

Report No. 27 to the Storting

(2012–2013)

Report to the Storting (white paper)

The Management of the Government Pension Fund in 2012

*Recommendations of the Ministry of Finance of 12 April 2013,
approved by the Council of State on the same day.*

Preliminary and unofficial translation

1 Introduction

With effect from 1 January 2006, the Government Pension Fund was established as a superstructure encompassing the Government Pension Fund Global (GPFG) and the Government Pension Fund Norway (GPFN). The Government Pension Fund has no governing bodies or employees of its own, and is not a separate legal entity. The GPFG and the GPFN are managed by Norges Bank and Folketrygdfondet, respectively, under mandates set by the Ministry of Finance.

In this report, the Ministry of Finance presents management performance and assessments of the Government Pension Fund for 2012. Assessments of the investment strategy are also presented, and an account is given of the efforts made to further develop the management framework.

Good results

The Fund performed well in 2012. The return on the GPFG was 13.4 percent and the return on the GPFN was 12.2 percent, before the deduction of management costs. The return on the GPFG is measured in the currency basket of the Fund, whilst the return on the GPFN is measured in Norwegian kroner. The active management of both Norges Bank and Folketrygdfondet delivered a positive contribution to returns in 2012. The management costs associated with the GPFG and the GPFN, accounted for 0.06 percent and 0.09 percent of fund assets, respectively. The overall value of the Government Pension Fund was NOK 3,961 billion at the end of 2012; an increase in value of NOK 520 billion from the beginning of that year.

The performance reflects the favourable developments in global equity and bond markets in 2012. Equity prices appreciated over the year as the result of, *inter alia*, monetary policy measures in the Euro zone that contributed to increased risk appetite on the part of investors. Moreover, declining yields on long-term government bonds contributed to higher bond prices and returns.

Future economic developments are still subject to considerable uncertainty globally. Going forward, one needs to be prepared for significant fluctuations in the value of the Fund.

Returns in 2012 were considerably higher than the long-term expectations of the Ministry, although well within what must be characterised as normal year-by-year return fluctuations. The average annual return before management costs from January 1998 to December 2012 was 5.0 percent for the GPFG and 6.6 percent for the GPFN. Returns have fluctuated considerably. Over this 15 year period, the annual return on the

GPFG has varied between -23 percent and 26 percent, whilst the annual return on the GPFN has varied between -25 and 34 percent.

The average real rate of return on the GPFG from January 1997 to December 2012 was 3.2 percent, net of inflation and management costs, compared to 2.7 percent at yearend 2011. The realised real rate of return is fairly close to the 4-percent real rate of return expected in the long run, given normal fluctuations in average returns.

Fund performance since 1998 reflects the fact that bond returns have been historically high over this period, and exceeded those on equities. This means that investors have not been compensated for the risk associated with the fact that the value of equities tends to be more volatile than bonds. The interest rate level has declined over the last 15 years. At the same time, the financial markets have suffered a number of major crises.

Although the overall return on the Fund varies considerably from year to year, the recurring income from equities, bonds and real estate in the form of dividends, coupons and rent is more stable. At present, the recurring income of the GPFG is in the range of NOK 110 billion per year, or about 3 percent of the fund capital, whilst the recurring income of the GPFN is about NOK 6 billion, or close to 4.5 percent of its capital.

The aggregate return on the GPFG's investments since the initial capital contribution in 1996 was NOK 1,087 billion, net of management costs, at the end of 2012. The aggregate return on investments made through the GPFN since January 1998 was NOK 136 billion. The high return in NOK relative to the current size of the GPFN must be seen in the context of the repayment of 101,8 bn NOK worth of account loans to the Treasury in December 2006. This just about halved the GPFN's capital.

The Ministry is committed to cost-effective management of the Government Pension Fund. Comparisons with other funds show that the management costs of the GPFG and the GPFN are relatively low. From 1999 to 2012, the annual management costs of the GPFG have declined from 0.09 percent of the capital to 0.06 percent, whilst those of the GPFN have increased from 0.02 percent to 0.09 percent. The increase in the management costs of the GPFN must be seen in the context of the aforementioned reduction in assets under management in 2006, and a significant cost increase associated with new governance systems at Folketrygdfondet, cf. Report No. 15 (2010-2011) to the Storting - The Management of the Government Pension Fund in 2010.

Further development of the investment strategy

The investment strategy of the Government Pension Fund is based on the Fund's purpose, assumptions regarding the functioning of the financial markets, as well as the special characteristics and comparative advantages of the Fund. The strategy t is

premised on seeking the maximum possible return over time, given a moderate level of risk. The Ministry emphasises the Fund's role as a responsible investor. Good long-term financial return is assumed to depend on sustainable development in economic, environmental and social terms, and on well-functioning, efficient and legitimate markets.

