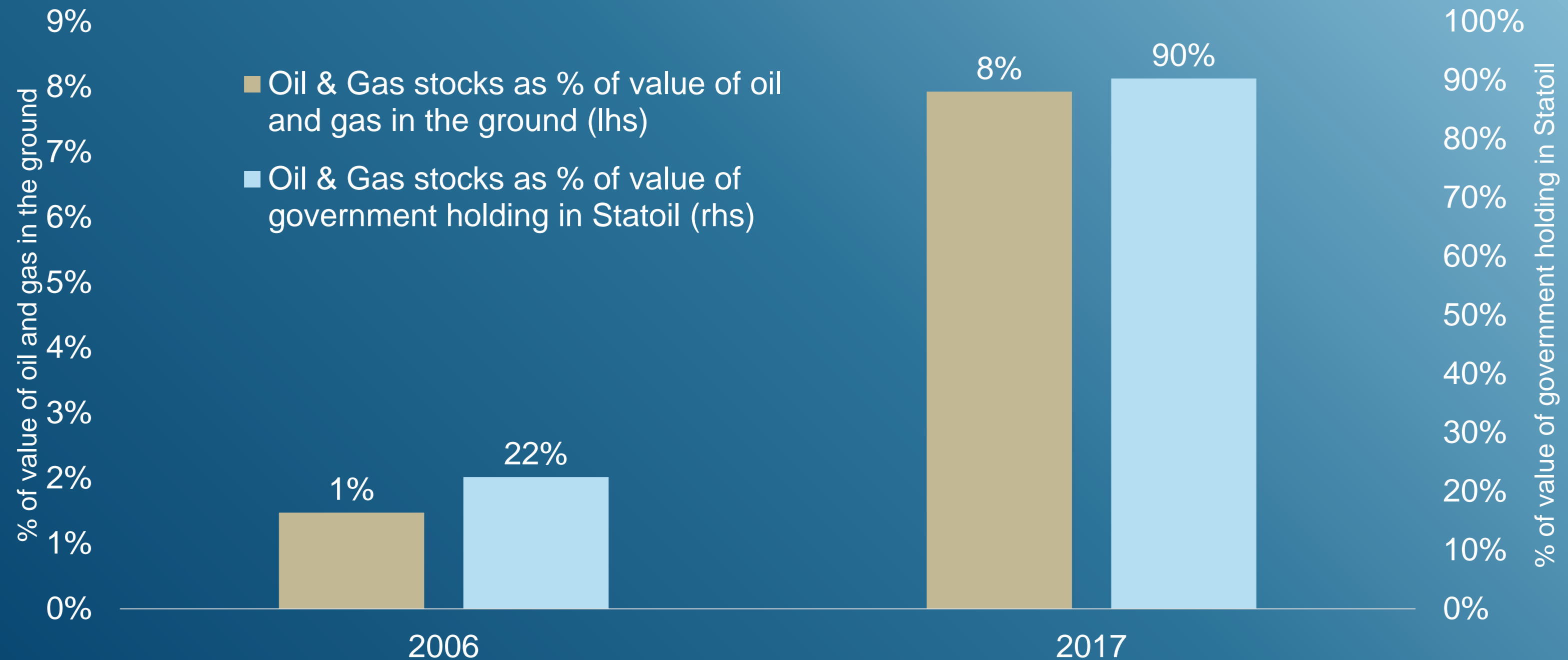Source: Ministry of Finance and Norges Bank Investment Management

■ Continental shelf   ■ The fund

Rising exposure to oil stocks in NOK terms...
As the value of the fund has grown

Oil & gas stocks in bn NOK (LHS)
Oil & gas stocks as % of fund value (RHS)

The graph shows implied GPFG strategic benchmark holdings in oil & gas stocks using FTSE's Industry Classification Benchmark (ICB), with pre-2006 industry classifications mapped to ICB for consistency. Source: FTSE and NBIM calculations

# ...also as a component of petroleum wealth

Oil & Gas stocks as % of value of oil and gas in the ground (lhs)

Oil & Gas stocks as % of value of government holding in Statoil (rhs)

% of value of oil and gas in the ground

% of value of government holding in Statoil

2006: 1%, 22%
2017: 8%, 90%

Notes: Implied GPFG strategic benchmark holdings in oil & gas stocks using FTSE's Industry Classification Benchmark (ICB), with pre-2006 industry classifications mapped to ICB for consistency. Value of stake in Statoil based on government ownership of 70.9% in 2006 and 66.7% in 2017.
Source: FTSE, Ministry of Finance and NBIM calculations

