Attachment to the letter from Norges Bank 15.12.2017

This attachment includes key elements from the upcoming Return and Risk 2017 publication, planned for release in March 2018. The numbers used in this attachment cover the time period 1998 to the end of Q3 2017. All numbers for the last 3, 5 and 10 year periods take as starting point January 1 of the respective starting year.

Contents

Return

In 2017, the fund's total market value rose 442 billion kroner to 7,952 billion kroner as of Q3 . The investment return was 691 billion kroner. However, the krone strengthened against the main currencies the fund invests in, reducing the fund's net asset value by 199 billion kroner. Withdrawals of capital amounted to 50 billion kroner.

The fund has received a total of 3,313 billion kroner, net of management costs, since the first inflow of capital in May 1996. The cumulative investment return since inception has been 3,814 billion kroner. Changes in the value of the krone against the currencies we invest in account for the remaining 826 billion kroner of the fund's market value.

Percentage return

In 2017, the fund returned 9.83 percent as of Q3. The return on equity investments was 13.79 percent, while the fixed-income investments returned 2.77 percent and the unlisted real estate investments 5.44 percent.

Over the past five years, the fund's annualised return has been 8.98 percent. The asset class returns have been 12.51 percent for the equity investments, 3.00 percent for the fixed-income investments, and 8.02 percent for the real estate investments.

Since inception, the fund's investment return has been 5.98 percent. The return on equity investments has been 5.96 percent and the return on fixed-income investments 4.80 percent.

Relative return

In 2017, the overall return on the fund was 50 basis points higher than the return on the fund's benchmark as of Q3 , and has been 27 basis points higher since inception.

The management mandate issued by the Ministry of Finance was amended with effect from 1 January 2017. The investment returns on all of the fund's investments, including real estate, are now measured against the fund's benchmark index consisting of global equity and bond indices. This benchmark index comprises an equity index based on FTSE Group's Global All Cap stock index and a bond index based on various bond indices from Bloomberg Barclays Indices.

The fund's allocation to real estate is from 1 January 2017 internally funded with a combination of local market equity and fixed-income holdings and tailored to the specific real estate investments. The equity and fixed-income asset class benchmarks are subsequently adjusted for the actual funding tailored to the real estate investments. This enables an accurate measurement of the relative return for all three asset classes.

In 2017, the equity investments returned 42 basis points more than its benchmark index as of Q3. Since 1 January 1999, the annualised relative return for equity investments has been 50 basis points. The relative return on the fixed-income investments was 49 basis points as of Q3 2017, and has been 16 basis points annualised since 1 January 1998.

Absolute return key figures. Measured in the fund's currency basket. Annualised. Percent

	Since 01.01.1998	Last 10 years	Last 5 years	Last 3 years	2017
Return on equity investments[1]	5.96	5.59	12.51	9.53	13.79
Return on fixed-income investments	4.80	4.46	3.00	2.68	2.77
Return on real estate investments	-	-	8.02	5.84	5.44
Return on fund	5.98	5.95	8.98	7.06	9.83

[1] Since 01.01.1999.

Absolute return, 5-year buckets. Measured in the fund's currency basket. Annualised. Percent

	1998 - 2002	2003 - 2007	2008 - 2012	2013 - 2017	2017
Return on equity investments[1]	-4.85	16.28	-0.59	12.51	13.79
Return on fixed-income investments	6.26	4.00	5.87	3.00	2.77
Return on real estate investments	-	-	-	8.02	5.44
Return on fund	3.19	8.92	3.14	8.98	9.83

[1] Since 01.01.1999.

The fund's real return. Measured in the fund's currency basket. Annualised. Percent

	Since 1998	Last 10 years	Last 5 years	Last 3 years	2017
Fund return (nominal)	5.98	5.95	8.98	7.06	9.83
Annual inflation	1.76	1.64	1.26	1.34	1.35
Annual management fees	0.09	0.08	0.06	0.06	0.06
Real return	4.06	4.16	7.57	5.59	8.31

Fund return, key figures, measured in various currencies. Annualised. Percent

	Since 01.01.1998	Last 10 years	Last 5 years	Last 3 years	2017
US Dollar	6.32	4.55	6.75	6.28	15.24
Euro[1]	5.93	6.86	9.23	7.18	2.81
British Pound	7.46	8.87	11.16	12.25	6.13
Norwegian Krone	6.78	8.74	15.11	8.62	6.57
Currency basket	5.98	5.95	8.98	7.06	9.83

[1] Euro was introduced as currency on 01.01.1999. WM/Reuters' Euro rate is used as estimate for 31.12.1997.

Fund return, 5-year buckets, measured in various currencies. Annualised. Percen

	1998 - 2002	2003 - 2007	2008 - 2012	2013 - 2017	2017
US Dollar	3.27	13.09	2.50	6.75	15.24
Euro[1]	4.23	5.84	4.65	9.23	2.81
British Pound	3.87	8.39	6.74	11.16	6.13
Norwegian Krone	2.15	7.71	3.01	15.11	6.57
Currency basket	3.19	8.92	3.14	8.98	9.83

[1] Euro was introduced as currency on 01.01.1999. WM/Reuters' Euro rate is used as estimate for 31.12.1997.

Relative return. Measured in the fund's currency basket. Annualised

	Since 01.01.1998	Last 10 years	Last 5 years	Last 3 years	2017
Return on fund (percent)[1]	5.98	5.95	8.97	7.06	9.83
Return on fund benchmark (percent)[1]	5.71	5.81	8.71	6.65	9.34
Relative return on fund (percentage points)[1]	**0.27**	**0.13**	**0.27**	**0.40**	**0.50**

[1] Based on aggregated equity and fixed-income investments until end of 2016.

	Since 01.01.1999	Last 10 years	Last 5 years	Last 3 years	2017
Return on equity investments (percent)	5.96	5.59	12.51	9.53	13.79
Return on equity benchmark (percent)	5.47	5.42	12.14	9.01	13.37
Relative return on equity investments (percentage points)	**0.50**	**0.17**	**0.37**	**0.52**	**0.42**

	Since 01.01.1998	Last 10 years	Last 5 years	Last 3 years	2017
Return on fixed-income investments (percent)	4.80	4.46	3.00	2.68	2.77
Return on fixed-income benchmark (percent)	4.63	4.24	3.00	2.54	2.28
Relative return on fixed-income investments (percentage points)	**0.16**	**0.22**	**0.00**	**0.15**	**0.49**

Relative return. 5-year buckets. Measured in the fund's currency basket. Annualised

	1998 - 2002	2003 - 2007	2008 - 2012	2013 - 2017
Return on fund (percent)[1]	3.19	8.92	3.15	8.97
Return on fund benchmark (percent)[1]	2.78	8.52	3.14	8.71
Relative return on fund (percentage points)[1]	**0.41**	**0.40**	**0.01**	**0.27**

[1] Based on aggregated equity and fixed-income investments until end of 2016

	1999 - 2002	2003 - 2007	2008 - 2012	2013 - 2017
Return on equity investments (percent)	-4.85	16.28	-0.59	12.51
Return on equity benchmark (percent)	-5.63	15.37	-0.59	12.14
Relative return on equity investments (percentage points)	**0.78**	**0.90**	**0.01**	**0.37**

	1998 - 2002	2003 - 2007	2008 - 2012	2013 - 2017
Return on fixed-income investments (percent)	6.26	4.00	5.87	3.00
Return on fixed-income benchmark (percent)	6.09	3.97	5.44	3.00
Relative return on fixed-income investments (percentage points)	**0.17**	**0.03**	**0.43**	**0.00**

Reference portfolio

A key objective in the management of the fund is to achieve the highest possible return after costs within the scope of the investment mandate.