The Government Pension Fund has a very long investment horizon. The Fund has no clearly defined liabilities, and it is unlikely that the State will need to withdraw large amounts from the Fund over a short period of time. Generally speaking, these characteristics give the Fund a greater ability to absorb risk than many other investors.

The investment strategy of the Fund is characterised, in particular, by seeking to exploit the long investment horizon of the Fund and profiting from risk premiums over time, by the investments being widely diversified, as well as by responsible investment practices, cost effectiveness, a moderate element of active management and a clear governance structure. The investment strategy of the GPFG is outlined in more detail in chapter 2 of this report, whilst the strategy of the GPFN is discussed in chapter 3.

The investment strategy of the Fund is based on assessments of expected return and risk in the long run and the assumption that one has to accept a certain degree of risk to achieve a satisfactory expected return over time. Experience gained from the management of both the GPFG and the GPFN in recent years has demonstrated that one needs to be prepared for periods of considerable market volatility, during which the investments of the Fund may fluctuate significantly in value. One has managed to maintain the investment strategy even though there have been major fluctuations in the Fund's return. Section 2.5 of the report takes a closer look at analyses of the risk associated with the GPFG.

Over time, a number of important decisions have been made in refining the strategy of the GPFG. The investments of the Fund have gradually been expanded to include new asset classes, countries and companies. By increasing the equity portion from 40 percent to 60 percent, both expected return and risk have increased.

In Report No. 15 (2010-2011) to the Storting - The Management of the Government Pension Fund in 2010, the Ministry outlined some perspectives on further developing the strategy of the GPFG. It was noted, *inter alia*, that the GPFG holds a significantly smaller portion of investments in private equity and infrastructure than do other major funds internationally. Furthermore, it was noted that the size and long investment horizon of the Fund make it appropriate to consider such investments. At the same time, the assessment was that it is uncertain whether the GPFG would be able to achieve a satisfactory risk-adjusted return on such investments, net of costs. The

Ministry emphasised that one should first gain experience from the largest and most developed unlisted market; the market for real estate. At the same time it was pointed out that the GPFG's characteristics make it appropriate to return to the question about private equity and infrastructure at a later stage.

In 2012, the Ministry adopted a number of changes to the investment strategy of the GPFG; cf. Report No. 17 (2011-2012) to the Storting - The Management of the Government Pension Fund in 2011. A new, simplified benchmark index was introduced for the fixed income portfolio. Some types of government-related and securitised bonds were removed from the benchmark index, whilst it was expanded to include government bonds from emerging economies. A new geographical distribution was adopted for the equity benchmark index, implying a wider distribution of these investments. Overall, these changes amounted to a shift in the distribution of the benchmark indices across geographical regions. The changes are being implemented over time. In the autumn of 2012, the Ministry adopted a new rule for rebalancing of the GPFG, which entailed simplifications and increased management transparency; cf. Report No. 1 (2012-2013) to the Storting – The National Budget for 2013.

This year's report does not present plans for major changes to the investment strategy of the Fund. On the other hand, the report discusses various aspects of the strategy and reports and follows up on decisions made in recent years.

One theme in this year's report is the composition of the equity investments of the GPFG and characteristics of strategies that seek to exploit systematic risk factors. One example of such a factor is "value", which reflects the observation that companies with low valuations have over time delivered higher returns than companies with high valuations. Another example is "size", which reflects the observation that small companies have over time delivered higher returns than large companies (measured by market capitalisation). Analyses of systematic risk factors in the equity portfolio of the Fund and a discussion of how one might implement investments focused on such risk factors, is found in section 2.2.

The Ministry's assessment is that the benchmark index of the GPFG should not be adjusted for systematic risk factors. Any strategies for exploiting systematic risk factors should form part of the operational management of Norges Bank.

Another theme of this report is whether the fixed income benchmark index of the GPFG should be further simplified by removing so-called inflation-linked bonds, in line with the advice given by Norges Bank in its letter of 9 August 2012 to the Ministry. This issue is discussed in section 2.3. The analyses conducted by the Ministry thus far indicate that such bonds should continue to form part of the GPFG benchmark index.

However, one may want to revisit the issue at a later date, from the perspective of a comprehensive assessment of how changes in inflation may influence the overall risk and return characteristics of the Fund.

Norges Bank is in the process of building up a real estate investment portfolio in the GPFG. In section 2.4, the Ministry presents analyses of risk and return that compare different methods of implementing real estate investments. The analysis addresses investments in both unlisted and listed real estate.