Long-term: Same return as broad markets
Total returns on oil stocks not significantly different from MSCI World
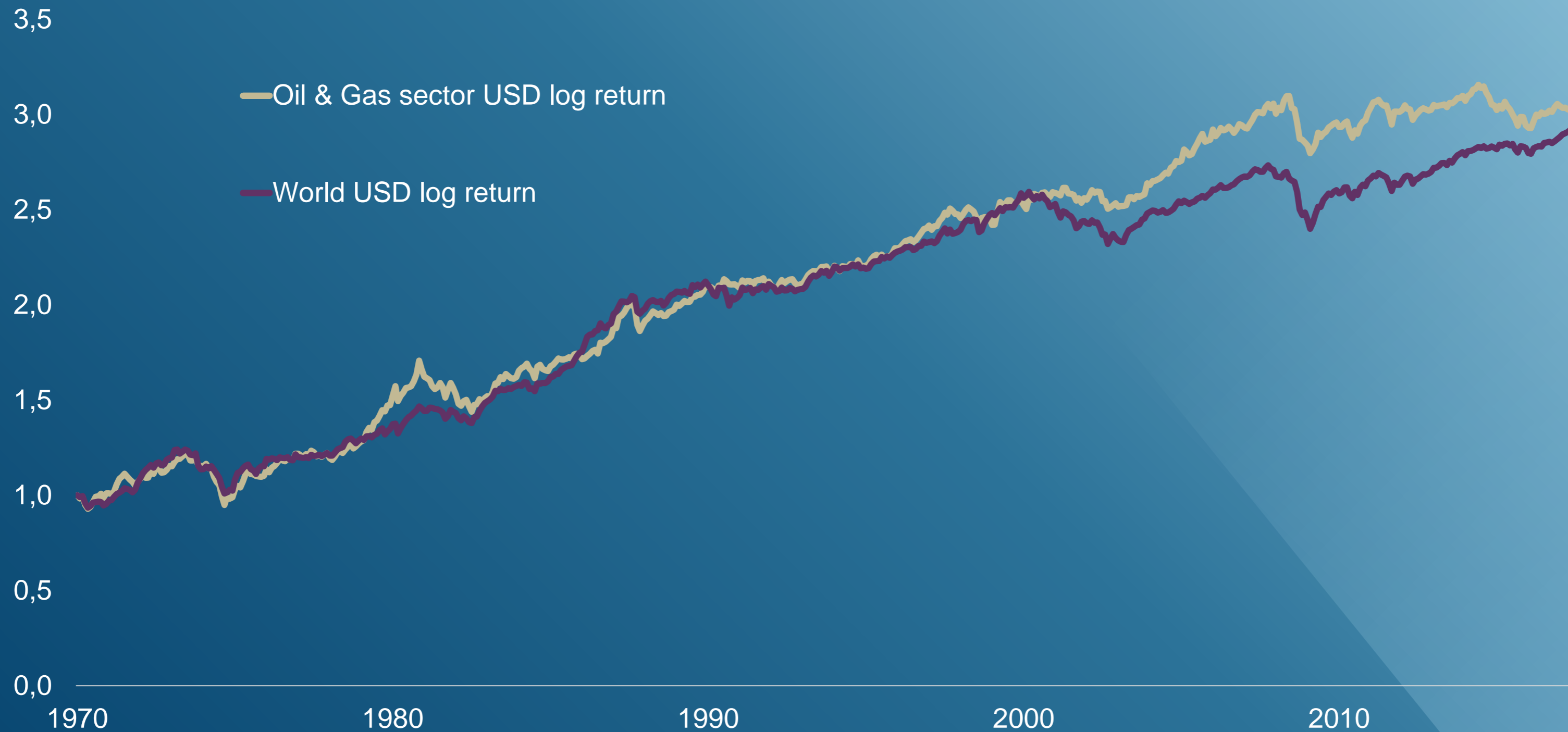
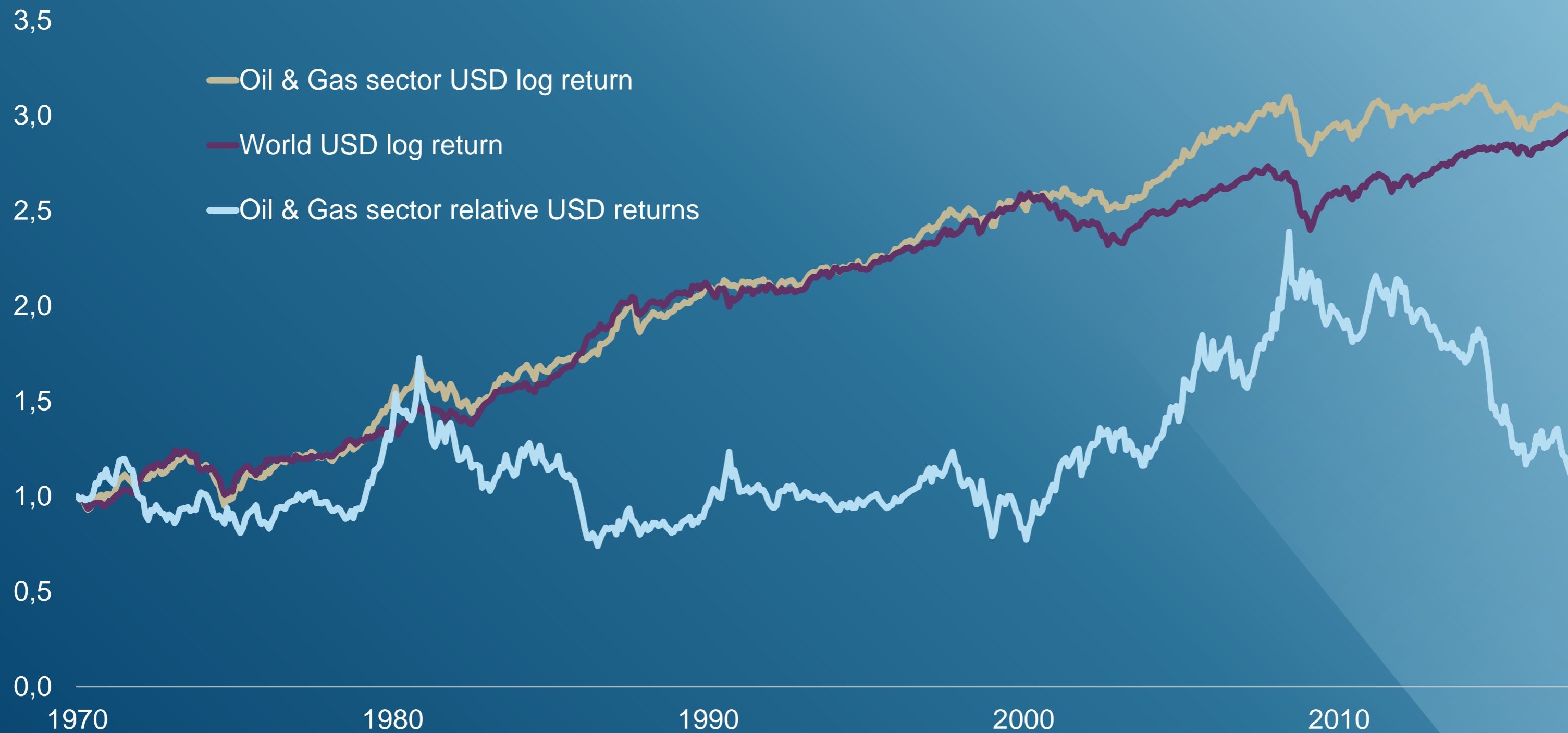Oil & Gas sector USD log return

World USD log return

Notes: Oil & Gas sector is based on MSCI World Energy sector and World is based on MSCI World Index. Log returns represented with a base of 10.