The total return of the fund is largely determined by the strategic benchmark index. The strategic benchmark index is based on standard, publicly available indices. These indices are designed to represent liquid investment alternatives for the typical broad equity or fixed-income investor. Since the fund has different characteristics than the average investor, following these indices in a mechanical manner may exclude investment opportunities available to the fund as a large, long-term, and cross-asset investor.

Through a series of adjustments of these publicly available indices, the reference portfolio is tailored to better fit the characteristics of the fund through improving diversification, gaining exposure to additional sources of systematic risk, reducing turnover and funding of the fund's real estate allocation. The reference portfolio serves as the starting point for our investments.

Universe expansion

A number of markets are not part of the investment universe as defined by the strategic benchmark index. The rules governing the publicly available indices that make up the strategic benchmark index exclude parts of the market based on liquidity considerations and market access constraints, such as local regulations, quota systems or currency convertibility issues. Some of these accessibility constraints are not binding for long-term investors such as the fund.

The reference portfolio therefore contains a number of additional markets the fund considers investable. The largest additional country allocations in the fixed-income reference portfolio are Brazil, Indonesia and India. On the equity side, mainland China is a notable example. The strategic benchmark index excludes mainland Chinese equities because foreign investors need currency quotas to be able to invest in the local equity market. The fund has been allotted renminbi quotas and has therefore been able to invest in the local Chinese equity market since 2008.

In total, 17 additional equity markets and 7 additional fixed-income markets are added to the reference portfolio. To the greatest extent possible, the internal reference portfolio adds markets and segments using the same weighting schemes as in the strategic benchmark index with market capitalisation for equities and GDP weights for government bonds. Both the strategic benchmark index and the reference portfolio adjust these market weights to take into account investability and market access. For instance, the renminbi quota has limited the amount we can invest in Chinese equities, which has therefore been included with a smaller weight than implied by its market capitalisation.

The strategic benchmark index adjusts a company's market capitalisation for free float. Since free float factors vary over time, following a free float adjusted market cap based index imply higher turnover than following a full market cap based one. In the reference portfolio, we adjust for the changes in these free float factors to a smaller extent than what is implied by the strategic benchmark index.

Systematic factors

For equity, the reference portfolio contains strategic allocations to systematic factors such as value, quality and size. These are well-established separate dimensions of risk beyond equity market risk. Exposure to these systematic factor premiums is obtained by setting security weights that deviate from market weights for the securities in the investment universe. For instance, value-based investment strategies aim to capture excess returns associated with value stocks relative to growth stocks.

The performance of risk factor strategies is highly time-varying, and can go through long periods of underperformance. Exposure to systematic factors is therefore not necessarily suitable for investors with potential short-term liquidity needs, but may on the other hand be a suitable investment strategy for a long-term investor such as the fund.

The management mandate from the Ministry of Finance contains requirements that are not specified in the benchmark index, such as environment-related mandates, and fiscal strength considerations in the management of the government bond portfolio. We use the reference portfolio to reflect these strategic exposures and their corresponding funding.

Cost efficient implementation
The strategic benchmark index incorporates a set of explicit and implicit rebalancing rules to maintain its target exposures to equities, credit and currencies. To avoid excessive turnover resulting from the fixed target exposures, the reference portfolio allows significant drift before rebalancing back to the targets.

On the fixed-income side, the credit share and currency weights are rebalanced back to pre-determined weights on a monthly basis in the strategic benchmark index. Frequent rebalancing do not add meaningful returns and may be costly to implement, particularly in certain corporate bond segments and emerging market currencies. The reference portfolio therefore rebalances these exposures less often.

Funding of real estate
The benchmark index expresses the asset owner’s market and currency risk preferences through the equity share and the currency composition. In addition to interest rate risk, these choices are of the most important determinants of the expected return and risk of a well-diversified equity and bond portfolio.

From January 2017, the allocation to real estate is no longer defined by the fund’s benchmark index. It is delegated to Norges Bank to decide the allocation to real estate and how it should be funded.

We allocate to real estate to obtain a more diversified total portfolio. Allocation to real estate can add market and currency risk to the total portfolio. The additional systematic risk is controlled through balanced funding of this asset class, in order to maintain the fund’s overall market and currency risk.

The fund’s allocation to real estate is funded with a combination of local market equity and fixed income and tailored to the specific real estate investments. For instance, investments in UK real estate are generally funded by a correspondingly lower allocation to UK equities and government bonds. The reference portfolio, as the starting point for our equity and fixed-income investments, reflects these funding adjustments. This allows accurate measurement of the portfolio by asset class. We obtain exposure to real estate through both unlisted and listed markets. Our real estate portfolio comprises approximately 25 percent listed securities in real estate companies and real estate investment trusts. The unlisted and the listed portfolios are funded with the same model, but adjustments for market risk and currency are tailored to each investment.

Reference portfolio return
The reference portfolio for equities has returned 12.1 percent per annum since 2013, which was in line with the return on the strategic benchmark index. Both the broad allocation to China and other emerging markets as well as the allocation to environment-related equities have made a positive contribution to the relative return.

The reference portfolio contains strategic allocations to additional systematic factors such as value, quality, and size, which together contributed positively to the relative return. It is important to note that the performance of such factor strategies is highly time-varying, and can go through long periods of underperformance. Exposure to systematic factors have overall contributed positively since 2013, but with significant variations in annual performance. The return-risk profile of these factor strategies should be evaluated over longer periods than some of the fund's other investment strategies.

The fund reduced its strategic allocation to European equities in 2013. The reference portfolio implemented this transition over a longer horizon than the strategic benchmark index in order to avoid unnecessary transactions in European equities. The longer implementation period resulted in a relative overweight in European stocks and this overweight contributed negatively to the relative return.

The reference portfolio for bonds has returned 2.8 percent per annum since 2013, which was -0.22 percentage point less per annum than the return on the strategic benchmark index.

Efforts to improve diversification involve expanding the universe by adding markets and segments, typically to broaden the geographical exposure. The additional markets in the reference portfolio made a negative contribution to the fund's relative return, with Russian bonds being a large contributor to this.

Russian government bonds were included the reference portfolio from December 2011. When included in the Ministry of Finance benchmark from April 2014, Russian government bonds were down-weighted with a factor of 0.25 after advice from Norges Bank. The adjusted Ministry of Finance benchmark had a positive return when measured against the Barclays index, which includes all sovereign bonds issuers with a factor of 1. The actual allocation in the reference portfolio was higher, generating a loss in 2014 of -15 basis points for the fund relative to the adjusted Ministry of Finance benchmark.

The reference portfolio limits the interest rate sensitivity, or so-called duration, to the issuers with the longest duration profile. A lower duration means that, in general, the reference portfolio is less sensitive to changes in interest rates than the strategic benchmark index. This made a negative contribution to the relative return as global government bond yields declined throughout the period.

The mandate from the Ministry of Finance requires Norges Bank to take fiscal strength into account in its bond investments. The reference portfolio therefore adjusts the weights assigned to countries in the government bond segment based on fiscal risk. This adjustment results in lower expected risk and return in this part of the reference portfolio. The fiscal strength adjustment made a negative contribution to the relative return, as the spread, or difference in yield, between the most heavily indebted countries in the Eurozone and German government debt narrowed substantially over the period.

Contributions to relative return differences between the fund's reference portfolio and the benchmark index for 2013-2017.
Annualised. Percentage point

	Equity	Fixed income	Total
Systematic factors	0.02		0.02
Universe expansion	0.00	-0.06	-0.06
Mandate allocations	0.01	-0.01	0.00
Universe adjustments	-0.02	-0.02	-0.04
Reference portfolio versus the benchmark index	**0.01**	**-0.09**	**-0.08**

Investment strategies

Our investment strategies aim at exploiting our characteristics as a large, global investor with limited short-term liquidity requirements to achieve a high return with acceptable risk.