Responsible investment practice

The Ministry is committed to managing the assets of the Government Pension Fund in a responsible manner. The asset management must therefore be organised in a way that achieves good long-term return, whilst at the same time maintains the Fund's role as a responsible investor.

Responsible investment, including the exercise of ownership rights and the observation and exclusion of companies, forms an integrated part of the management of the Fund and is discussed in detail in section 4.4. Considerable experience has been gained through work within this area over the last decade, and the responsible investment strategy has been developed over time. In 2004, ethical guidelines were introduced. The guidelines were evaluated in 2009. The evaluation indicated that more emphasis should be given to the potential for contributing to positive change in the conduct of companies and that the interaction between exercise of ownership rights and exclusion of companies should be strengthened. 2010 saw the establishment of a new mandate for responsible investment to Norges Bank and new guidelines on observation and exclusion.

It is the ambition of the Ministry that all aspects of the management of the GPFG and the GPFN shall be in line with best practice internationally. The Ministry is therefore committed to the further development of the responsible investment strategy; see also Report No. 17 (2011-2012) to the Storting.

In January 2013, the Ministry instructed the Strategy Council for the GPFG to prepare a report on the overall responsible investment strategy of the Fund. Valuable expertise has been accumulated by the Council on Ethics, Norges Bank and the Ministry of Finance. In its report, the Strategy Council will, *inter alia*, examine how the collective resources and expertise can best be utilised to strengthen the responsible investment work further. An important premise underpinning the work is an ambition to eliminate any deviations from best practice internationally, thus placing the Fund at the forefront of developments. The Council may propose any changes it believes can strengthen the work on responsible investment, including operational and institutional changes. The

report will be submitted in the autumn of 2013. The mandate of the Strategy Council is addressed in further detail in section 4.4 of this report.

Transparent management and a strategy which enjoys widespread support

It is important for the management of the Government Pension Fund to enjoy widespread support, thus enabling us to adhere to the long-term strategy, especially during times of market volatility. Prudent long-term management is necessary to ensure that the revenues originating from the petroleum resources will benefit both current and future generations.

The Ministry emphasises that the risk in the management of the fund is communicated, managed and controlled in a clear and effective manner. Nonetheless, experience shows that it is challenging to uncover all types of risk. Section 4.3 addresses verifications of return data and independent control of frameworks and processes for the management and control of risk.

Transparency is a prerequisite for securing widespread confidence in the management of the Government Pension Fund. The Ministry seeks to facilitate a broad-based debate on important aspects of the Fund's investment strategy. Material changes are submitted to the Storting. A thorough decision-making process is a strength of the investment strategy.

Alongside the reporting of Norges Bank and Folketrygdfondet, this report is intended to contribute to transparency and broad-based debate concerning the management of the Fund.

2 The investment strategy of the Government Pension Fund Global

2.1 The background to the investment strategy

2.1.1 Developments over time

The investment strategy of the GPFG has been developed over time and is based on comprehensive professional assessments. Key decisions in the development of the strategy have been submitted to the Storting. Figure 2.1 shows milestones in the development of the investment strategy.

1996	First capital inflow to the Fund
1998	Equities included in the benchmark, with a 40 percent weight
2000	Some emerging markets included in the equity benchmark
2002	Decision to include non-government guaranteed bonds in the fixed income benchmark
2004	Additional emerging markets included in the equity benchmark Ethical guidelines adopted
2007	Decision to increase equity portion from 40 to 60 percent Small-cap added to equity benchmark
2008	Decision to invest up to 5 percent in real estate Inclusion of all emerging equity markets as per FTSE's classification
2009	Evaluation of ethical guidelines
2010	Real estate investment guidelines adopted Evaluation of active management
2011	First investment in real estate
2012	New fixed income benchmark New geographical distribution of the equity benchmark New rebalancing rules

Figure 2.1 Milestones in the development of the GPFG investment strategy

Source: Ministry of Finance.

The Government Petroleum Fund was established in 1990, upon the enactment of the Petroleum Fund Act by the Storting. The first net transfer of capital to the Fund

was made in May 1996 against the background of a fiscal account surplus for 1995. Until 1998, the fund capital was invested in government bonds from eight countries.

In 1998, equities were included in the benchmark index of the Fund, with the initial equity portion being 40 percent. The investment universe was expanded to include 21 countries. Two years later, in 2000, some emerging markets were also included in the equity benchmark. The fixed income benchmark was expanded through the inclusion of non-government guaranteed bonds from 2002.

In 2001, the Ministry introduced an arrangement for the exclusion of investments on the basis of human rights violations, based on advice from the Petroleum Fund's Advisory Commission on International Law. In 2004, ethical guidelines for the Fund were adopted. The ethical guidelines were evaluated in 2009. This resulted in new guidelines on responsible investment; cf. the discussion in section 4.4.