Shorter term: Significant return differences
## Oil stocks outperformed during the 2000s, underperformed since 2010

Oil & Gas sector USD log return

World USD log return

Oil & Gas sector relative USD returns

3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0

1970   1980   1990   2000   2010

Notes: Oil & Gas sector is based on MSCI World Energy sector and World is based on MSCI World Index. Log returns represented with a base of 10.

9

Return differentials driven by oil price
Investing in oil stocks and not in the market adds oil price risk
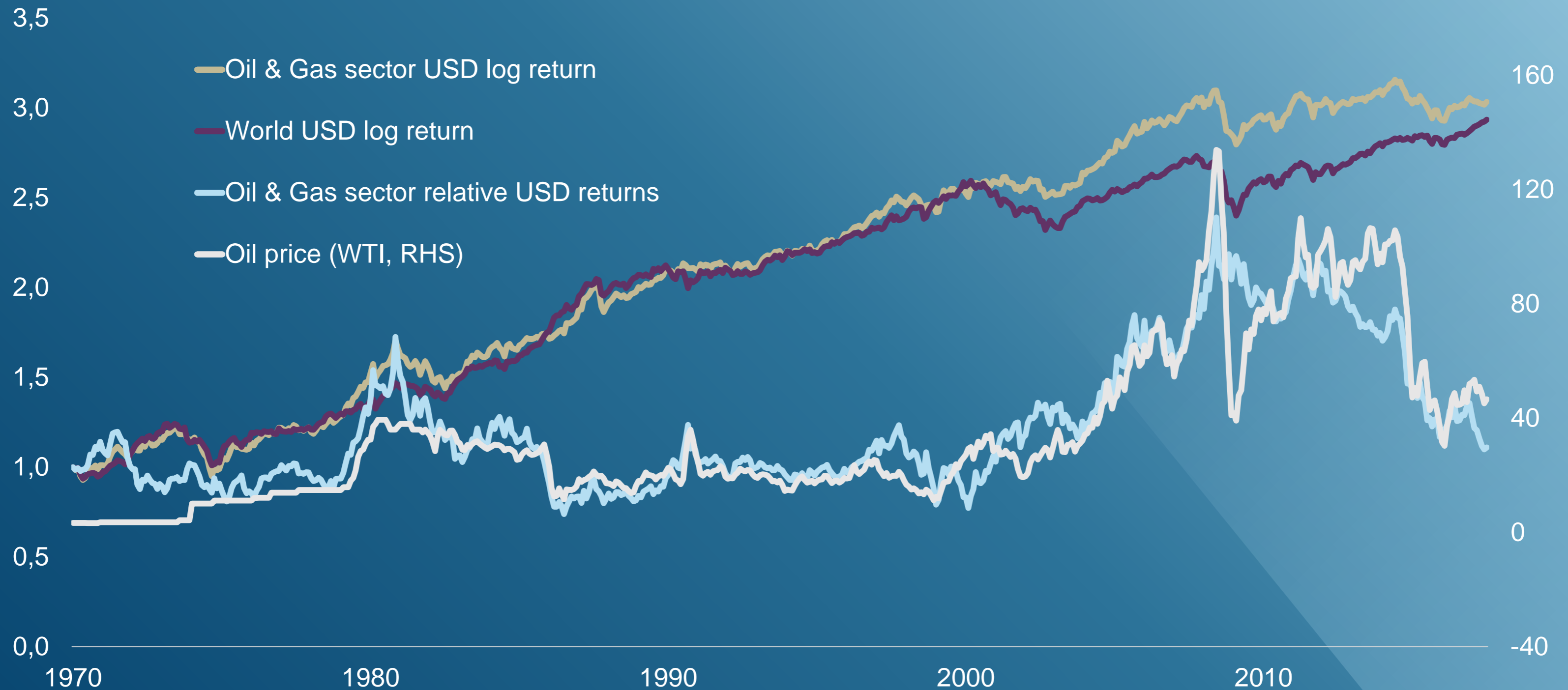
Notes: Oil & Gas sector is based on MSCI World Energy sector and World is based on MSCI World Index. Log returns represented with a base of 10.
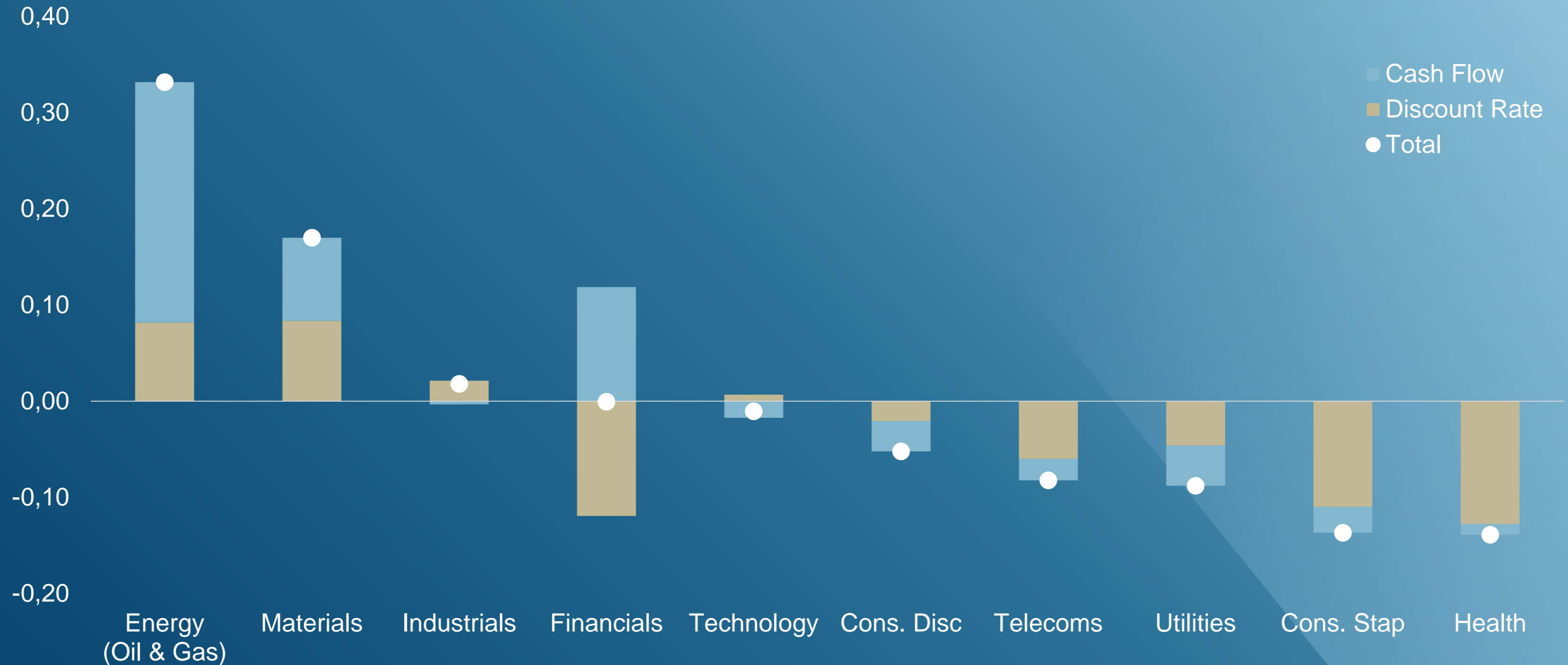
# Oil price sensitivity, sector relative to market
Oil & Gas standing out
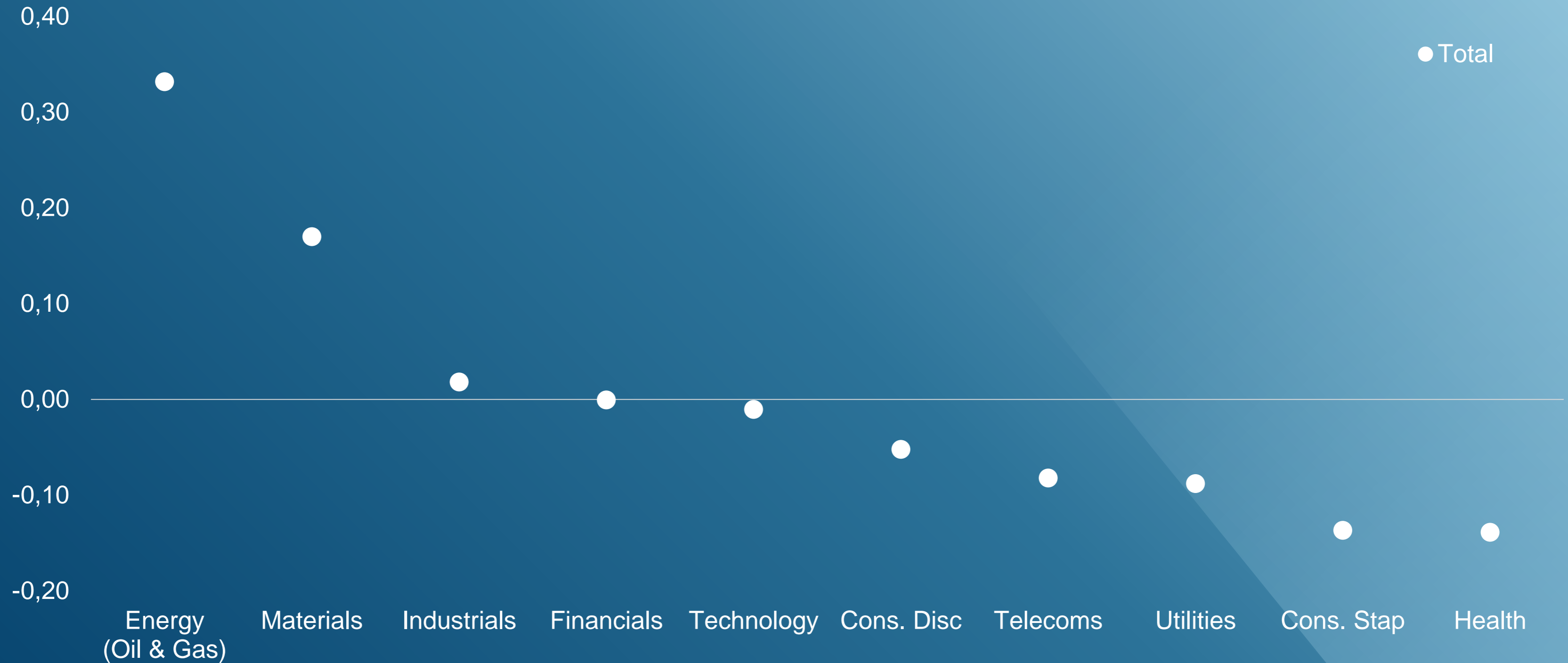
Oil price sensitivity decomposed
Cash flow news (persistent), Discount rate news (transitory)