Fund allocation

Fund allocation aims to improve the fund's exposure to broad markets and sources of return, in both the medium and the long term.

Internal reference portfolio

The reference portfolio serves as the starting point for the fund's investments. We seek to improve diversification by adding additional markets and asset classes, and to enhance return through allocation to systematic factors in a controlled, balanced way. The objective of the reference portfolio is to obtain the best possible long-term return-risk profile for the fund, within the opportunity set defined in our management mandate.

Real estate

The fund's real estate investments was removed from the fund's strategic benchmark index as of January 2017. Unlisted real estate remains in the fund's investment universe. The allocation decision has been delegated to us as the manager of the fund. We invest in unlisted and listed real estate with an objective to improve the trade-off between return and risk in the fund. Investments in unlisted and listed real estate are funded by selling a tailored mix of equities and fixed-income investments in the same currency. Fund allocation manages these funding decisions. Certainty about the availability of funding is one of the fund's comparative advantages when we invest in real estate. The funding mix may, however, vary between properties and over time.

Allocation decisions

Market movement results in a portfolio that deviates from the reference portfolio's strategic exposures to equities, duration, and currencies. Allocation decisions are made to balance transaction costs, risk and valuation when rebalancing the portfolio back to the strategic exposures.

Within emerging markets, allocation decisions are made to refine the reference portfolio to avoid high transaction costs, manage risk and capturing a changing opportunity set. This entails allocation to frontier markets and emerging market debt, as well as the use of tailored benchmarks for external managers.

Security selection

Our security selection strategies seek to generate excess return over carefully designed benchmarks. This applies to both internal and external security selection strategies.

Internal security selection

The aim of internal security selection is to enhance returns and ensure that responsible management activities have a robust foundation. To achieve this, we develop and maintain a thorough understanding of large companies, and the issues they face. The knowledge created through security selection activities also supports the understanding of the risks in the overall portfolio.

Our internal security selection strategies make investments based on a strong understanding of individual companies and their long-term prospects. In the short run, returns in capital markets are affected by a number of factors. As a result, realised returns may or may not be related to underlying developments in the company. However, as the investment horizon increases, the development in a company's profit and cash flow becomes increasingly important.

As the manager of a long-term fund, we are particularly well positioned to make investments based on developments that will not necessarily become evident in the short run. However, such developments are not always easy to identify. We therefore spend considerable resources on researching companies and the markets in which they operate and the issues they are facing. We conduct research in a number of ways. We collect data from open sources such as companies and government entities, we purchase data from providers such as industry consultancies, and we gather bespoke, proprietary data. We also engage with external equity research analysts. We meet with companies we invest in, typically with senior management. The company dialogue improves our understanding of the companies and the issues they face. It also builds strong relationships, and supports our ownership work.

Our investment professionals typically work in teams that consist of three to six members. Most teams are dedicated to a particular industry. We also have teams that assess investment opportunities across industries, such as the team dedicated to investments in environmentally friendly companies. We have a credit team that makes investments in corporate credit following the same underlying principles as for our equity investments.

We believe that investment professionals must be highly specialised or focused in order to achieve the necessary level of understanding. Therefore, each investment professional has a clearly defined responsibility, which typically consists of keeping track of and investing in a limited set of companies within one or a few sub-industries. As a global investor, we can divide responsibilities according to the characteristics of the particular industries. For instance, the major oil companies would be covered together, regardless of their geographical belonging, while utility companies would be covered on a regional basis. Most of our investment decisions are made by the investment professional that conducted the research. These portfolio managers' responsibilities are specified in individual investment mandates for particular sub-portfolios of the fund.

Each sub-portfolio is measured relative to a benchmark consisting of companies within the portfolio manager's area of responsibility. We are mindful that realised returns, especially in the short-run, may be influenced by chance. Therefore, we put a lot of emphasis on understanding and monitoring the underlying work of each portfolio manager, both through informal discussions and more formal reviews. This will support the long-term orientation of our investment strategy.

External security selection

We invest in emerging market equities through locally based external managers. Our external managers hold fairly concentrated portfolios chosen from a wider universe than reflected in off-the-shelf indices.

We have built expertise in selecting managers that are both proficient in assessing the return potential of individual companies, and in managing the companies' environmental, social and governance risks. Market specific knowledge is required, since public transparency and corporate governance standards vary considerably across these markets. Access to local expertise enables us to adjust our investments to changing opportunities.

We utilise our external manager selection capabilities in market segments that exhibit many of the same characteristics as emerging markets. Illiquid, less well-covered, small capitalisation segments of developed equity markets and environment-related investments provide opportunities for return enhancement and efficient implementation, through specialised security selection. We monitor our investments continuously, frequently visit our external managers and are able to make swift changes if necessary.

Asset management

Our asset management strategies aim to generate excess return over time through systematic strategies, efficient trade execution and prudent risk management. Our approach is founded on internal research and market expertise, and is tailored to the fund's unique characteristics.

An effective and tailored strategy implementation relies upon deep understanding of the selected systematic strategies and the markets we invest in. We believe investment professionals must be highly specialised to achieve the necessary level of understanding. Therefore, each investment professional has clearly defined responsibilities and areas of focus. Investment teams, made up of specialised strategists, portfolio managers and traders, allows for efficient development and utilisation of the team's accumulated competence.

Risk is tightly controlled at the regional, sector and issuer level, exploiting the benefits of diversification through a large number of relatively small relative positions. We are conscious that some of these strategies may expose the fund to tail risk, and we monitor these risks closely.

Asset positioning
A fund of our size and reach across asset classes, regions and market capitalisations, needs to manage broad market exposures efficiently. Introducing flexibility in our portfolio management process allows us to patiently target desired market exposures with aim of enhancing performance and lowering transaction costs.

As the manager of a long-term fund, we are well positioned to make investments to harvest risk factor premia. Our factor strategies are underpinned by academic research coupled with our own factor strategy research and in-depth market expertise, and adapted to the fund's characteristics and liquidity profile. We dynamically manage the factor exposure, combining a diversified set of systematic strategies across a number of investment horizons in a risk- and turnover-controlled manner. So far, our factor strategies has focused on equity related premia.

Our large diversified global holdings enables us to generate returns by exploiting market price differences in securities with similar characteristics. These price differences are often driven by other market participants' constraints or preferences. Providing instant liquidity to less patient investors at a price is part of this effort to monetise on the fund's holdings of securities.

Capturing returns from relative value strategies requires a robust risk management system, proprietary decision support systems, market presence and deep knowledge of the markets in which we invest. Our relative value strategies are an integrated part of our work to ensure the fund's desired market exposures, implemented regionally by strategists, portfolio managers and traders to ensure we take advantage of liquidity events.

Transaction costs are a drag on fund performance. We aim to minimise and control the transaction costs of implementing the fund's investment strategies. We avoid weaknesses of stricter, mechanical benchmark replication. These often lead to higher friction costs, particularly for large, global funds.

We seek to be patient in our portfolio rebalancing decisions, utilising natural liquidity and capital market events to implement longer-term exposure targets when we can. Where possible we try to benefit from the behaviour and liquidity profile of other, more constrained market participants.

Cost efficient market execution requires us to adapt our trading strategies to the evolving market structure. It also requires rigorous trading analytics and feedback, tailored trading support solutions as well as effective collaboration with leading market participants. We work actively towards improving the functioning of the markets we invest in for the long-term benefit of the fund.