Legend:
- Cash Flow
- Discount Rate
- Total

Categories: Energy (Oil & Gas), Materials, Industrials, Financials, Technology, Cons. Disc, Telecoms, Utilities, Cons. Stap, Health

Y-axis: -0,20 to 0,40

Source: Bloomberg, Ken French, MSCI, NBIM

Oil & Gas sector rolling returns

10-year returns relative to equity market and 10-year change in real oil price
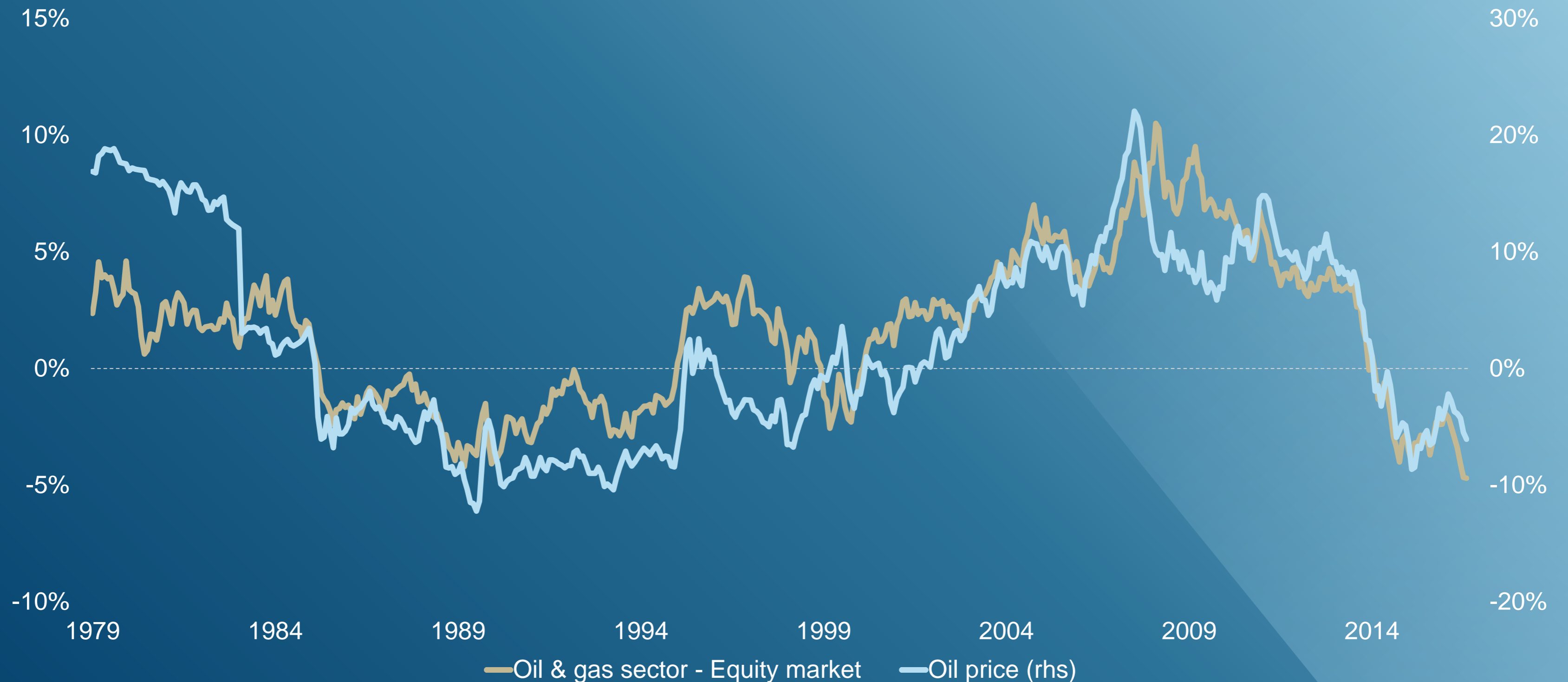
Oil & gas sector - Equity market   Oil price (rhs)

Does it matter? Yes

20 percent decline for 12m forward – one standard deviation shock
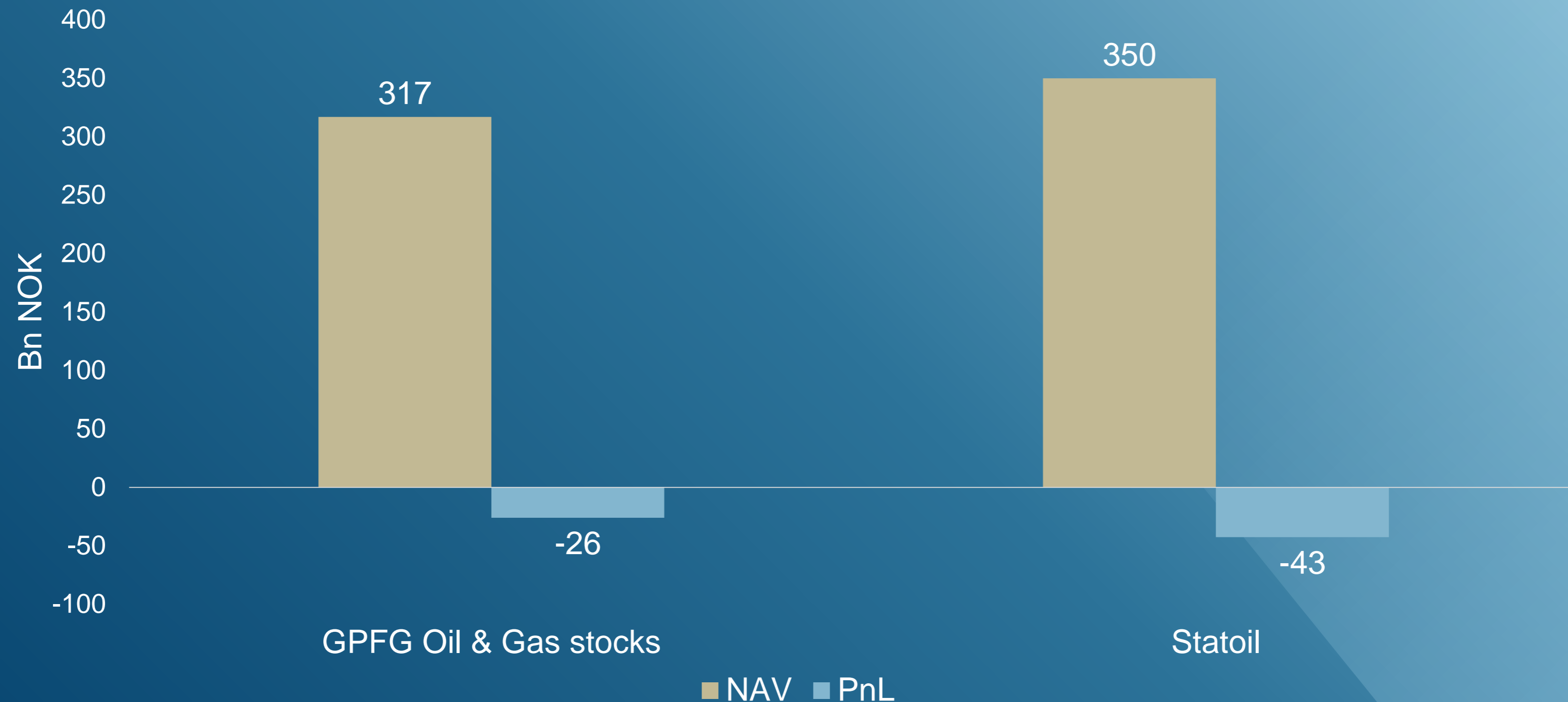
Bar chart (Bn NOK):

	NAV	PnL
GPFG Oil & Gas stocks	317	-26
Statoil	350	-43

Legend: ■ NAV ■ PnL

Will it lower *expected* return? No
Plus (minus) 2 standard errors represented by dashed lines
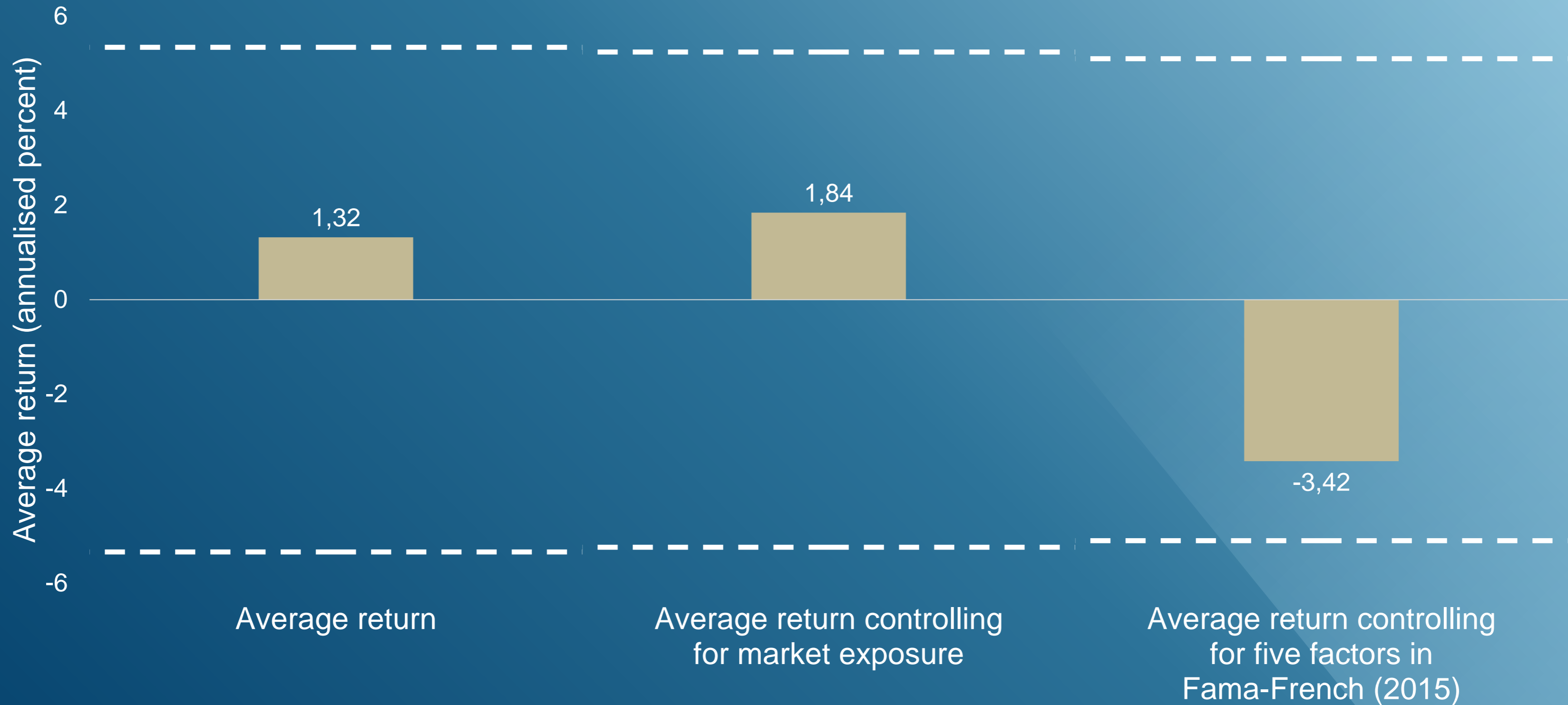
Average return (annualised percent)

1,32

1,84

-3,42

Average return

Average return controlling for market exposure

Average return controlling for five factors in Fama-French (2015)

Notes: FTSE Oil & Gas stocks relative return regressions, monthly observations from January 1994 to July 2017, with all series measured in USD. Robust standard errors calculated using the Newey-West (1987) methodology (with 3-mongh lag length). Source: FTSE, Ken French, NBIM

Summary
Advice submitted to MoF

- Relative to other stocks, the Fund's Oil & Gas stocks load heavily on the oil price…

- …*adding* to the oil price sensitivity of Norway's (petroleum) wealth

- We can reduce the oil price sensitivity by not investing in Oil & Gas stocks *without* changing expected return

- We have proposed to remove Oil & Gas stocks from the fund's reference index

- This advice is based on financial considerations only.
  It does not reflect any views about the future development of the oil price,
  the profitability and/or sustainability of the oil and gas sector