Securities lending
Securities lending is an integrated part of our asset management strategies. We use both direct internal lending and external agency lending through our custodian. Returns to

securities lending depends not only on the composition of the portfolio, but also on the flexibility of the lender when structuring transactions.

We seek to optimise the risk-reward trade off from lending activities by actively engaging our counterparties and offering lending terms and structures that are cost efficient. Extended loan duration, diversification of collateral and lending via alternative instruments are all utilised to extract incremental securities lending revenue from our investment portfolio.

Securities lending exposes the fund to counterparty default risk. We manage this risk by ensuring that all securities lending transactions are secured with appropriate collateral and by diversifying exposures to individual counterparties.

Investment strategies last five years, 2013-2017
The fund's annualised relative return of 27 basis points over the last five years can be broken into contributions from the main investment strategies employed for the management of the fund, as well as asset classes.

The fund allocation strategies have contributed -7 basis points, security selection strategies 11 basis points and asset management strategies 23 basis points, in annualised relative return for the fund as a whole for the last five years.

Fund allocation
Fund allocation aims to improve the fund's exposure to broad markets and sources of return. The three strategies it employs to achieve this is the internal reference portfolio, the real estate strategy and allocation decisions.

Fund allocation has had a negative contribution of 7 basis points to the fund's relative return for the five-year period from 2013 to 2017.

Internal reference portfolio
Through a series of adjustments of publicly available equity and fixed-income indices, the internal reference portfolio is tailored to better fit the characteristics of the fund through improving diversification, gaining exposure to additional sources of systematic risk, reducing turnover and funding of the fund's real estate allocation.

The internal reference portfolio had a negative contribution of 8 basis points to the fund's relative return in the period 2013 to 2017. Adjustments to the fixed-income benchmark index contributed -9 basis points to the fund's relative return, while the equity index adjustments contributed 1 basis point.

A more detailed review of the factor adjustments made can be found under the section "Reference portfolio return".

Real estate
With the amendment of the management mandate from the Ministry of Finance in January 2017, the fund's real estate investments are now measured against the fund's benchmark index of global equity and bond indices. In the operational implementation of the fund's real estate strategy, the fund's unlisted and listed real estate investments are measured against internal funding benchmarks that consist of tailored equity and bond holdings in the same currency as the real estate investments.

In 2017, the real estate strategy contributed -3 basis points to the fund's relative return as of Q3, which gives an impact to the fund's relative return over the period 2013 to 2017 of negative 1 basis point.

In 2017, the listed real estate investments contributed negatively by 5 basis points as of Q3, mostly due to poor performance from the US listed real estate investments. The unlisted real estate investments contributed positively by 2 basis points, after the unlisted real estate investments returned 5.4 percent as of Q3 2017, compared with a 4.9 percent return for its funding benchmark.

Allocation decisions
Allocation decisions involve rebalancing the reference portfolio's exposure to a number of return drivers, the fund's exposure to emerging markets and various factor strategies. These adjustments include changes to the equity share, duration or currency composition.

Overall, allocation decisions have contributed 2 basis points to the relative return of the fund for the five-year period. Cross-asset allocation decisions have contributed positively by 3 basis points, while equity related decisions have contributed negatively by 2 basis points. Fixed-income related decisions on aggregate have had a minimal impact.

Security selection
Security selection investment strategies seek to generate excess return over carefully designed benchmarks.

The overall security selection strategy has contributed 11 basis points in annualised relative return for the fund since 2013.

Internal security selection
The main activity within internal security selection is to identify and invest in companies that will generate better investment returns than their competitors in the long-term.

The internal security selection strategy has contributed 1 basis point to the fund's relative return over the last five years. The equity portfolios within internal security selection contributed 1 basis point to the fund's annual relative return, while the returns from the fixed-income internal selection strategy have had an immaterial impact on the fund's relative return.

The fund's investments within industry sectors change as a result of internal security selection. The impact of making such changes to the fund's equity investments made an annual contribution of 1 basis point to the fund's relative return since 2013. The single largest positive impact came from changing the fund's investments within the sub-sector basic resources. This contributed 4 basis points to the fund's relative return. Changes to the fund's investments within insurance and financial services both contributed 2 basis points per year. The changes to the fund's equity investments within retail, on the other hand, has made a negative contribution of 5 basis points per year.

Although the main activity is to change the fund's investments within industries, internal security selection also has an impact on the fund's investments across industries. An increase in the fund's equity investments in financial services contributed 2 basis points to the fund's annual relative return, as financial services performed strongly. Reductions to the fund's equity investments in health care and technology each contributed -1 basis point. Overall, changes to the composition of the fund's equity investments at industry level has made an immaterial impact on the fund's relative return.

As regards the impact of changing the fund's equity investments within countries, the single largest impact came from changing the investments within the United States. This contributed 4 basis points to the fund's relative return. The contribution from changing the fund's investments in Switzerland contributed -4 basis points.

Internal security selection also has an impact on the geographical distribution of the fund's equity investments. A somewhat higher weight of European stocks, and a corresponding lower weight of US stocks, than the benchmark has contributed -2 basis points to the fund's relative return. This was offset by positive contributions from the distribution across other countries, so the overall impact on the fund's relative return of changing the geographical distribution was negligible.

The fixed-income portfolios within internal security selection are invested in corporate bonds. Norges Bank Investment Management started the internal security selection strategy for corporate bonds in 2014. The contribution to the fund's relative return over the last five years has been minor.

External security selection

Norges Bank Investment Management utilises external equity managers with expertise in markets and segments where it is not expedient to build internal expertise, and local knowledge is important to understand the inherent environmental, social and regulatory risks in these markets. The external equity mandates cover investments in emerging markets, small capitalisation companies in developed markets, and environment-related investments. On average, around 4 percent of the fund was managed by external equity managers in the period.

The external security selection strategy has contributed 11 basis points to the fund's annualised relative return over the last five years.

The mandates for equity investments in emerging markets are measured against benchmarks adapted to the market. All regions within emerging markets have contributed positively to the relative return, in total by 10 basis points over the five-year period. The mandates in the Asian region have had the largest positive contributions with the China and India mandates as considerable positive contributors.

The mandates for investments in small capitalisation companies in developed markets are measured against benchmarks adapted to country and company size. Overall, these mandates outperformed their benchmarks, largely driven by strong performance by the Italian small capitalisation mandates.

Asset management

Asset management encompasses a broad range of systematic strategies for both equities and fixed income. For the period 2013 to 2017, the asset management strategy has contributed 23 basis points to the fund's annualised relative return.

Asset positioning

Asset positioning implements the targeted market exposures with an aim to enhance investment returns and lower transaction costs for the fund.

In the five-year period, asset positioning has contributed 17 basis points to the annualised relative return of the fund.

The investment strategy's equity investments have contributed 9 basis points. Of this, integrated market exposure and relative value strategies accounted for 7 basis points. European equities contributed the most with just over half of the result, followed by Asian equities.

Broken into market segments, the largest contribution stemmed from developed large capitalisation companies, followed by emerging market companies and developed small capitalisation companies.

In addition to the risk factors inherent in the reference portfolios, the asset positioning strategy has been positioned towards dynamically managed systematic factors.

These factors have contributed 2 basis points annually to the fund's relative return over the five-year period. Adding this together with the systematic factors inherent in the reference portfolio, the factors have contributed 4 basis points in total, with positioning towards quality contributing the most.

Asset positioning's fixed-income investments have contributed 8 basis points. Several strategies are pursued, such as new issues, and relative value strategies across instruments, sectors, and issuers. In addition, there are positions that can be more large-scale, related to transition activity, and hence motivated by reduction of transaction costs.

Investments in government, government-related and covered bonds in developed markets have contributed 4 basis points. European bonds had the largest contribution with 3 basis points, while North-American bonds contributed 1 basis point.

Investments in corporate bonds have contributed 3 basis points to the fund's relative return. The contribution has been driven by strategies focusing on variation in issuer and sector spread curves, and new issue premiums.

Investments in emerging market bonds have contributed 1 basis point to the fund's relative return over the five-year period. Balanced duration positions across countries have contributed most.

Securities lending

Securities lending is an integrated part of our asset management strategies. We use both direct internal lending and external agency lending through our custodian.

The fund's securities lending activities have contributed 6 basis points to the fund's relative return. Lending of equity investments contributed 5 basis points. The Asia and Oceania region has contributed 45 percent of the equity revenues, while Americas and Europe split the balance with 28 and 27 percent respectively. Bond lending has contributed half a basis point to the fund's return over the five-year period.

Contributions to fund relative return from investment strategies in 2017. Percentage points

	Equity	Fixed income	Unlisted real estate	Cross-asset allocation	Total
Fund allocation	**0.06**	**0.12**	**0.02**	**0.00**	**0.20**
Internal reference portfolio	0.11	0.11		0.00	0.22
of which systematic factors	0.01				0.01
of which universe expansion	0.00	0.08			0.07
Real estate	-0.05		0.02		-0.03
Allocation decisions	0.00	0.00		0.00	0.01
Security selection	**0.26**	**-0.02**			**0.24**
Internal security selection	0.12	-0.02			0.10
External security selection	0.14				0.14
Asset management	**-0.04**	**0.08**		**0.02**	**0.07**
Asset positioning	-0.07	0.07		0.02	0.02
Securities lending	0.03	0.01			0.04
Total	**0.28**	**0.18**	**0.02**	**0.03**	**0.50**

Contributions to fund relative return from investment strategies for 2013-2017. Percentage points

	Equity	Fixed income	Unlisted real estate	Cross-asset allocation	Total
Fund allocation	-0.02	-0.09	0.00	0.03	-0.07
Internal reference portfolio	0.01	-0.09		0.00	-0.08
of which systematic factors	0.02				0.02
of which universe expansion	0.00	-0.06			-0.06
Real estate	-0.01		0.00		-0.01
Allocation decisions	-0.02	0.00		0.03	0.02
Security selection	0.12	0.00			0.11
Internal security selection	0.01	0.00			0.01
External security selection	0.11				0.11
Asset management	0.14	0.09		0.01	0.23
Asset positioning	0.09	0.08		0.01	0.17
Securities lending	0.05	0.00			0.06
Total	0.24	-0.01	0.00	0.04	0.27

Return and costs

Norges Bank maintains a high level of cost awareness in the management of the fund. Total management costs as a share of assets under management have been relatively stable over recent years, despite the inclusion of additional markets, currencies, increased allocation to equities and unlisted real estate.

The objective specified in the mandate from the Ministry of Finance is the highest possible return after costs.

The Ministry of Finance has delegated responsibility for the management of the fund to Norges Bank. The Ministry of Finance reimburses Norges Bank for costs incurred in connection with the management of the fund, in form of a management fee within an annual limit. Performance-based fees to external managers are reimbursed separately. Management costs are also incurred in real estate subsidiaries of Norges Bank in relation to unlisted real estate investments. These costs are also measured against the annual limit, but they are not reimbursed or included in the management fee, since they are expensed directly in the investment portfolio.

Management cost by strategy

We pursue a variety of investment strategies in our management of the fund. These strategies complement and influence one another, and cost synergies arise between them. For example, costs related to specific systems or data feeds might be utilised in multiple strategies.

We split the costs between the different strategies based on number of employees, usage or volume. Costs related to salary, personnel, analysis, consultants and legal services are allocated to the relevant strategy based on usage. Costs related to office premises and IT infrastructure are allocated to the relevant strategy based on headcount. Specific system costs are allocated to each strategy based on usage.

Custody costs consist of safekeeping, transaction and performance measurement costs. Safekeeping costs are allocated to the asset management strategy, while transaction costs are split between the relevant strategies based on transaction volumes. Performance measurement costs are allocated to the external security selection strategy, as well as base- and performance fee to external managers, and costs related to the internal team managing the external managers. Costs related to ownership strategies are allocated to internal security selection.

Management cost per investment strategy in 2017. Cost as reimbursed by the Ministry of Finance. Basis points

	Contribution to the fund's management cost	Management cost based on assets under management
Fund allocation	0.3	
Security selection	3.0	13.9
Internal	0.7	4.0
External[1]	2.3	49.0
Asset management	2.1	2.9
Unlisted real estate	0.6	23.3
Total	6.0	

[1] Includes all externally managed capital.

Management cost per investment strategy 2013 - 2017. Cost as reimbursed by the Ministry of Finance. Basis points

	Contribution to the fund's management cost	Management cost based on assets under management
Fund allocation	0.3	
Security selection	2.7	17.5
Internal	0.7	6.2
External[1]	2.0	48.2
Asset management	2.3	2.9
Unlisted real estate	0.5	25.3
Total	5.9	

[1] Includes all externally managed capital.

Cost-adjusted relative return
The fund's relative return after management costs can be compared with the investment performance that could theoretically be expected to be achieved with a passive index management strategy.

A passive investment strategy would aim at replicating a benchmark following set rules. The estimated relative return of a passive strategy is dependent on various estimated cost components. The return adjustments made are management costs of a passive strategy, revenues from securities lending, transaction costs related to replication of the benchmark index and transaction costs related to inflows and extraordinary benchmark changes.

Management costs of a passive strategy
The estimated management costs for a passive management strategy are based on the fund's actual management costs for each year, where costs related to both internal and external active management strategies have been subtracted.

Revenues from securities lending
Unlike a theoretical index, but similar to an actively managed portfolio, a passive index portfolio would also be expected to generate income from securities lending activities. In this analysis, actual revenues from securities lending have been used, consistent with the financial reporting for the fund.

Transaction costs related to replication of the benchmark index
Changes in the equity and bond indices, such as company inclusions and periodic index re-weightings, would trigger transactions in the portfolio and subsequent costs. These index replication costs are estimates based on models and not on realised costs, and are therefore uncertain in nature.

Transaction costs related to inflows and extraordinary benchmark changes
These costs are estimated costs related to the phasing-in of new capital into the fund, costs related to the set rules for rebalancing of the asset allocation in the benchmark, and transition costs related to rule changes for the benchmark. The broad benchmark indices for equity and fixed-income investments set by the Ministry of Finance are used as the

underlying indices. The costs related to inflows, rebalancing and index transition costs are estimates based on standard market assumptions about trading costs and not actual realised costs, and are therefore uncertain in nature.

The estimated relative return of a passive strategy since inception is -7 basis points. Over the last three years, however, a passive strategy would have been expected to perform in line with the benchmark, with relevant costs being around the same level as the revenues that could be generated from securities lending.

Comparing the fund's relative return after management costs with the estimated relative return of a passive strategy, the estimated relative return difference since inception is 26 basis points. Measured over the last five and three years the difference is estimated at 23 and 35 basis points respectively.

The fund's relative return after management costs

	3 years	5 years	Since inception
The fund's relative return before management costs	40	27	27
The fund's management costs	-6	-6	-9
The fund's relative return after management costs	**34**	**21**	**19**

Estimated relative return of a passive strategy

	3 years	5 years	Since inception
Management costs of a passive strategy	-3	-3	-5
Revenues from securities lending	5	5	6
Transaction costs related to replication of the benchmark index	-2	-3	-4
Transaction costs related to inflows and extraordinary benchmark changes	0	-1	-5
Estimated relative return of a passive strategy	**0**	**-2**	**-7**

Cost-adjusted relative return comparison

	3 years	5 years	Since inception
The fund's relative return after management costs	34	21	19
Estimated relative return of a passive strategy	0	-2	-7
Estimated relative return difference	**35**	**23**	**26**

Relative risk

Deviations from the benchmark are sources of relative risk. There are various approaches to measuring relative risk in the fund.