APPENDIX

Norway's petroleum wealth

Source: Norwegian Ministry of Finance, NBIM
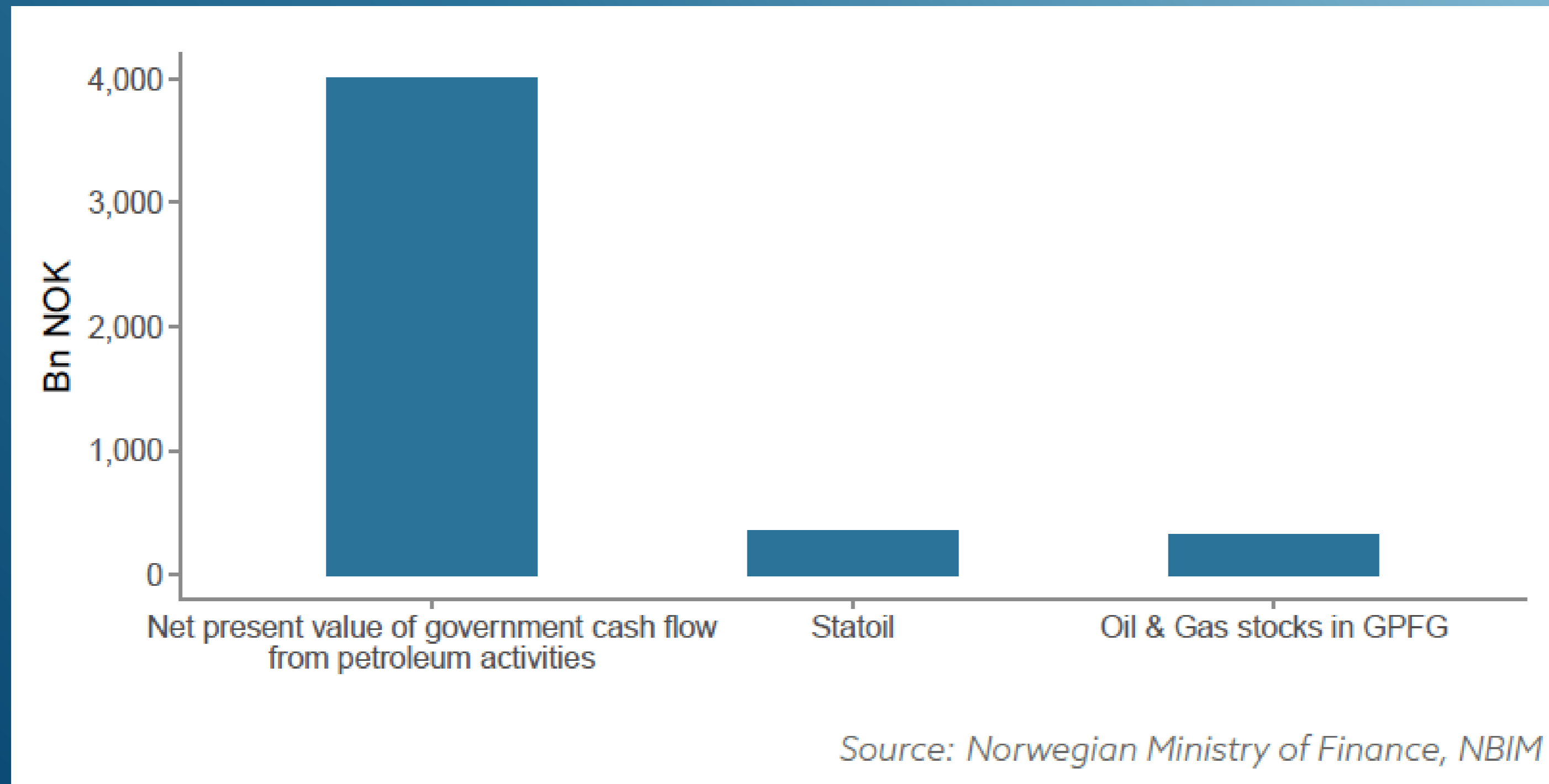
Sector relative return regressions

	Oil & Gas	Basic Mat.	Indus-trials	Cons. Gds	Health Care	Cons. Svs	Telecom.	Utilities	Finan-cials	Tech
(Intercept)	0.30	−0.99	−0.38	2.60*	6.17*	0.62	0.28	1.31	−1.36	2.23
	(1.97)	(2.58)	(0.98)	(1.28)	(1.95)	(0.97)	(2.47)	(1.95)	(1.67)	(3.07)
Market	−0.29*	0.08	0.08*	−0.22*	−0.39*	−0.06*	−0.06	−0.45*	0.19*	0.36*
	(0.05)	(0.05)	(0.03)	(0.04)	(0.05)	(0.02)	(0.06)	(0.05)	(0.05)	(0.09)
ΔOil	0.41*	0.19*	0.02	−0.04*	−0.08*	−0.10*	−0.10*	0.04	−0.05*	−0.09*
	(0.04)	(0.04)	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.03)	(0.04)
N	283	283	283	283	283	283	283	283	283	283
R^2	0.37	0.16	0.08	0.30	0.33	0.23	0.05	0.34	0.12	0.11

Note: Newey and West (1987) corrected standard errors reported in parentheses (using 3-month lag), * indicates significance at $p < 0.05$. Intercept annualised and in percent. Source: Bloomberg, FTSE, Ken French, NBIM

Sector relative return regressions
Fama-French (2015) five-factors

	Oil & Gas	Basic Mat.	Indus-trials	Cons. Gds	Health Care	Cons. Svs	Telecom.	Utilities	Finan-cials	Tech
(Intercept)	−4.13*	−5.48*	−1.62	−2.14*	3.42	−0.34	3.24	−3.54	−1.67	11.62*
	(2.10)	(2.57)	(0.87)	(0.97)	(1.99)	(0.98)	(2.20)	(2.02)	(1.01)	(2.37)
Market	−0.15*	0.22*	0.13*	−0.07*	−0.28*	−0.02	−0.14*	−0.28*	0.16*	0.06
	(0.06)	(0.06)	(0.02)	(0.03)	(0.05)	(0.02)	(0.05)	(0.05)	(0.03)	(0.06)
SMB	0.07	0.46*	0.26*	0.14*	−0.23*	0.10*	−0.46*	0.12	−0.16*	−0.19
	(0.09)	(0.10)	(0.06)	(0.05)	(0.09)	(0.04)	(0.15)	(0.09)	(0.05)	(0.13)
HML	0.22	0.43*	0.12*	0.11	−0.30*	−0.08	−0.63*	−0.00	0.72*	−0.69*
	(0.14)	(0.12)	(0.06)	(0.08)	(0.11)	(0.06)	(0.13)	(0.13)	(0.09)	(0.14)
RMW	0.49*	0.45*	0.01	0.62*	0.33*	0.13	−0.09	0.50*	−0.33*	−0.71*
	(0.16)	(0.16)	(0.06)	(0.08)	(0.13)	(0.07)	(0.17)	(0.17)	(0.07)	(0.20)
CMA	0.21	−0.07	0.07	0.22*	0.62*	0.13	0.19	0.49*	−0.19	−0.60*
	(0.17)	(0.15)	(0.08)	(0.09)	(0.18)	(0.08)	(0.19)	(0.18)	(0.12)	(0.23)
ΔOil	0.40*	0.14*	−0.01	−0.06*	−0.04	−0.10*	−0.03	0.04	−0.08*	−0.06
	(0.04)	(0.04)	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.03)
N	283	283	283	283	283	283	283	283	283	283
R^2	0.45	0.32	0.26	0.57	0.42	0.25	0.28	0.45	0.56	0.53

*Source: Bloomberg, FTSE, Ken French, NBIM*

Sector relative return regressions
Only control for exposure to oil price changes