The composition of the fund differs from its benchmark index along several dimensions including currencies, sectors, countries, regions, individual stocks and bond issuers, as well as having investments in unlisted real estate. These deviations from the benchmark are sources of relative risk.

The mandate issued by the Ministry of Finance was changed with effect from 1 January 2017. All the fund investments, including unlisted real estate, are now included in the calculation of expected relative volatility and measured against the fund's benchmark index, which comprises global equity and bond indices. The scope for deviation from the benchmark is regulated by the Ministry of Finance and Norges Bank's Executive Board.

Expected relative volatility

The limit for expected relative volatility, or tracking error, is a restriction on how much the return on the fund's investments can be expected to deviate from the return on the benchmark index. This restriction is set out in the management mandate laid down by the Ministry of Finance. A significant change in 2017 was the re-definition of the treatment of real estate investments, which are now included in the measurement against the actual benchmark. The limit for expected relative volatility for the fund remained at 1.25 percentage points. The expected relative volatility, using a three-year price history, was 33 basis points at the end of 2017. Estimated by historical simulations of the current portfolio, the expected relative volatility using a ten-year price history was 45 basis points. Within this ten-year period, the highest expected relative volatility of a consecutive three-year period is 65 basis points and the lowest 29 basis points. The fund's expected relative volatility over the last 18 years has on average been 39 basis points.

Relative risk can be decomposed and calculated for the asset classes of the fund. The expected relative volatility of the equity investments was 42 basis points at the end of 2017, while that of the fixed-income investments was 39 basis points. The historical average expected relative volatility over the last ten years has been 52 and 60 basis points, respectively, for the equity and fixed-income investments.

Relative volatility can also be estimated for the fund's established investment strategies. These calculations are performed for one strategy at a time, assuming that the rest of the fund is invested in line with the respective benchmarks. The fund's expected relative volatility is lower than the sum of the relative volatilities of the investment strategies, reflecting diversification effects.

Relative risk contribution to equity investments as at 31 December 2017. Basis points

Sector	Relative volatility contribution
Financials	14
Oil and gas	7
Industrials	5
Basic materials	4
Consumer goods	3
Health care	3
Telecommunications	2
Consumer services	2
Technology	1
Utilities	0
Cash and derivatives	1
Total equities	**42**

Relative risk contribution to fixed-income investments as at 31 December 2017. Basis points

Sector	Relative volatility contribution
Government bonds	38
Government-related bonds	-27
Inflation-linked bonds	9
Corporate bonds	12
Securitised bonds	-2
Cash and derivatives	10
Total fixed income	**39**

Expected relative volatility of investment strategies as at 31 December 2017. Each strategy measured stand-alone with the other strategies positioned in-line with the benchmarks. All numbers measured at fund level. Basis points

Strategy	Equity	Fixed income	Unlisted real estate	Cross asset allocation	Total
Fund allocation	**18**	**11**	**16**	**1**	**27**
Internal reference portfolio	14	10		0	15
of which systematic factors	9				9
of which universe expansion	10	6			11
Real estate	7		16		21
Allocation decisions	6	3		1	6
Security selection	**14**	**2**			**14**
Internal security selection	11	2			11
External security selection	6				6
Asset management	**7**	**2**		**4**	**9**
Asset positioning	7	2		4	9
Total	28	12	16	4	33

Expected shortfall

Expected relative volatility is an estimate of what happens under normal market conditions, but provides no information about the distribution and magnitude of less probable outcomes (tail risk). Expected shortfall, also called conditional value at risk, is a widely used tail risk measure. It shows the average expected loss in the worst q percent of observations, where q is the tail probability and equivalent to one minus the specified confidence level. The expected shortfall for the fund's portfolio at a 97.5 percent confidence level shows an expected annual negative deviation from the benchmark of 1.48 percentage points. The calculations are based on simulated relative returns in the currency basket over the last ten years. The Executive Board has set a limit for expected shortfall between the return on the fund and the benchmark index. With effect from 1 January 2017, investments in unlisted real estate have also been included in the calculations. The fund is to be managed with the aim that the expected negative relative return in extreme situations shall not exceed 3.75 percentage points.

Expected relative volatility and expected shortfall of equity investments and fixed-income investments versus benchmark indices as at 31 December 2017. Equity and fixed-income instruments measured versus market value of each asset class. Measured in the fund's currency basket. Basis points

	Expected relative volatility 3-years price history	Expected relative volatility 10-years price history	Expected shortfall 10-years price history
Fund	33	45	148
Equity	42	43	110
Fixed income	39	50	143

Expected relative volatility and expected shortfall relative to benchmark of investment strategies as at 31 December 2017. Each strategy measured stand-alone with the other strategies positioned in-line with the benchmarks. Measured in the fund's currency basket. Basis points

	Expected relative volatility 3-years price history	Expected relative volatility 10-years price history	Expected shortfall 10-years price history
Fund allocation	**27**	**37**	**116**
Internal reference portfolio	15	18	49
of which systematic factors	9	9	26
of which universe expansion	11	11	34
Real estate	21	31	100
Allocation decisions	6	8	19
Security selection	**14**	**15**	**40**
Internal security selection	11	13	32
External security selection	6	7	20
Asset management	**9**	**14**	**47**
Asset positioning	9	14	47
Total	33	45	148

Fiscal strength and environment related mandates

The mandate from the Ministry of Finance requires Norges Bank to take fiscal strength into account in its government bond investments. The expected relative volatility of this requirement, measured at fund level, was estimated to be 1 basis point at the end of 2017, and 4 basis points when measured at asset class level. The expected shortfall was estimated at year-end to be 7 basis points at fund level, and 23 basis points at asset class level.

The mandate also requires Norges Bank to establish environment-related mandates with a market value that is normally in the range of 30–60 billion kroner. The expected relative volatility of this requirement was estimated to be 3 basis points at the end of 2017, when measured at fund level, and 4 basis points, measured at asset class level. The expected shortfall was estimated to be 13 basis points at fund level, and 20 basis points at asset class level.

Benchmark overlap

Benchmark overlap is an alternative relative risk measure that shows how closely the portfolios match the benchmark index. In line with the management mandate from the Ministry of Finance, Norges Bank's Executive Board has set a limit for minimum overlap between the equity and fixed-income portfolios and their corresponding benchmark indices of 60 percent. At the end of Q3 2017, the benchmark overlap was 82.3 percent at security level for equities and 72.6 percent at issuer level for fixed income. Over the last ten years, the equity benchmark overlap has been relatively stable in the 80 to 90 percent range. The fixed-income overlap started at a low level before the financial crisis, but increased sharply after 2008 as a result of portfolio restructuring and new mandate requirements for minimum benchmark overlap. In recent years, it has been in the 70 to 80 percent range.

Distribution of realized relative return

Another approach to relative risk is to analyse the characteristics of the distribution of the fund's realised relative return. The standard deviation of the fund's realised monthly relative returns, measured in the fund's currency basket, has been 11 basis points over the last five years. This is less than over longer sample periods and particularly the previous five-year period, which included the financial crisis of 2008-2009. The fund's relative return has been less skewed over the last five years than in previous periods. Excess kurtosis has also been lower in the most recent five-year period, with fewer instances of very large monthly relative return figures than in previous periods.

Characteristics of the distribution for realised monthly relative return. Measured in the fund's currency basket

	Since 1998[1]	Last 10 years	Last 5 years	Last 3 years
Fund[2]				
Standard deviation (percent)	0.20	0.26	0.11	0.09
Skewness	-2.30	-2.04	-0.35	-0.87
Excess kurtosis	17.31	11.32	1.04	1.49
Equity investments				
Standard deviation (percent)	0.23	0.20	0.13	0.12
Skewness	-0.75	-3.54	-0.94	-0.99
Excess kurtosis	9.86	23.88	1.48	2.01
Fixed-income investments				
Standard deviation (percent)	0.30	0.41	0.14	0.12
Skewness	-0.59	-0.42	-0.09	-0.26
Excess kurtosis	16.69	7.84	-0.13	-0.41

[1] Equity investments since 01.01.1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Characteristics of the distribution for realised monthly relative return. Five-year periods. Measured in the fund's currency basket

	1998 - 2002[1]	2003 - 2007	2008 - 2012	2013 - 2017
Fund[2]				
Standard deviation (percent)	0.12	0.12	0.35	0.11
Skewness	0.79	-1.44	-1.68	-0.20
Excess kurtosis	2.44	4.47	6.18	0.68
Equity investments				
Standard deviation (percent)	0.29	0.22	0.24	0.13
Skewness	1.03	-0.23	-3.62	-0.88
Excess kurtosis	3.10	0.54	20.37	1.26
Fixed-income investments				
Standard deviation (percent)	0.09	0.11	0.57	0.14
Skewness	-0.55	-3.48	-0.45	-0.11
Excess kurtosis	11.49	13.73	3.56	-0.27

[1] Equity investments since 01.01.1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Risk adjustments

There are various risk-adjusted performance measures and factor-adjusted regression analysis of returns. Risk-adjusted performance measures aim to standardise performance results by accounting for the risks taken when obtaining these returns. Even when using risk-adjusted performance measures to compare asset managers, the differences in their investment mandates should be kept in mind.

Relative risk adjustment

When performing relative risk adjustments, the fund's benchmark serves as a reference point. This is a natural approach given the central role of the benchmark in the investment mandate of the fund.

Information ratio

The information ratio divides the mean of the portfolio return relative to the benchmark by the standard deviation of the relative return (tracking error). The information ratio measures both return and risk in terms of deviations from the benchmark. Since inception, the fund has been constrained by an official tracking error limit versus its benchmark. By using tracking error as the risk measure, the information ratio therefore serves as a natural starting point for risk-adjusted return analysis.

The information ratio for the fixed-income investments was lower than the information ratio for the equity investments and the total fund in most periods. This was due to both a lower mean of relative returns and a greater volatility of relative returns. The fixed-income information ratio was higher in the 2008-2012 period containing the financial crisis than the 5-year periods before and after, as the large negative relative returns during the financial crisis were offset by strong performance in the period that followed. The opposite pattern holds for the equity investments with lower information ratio in the period 2008-2012 compared to 2003-2007 and 2013-2017. Further, the other risk-adjusted measures: Jensen's alpha, appraisal ratio and the Sharpe ratio difference do not show the same pattern for the fixed-income investments as they indicate improved performance in the most recent 5 years.

Jensen's alpha

Under the assumptions of the Capital Asset Pricing Model (CAPM), all differences in expected return are explained by beta. Beta measures systematic risk and is estimated using a regression of the portfolio returns in excess of the risk-free rate on the benchmark's excess returns. Jensen's alpha is the residual average return after correcting for the portfolio's beta. Again, the benchmark is used for risk adjustment. Jensen's alpha assumes that the only relevant risk is the risk that cannot be diversified away, whereas the Sharpe ratio assumes that total risk is the relevant measure.

While the CAPM theoretically should be able to price all assets, it should be noted that it is most commonly applied to equities. Considering equity and fixed-income investments separately, Jensen's alpha was positive for all periods shown in the table before management costs. For the fund, the sign of Jensen's alpha depends more on the evaluation period. The periods containing the financial crisis in 2008-2009 stand out in particular. The differences between the fund and the equity and fixed-income investments viewed alone suggest a change in the degree of co-movement between the two markets in these periods.

Relative risk-adjusted measures. Before management costs. Annualised

	Since 01.01.1998[1]	Last 10 years	Last 5 years	Last 3 years
Fund[2]				
Information ratio	0.41	0.20	0.67	1.12
Jensen's alpha (percent)	0.08	-0.19	0.11	0.30
Appraisal ratio	0.14	-0.27	0.30	0.89
Sharpe ratio difference	0.01	-0.02	0.02	0.04
Equity investments				
Information ratio	0.67	0.33	0.76	1.17
Jensen's alpha (percent)	0.42	0.07	0.11	0.33
Appraisal ratio	0.58	0.12	0.25	0.86
Sharpe ratio difference	0.03	0.00	0.01	0.03
Fixed-income investments				
Information ratio	0.15	0.15	-0.02	0.34
Jensen's alpha (percent)	0.17	0.22	0.26	0.31
Appraisal ratio	0.16	0.15	0.65	0.93
Sharpe ratio difference	0.01	-0.03	0.08	0.10

[1] Equity investments since 01.01.1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Relative risk-adjusted measures. Before management costs. Annualised

	1998 - 2002[1]	2003-2007	2008-2012	2013-2017
Fund[2]				
Information ratio	0.96	0.91	0.09	0.67
Jensen's alpha (percent)	0.43	0.16	-0.15	0.11
Appraisal ratio	1.03	0.41	-0.17	0.30
Sharpe ratio difference	0.07	0.03	-0.01	0.02
Equity investments				
Information ratio	0.87	1.07	0.13	0.76
Jensen's alpha (percent)	1.03	0.53	0.09	0.11
Appraisal ratio	1.06	0.72	0.13	0.25
Sharpe ratio difference	0.06	0.05	0.00	0.01
Fixed-income investments				
Information ratio	0.52	0.08	0.22	-0.02
Jensen's alpha (percent)	0.16	0.05	0.15	0.26
Appraisal ratio	0.52	0.13	0.08	0.65
Sharpe ratio difference	0.05	0.02	-0.11	0.08

[1] Equity investments since 1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Appraisal ratio
The appraisal ratio is similar to the Sharpe ratio, but instead of measuring the total risk/return trade-off, it is computed after removing systematic risk. For the fund, this corresponds to adjusting risk and return for variability stemming from the benchmark. The appraisal ratio is estimated by dividing Jensen's alpha by the standard deviation of the residuals from the CAPM regression.

The sign of the appraisal ratio is naturally the same as the sign of Jensen's alpha. In the first periods, the appraisal ratio was higher for equity investments than for fixed-income investments while the reverse was true for the most recent 5-year period. However, as indicated above, care should be taken when evaluating risk using the CAPM for fixed-income investments.

Absolute risk adjustments
When performing absolute risk adjustments, the fund's benchmark and risk restrictions play no role. The performance measures are therefore reported separately for the portfolio and the benchmark, and the levels can then be compared.

Sharpe ratio
The Sharpe ratio is a widely used risk-adjusted performance measure. The Sharpe ratio is computed by dividing the average portfolio return in excess of the risk-free rate by the standard deviation of portfolio returns. A higher Sharpe ratio indicates a higher expected reward per unit of total risk. The Sharpe ratio measures absolute risk-adjusted performance and ranks portfolios based on the estimated trade-off between total risk and return. The Sharpe ratio difference reflects this ranking and captures the change in performance relative to the benchmark.

Across all periods, the Sharpe ratio for the fund was similar to the benchmark's Sharpe ratio. This is a consequence of the fund having limited scope to deviate from the benchmark. While the fund had higher volatility of returns than the benchmark, the average fund return also tended to be higher, resulting in similar reward-to-variability ratios and consequently small differences in Sharpe ratio.