	Oil & Gas	Basic Mat.	Indus-trials	Cons. Gds	Health Care	Cons. Svs	Telecom.	Utilities	Finan-cials	Tech
(Intercept)	−1.02	−0.60	0.01	1.60	4.39*	0.33	−0.02	−0.77	−0.50	3.87
	(2.32)	(2.53)	(1.01)	(1.42)	(2.20)	(0.97)	(2.48)	(2.32)	(1.68)	(3.22)
ΔOil	0.34*	0.22*	0.04*	−0.10*	−0.18*	−0.11*	−0.11*	−0.08*	−0.01	−0.00
	(0.05)	(0.04)	(0.01)	(0.02)	(0.03)	(0.01)	(0.03)	(0.04)	(0.03)	(0.03)
N	283	283	283	283	283	283	283	283	283	283
R^2	0.28	0.15	0.03	0.10	0.10	0.20	0.05	0.02	0.00	0.00

Source: Bloomberg, FTSE, Ken French, NBIM

Change in R2 when adding oil price change

Source: Bloomberg, FTSE, Ken French, NBIM
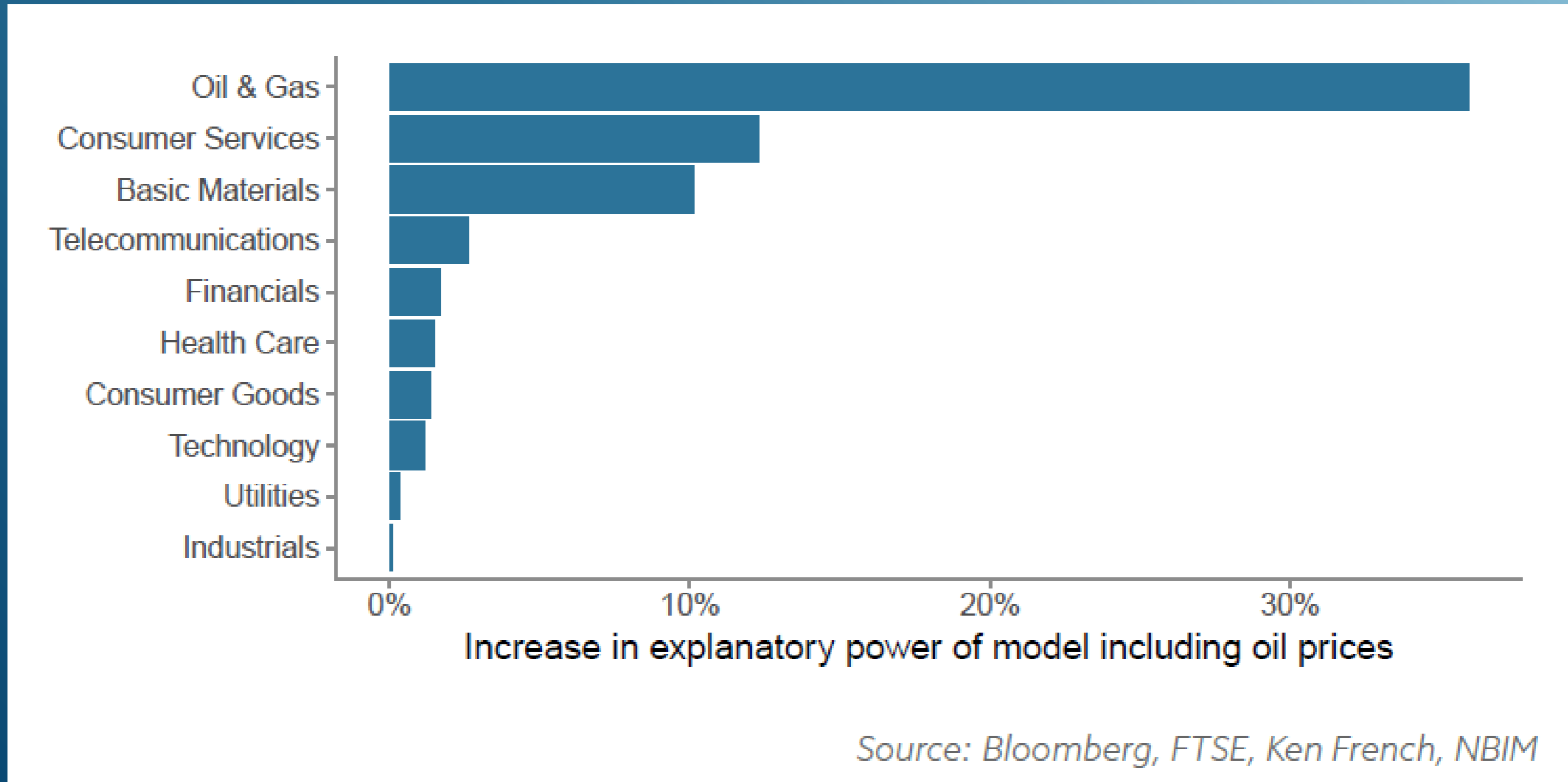
Sensitivity to different oil price variables
Monthly Oil & Gas stocks relative returns, USD

	Model 1	Model 2	Model 3
Intercept	1.46	0.19	0.30
	(2.26)	(2.15)	(1.97)
Market	−0.14*	−0.22*	−0.29*
	(0.05)	(0.05)	(0.05)
ΔOil - Spot	0.17*		
	(0.03)		
ΔOil - 1M Future		0.25*	
		(0.03)	
ΔOil - 12M Future			0.41*
			(0.04)
N	283	283	283
R^2	0.14	0.31	0.37

Regression analysis – Oil & Gas stocks

	Model 1	Model 2	Model 3
(Intercept)	1.32	1.84	-3.42
	(2.67)	(2.62)	(2.55)
Market		-0.08	0.04
		(0.06)	(0.06)
SMB			0.34*
			(0.10)
HML			0.47*
			(0.18)
RMW			0.57*
			(0.21)
CMA			-0.07
			(0.22)
N	283	283	283
R^2	0%	1%	14%

Notes: FTSE Oil & Gas stocks relative return regressions, monthly observations from January 1994 to July 2017, with all series measured in USD. Robust standard errors in parentheses calculated using the Newey-West (1987) methodology (with 3-mongh lag length). Source: FTSE, Ken French, NBIM