Since periods that include the financial turmoil of 2008-2009 were characterised by both lower average returns and higher volatility of returns, the Sharpe ratios for both the fund and the benchmark in these periods were lower than for other periods. The negative Sharpe ratios in the period 1998-2002 reflect the relatively high risk-free rate compared to the average returns of the fund's investments and the benchmark index.

The equity investments' Sharpe ratio was also close to the Sharpe ratio for the benchmark index for all periods, with both ratios displaying significant variation across time. For both the equity investments and the benchmark, the Sharpe ratios were lower than the ratios for the fund.

Although the fixed-income investments often had lower average returns than the equity investments, the returns were also less volatile resulting in higher Sharpe ratios in periods such as 2008-2012, which includes the financial crisis. Comparing the fixed-income investments with the benchmark, the relative performance again depends on the evaluation period, although the Sharpe ratios tend to move closely together.

Absolute risk-adjusted measures. Before management costs. Annualised

	Since 01.01.1998[1]	Last 10 years	Last 5 years	Last 3 years
Fund[2]				
Standard deviation of investments (percent)	7.38	9.15	6.13	6.57
Standard deviation of benchmark (percent)	6.99	8.58	6.02	6.48
Sharpe ratio of investments	0.57	0.65	1.41	1.03
Sharpe ratio of benchmark	0.56	0.67	1.40	0.99
Equity investments				
Standard deviation of investments (percent)	14.35	15.22	9.47	10.37
Standard deviation of benchmark (percent)	14.01	14.83	9.26	10.18
Sharpe ratio of investments	0.36	0.42	1.28	0.91
Sharpe ratio of benchmark	0.33	0.41	1.27	0.87
Fixed-income investments				
Standard deviation of investments (percent)	3.34	3.61	2.74	2.92
Standard deviation of benchmark (percent)	3.20	3.33	2.99	3.13
Sharpe ratio of investments	0.86	1.15	1.04	0.83
Sharpe ratio of benchmark	0.84	1.19	0.95	0.73

[1] Equity investments since 01.01.1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Absolute risk-adjusted measures. Before management costs. Annualised

	1998 - 2002[1]	2003 - 2007	2008 - 2012	2013 - 2017
Fund[2]				
Standard deviation of investments (percent)	6.13	3.82	11.31	6.13
Standard deviation of benchmark (percent)	6.02	3.66	10.46	6.02
Sharpe ratio of investments	-0.12	1.51	0.30	1.41
Sharpe ratio of benchmark	-0.19	1.47	0.31	1.40
Equity investments				
Standard deviation of investments (percent)	16.88	9.24	19.11	9.47
Standard deviation of benchmark (percent)	16.55	9.00	18.60	9.26
Sharpe ratio of investments	-0.44	1.38	0.05	1.28
Sharpe ratio of benchmark	-0.50	1.32	0.04	1.27
Fixed-income investments				
Standard deviation of investments (percent)	3.06	3.04	4.27	2.74
Standard deviation of benchmark (percent)	3.05	3.10	3.62	2.99
Sharpe ratio of investments	0.67	0.36	1.27	1.04
Sharpe ratio of benchmark	0.62	0.34	1.38	0.95

[1] Equity investments since 1999.
[2] Based on aggregated equity and fixed-income investments until end of 2016.

Factor-adjusted return
The analyses introduced here involve multivariate regressions of relative returns against sets of historical factor return series. Estimated regression coefficients are interpreted as active exposures to systematic factors over the historical period. Regression intercepts can be interpreted as performance attributable to manager value creation over and above the exposure to the set of factors considered in the regression. All regressions are conducted using relative returns before management costs and factor returns in dollars. The regressions for the fund's relative return are based on the aggregated equity and fixed-income investments until the end of 2016. Additional information and regressions, including analyses based on relative return data after management costs, are available in the appendix published on our website nbim.no.

For equity investments, the factor set used is the five-factor model of Fama and French (2015) and factor return data are global research factors downloaded from Kenneth French's website. In these regressions, factors explain between 35 and 45 percent of the variability in the relative returns of equity investments for the three periods: since inception, last ten years and last five years. The relative returns of equity investments are estimated to have had positive active exposures to the market factor (MKT) and the small firm factor (SMB), and a negative active exposure to the investment factor (CMA) both for the full sample period and for the last ten-year period. In the last five-year period, only the market factor is significant at conventional statistical confidence levels.

For fixed-income investments, the factor set is based on Fama and French (1993), who use a default factor and a term factor. The factor return data have been calculated by Norges Bank Investment Management, based on Bloomberg Barclays Indices data. Both have been constructed as global factors, and the default factor has been adjusted to take duration differences in the credit and government segments of the fixed-income benchmark into account. The construction of global factors introduces sovereign risk into the term factor due to differences in currency composition between global long-maturity and global short-maturity indices. This is discussed in more detail in the appendix. In the fixed-income regressions, factors explain between 28 and 41 percent of the variability in the relative returns. The relative returns of fixed-income investments are estimated to have had exposure to the default premium factor over the full sample period and the last ten-year period. Over the last five-year period, only the regression coefficient for the negative term premium is significant at conventional statistical confidence levels.

For the fund, the factor set is the combination of the factors used for each asset class. In these regressions, factors explain 55 to 65 percent of the variability in relative returns and the signs of the estimated exposures are qualitatively in line with the results for the asset classes. However, the profitability (RMW) coefficient is positive for the last 5 and 10 years, and the value (HML) coefficient is positive since inception.

Equity investments. Regression analysis of relative return in dollars before management costs

		Regression coefficients					
Sample period	Intercept, bps annualised	Market (MKT)	Small vs large (SMB)	Cheap vs expensive (HML)	Profitable vs unprofitable (RMW)	Conservative vs aggressive investment (CMA)	Variance explained in percent (R squared)
Since 01.01.1999	**37**	**0,02**	**0,05**	-0,01	0,01	**-0,02**	45
Last 10 years	23	**0,02**	**0,03**	0,00	-0,02	**-0,04**	45
Last 5 years	24	**0,01**	0,01	0,01	-0,03	-0,03	35

Source: Norges Bank Investment Management, Kenneth French. Bold indicates significant at 5 percent confidence level.

Fixed-income investments. Regression analysis of relative return in dollars before management costs

Sample period	Intercept, bps annualised	Regression coefficients: Default (duration adjusted)	Regression coefficients: Term	Variance explained in percent (R squared)
Since 01.01.1998	12	**0.07**	-0.01	28
Last 10 years	6	**0.09**	-0.02	35
Last 5 years	19	0.00	**-0.05**	41

Source: Norges Bank Investment Management, Bloomberg Barclays Indices. Bold indicates significant at 5 percent confidence level.

Equity and fixed-income investments. Regression analysis of relative return in dollars before management costs.

Sample period	Intercept, bps annualised	Regression coefficients							Variance explained in percent (R squared)
		Market (MKT)	Small vs large (SMB)	Cheap vs expensive (HML)	Profitable vs unprofitable (RMW)	Conservative vs aggressive investment (CMA)	Default (duration adjusted)	Term	
Since 01.01.1998	7	**0,02**	**0,03**	0,01	**0,02**	**-0,02**	**0,03**	-0,01	55
Last 10 years	-1	**0,02**	**0,04**	0,02	0,02	**-0,04**	**0,03**	-0,01	65
Last 5 years	17	**0,01**	**0,02**	0,00	0,01	0,01	0,01	**-0,04**	60

Source: Norges Bank Investment Management, Kenneth French, Bloomberg Barclays Indices. Bold indicates significant at 5 percent confidence level.