In 2007, it was decided to include the small-cap segment in the equity benchmark and to increase the equity portion from 40 percent to 60 percent. The increase in the equity portion was completed in the first half of 2009. In 2008, the equity benchmark was expanded through the inclusion of all emerging stock markets as per the classification of the index provider, FTSE.

Experience from the financial crisis in 2008-2009 demonstrated that there was a need for a new evaluation of the theoretical underpinnings of active management, as well as for clarifying the role of active management as part of the overall investment strategy. Active management was therefore subjected to a comprehensive evaluation in the report submitted to the Storting in the spring of 2010. The evaluation resulted in a number of changes to the guidelines. The limit for expected relative volatility, which is of key importance in limiting the market risk associated with the Fund, was changed. At the same time, the Ministry announced regular evaluations of active management at the beginning of each term of the Storting and that such evaluations may lead to upwards or downwards adjustments in the scope of active management.

In 2008, it was decided to invest up to 5 percent of the fund capital in a separate real estate portfolio. The fixed income portion will be reduced correspondingly. Real estate investment guidelines were adopted on 1 March 2010; cf. Report No. 10 (2009-2010) to the Storting – The Management of the Government Pension Fund in 2009. The first investments were made in Europe. At the end of 2012, the real estate portfolio, which comprised investments in office and retail properties in several European countries, represented 0.7 percent of the value of the Fund. It has from the outset been the intention to permit global real estate investments. The mandate for the GPFG was amended with effect from 1 January 2013, to allow the real estate portfolio to be invested worldwide. The real estate portfolio is discussed in sections 2.4 and 4.3.1 and chapter 5.

Further changes to the investment strategy were presented in Report No. 17 (2011-2012) to the Storting - The Management of the Government Pension Fund in 2011. The purpose of these changes was to further improve the distribution of the Fund's investments across countries and geographical regions.

The report proposed a new benchmark index for the fixed income portfolio. The currency weights of the benchmark index were previously fixed at 60 percent European currencies, 35 percent North-American currencies and 5 percent currencies from Asia and Oceania. The new benchmark index excludes some sub-markets for government-related and securitised bonds. The fixed income benchmark index comprises a government fixed income portion (70 percent) and a corporate fixed income portion (30 percent). The role of the government fixed income portion is, in particular, to reduce the volatility of the Fund's returns. The country composition of this sub-index is determined by the size of each country, as measured by GDP. Moreover, a provision was added to the mandate for the GPF to the effect that Norges Bank shall seek to take account of differences in fiscal strength between countries in the composition of government bond investments. Bonds issued by corporations are expected to make somewhat more of a contribution to the expected return on the Fund as the result of, *inter alia*, an expected compensation for the credit risk associated with such investments. The corporate fixed income benchmark also includes covered bonds and is based on global market weights. In the report, the Ministry proposed that the government fixed income benchmark be expanded to include all currencies approved by the index provider, Barclays. The changes entailed a lower portion of European currencies and a higher portion of North-American and Asian currencies. The Storting endorsed these changes, cf. Recommendation No. 361 (2011-2012) to the Storting.

Plans were also proposed for a new geographical distribution of the equity benchmark, which was endorsed by the Storting. The Ministry has adopted a new equity benchmark in the wake of the deliberations of the Storting. The equity benchmark previously featured a fixed distribution, with 50 percent Europe, 35 percent America and Africa and 15 percent Asia and Oceania. The distribution between companies within each region was based on the market value of the companies. The new benchmark does not feature fixed regional weights. Instead, the geographical distribution will change in line with relative developments in the size of the world's stock markets. The portion of developed markets in Europe in the benchmark will remain somewhat higher than indicated by global market weights, whilst the portion of developed markets in North-America will be somewhat smaller. The portion accounted for by emerging markets in all regions and developed markets in Asia and Oceania will be in line with global market weights. The specific rule for determining the benchmark is set out in the mandate for the management of the GPF, which is available on the Ministry website (www.government.no/gpf).

Based on market values at the beginning of 2012, the new benchmarks implies that the portion in Europe is reduced by a total of 13 percentage points, from 54 percent to 41 percent, whilst the portion in emerging markets is increased by a total of 4 percentage points, from 6 percent to 10 percent. At the end of 2012, the overall European portion in the equity and fixed income benchmarks has been reduced to just short of 47 percent. The emerging market portion has been increased to just short of 9 percent. At yearend, adaptation of the benchmark had progressed further for bonds than for equities. European currencies then accounted for somewhat in excess of 43

percent of the fixed income benchmark, whilst the European stock market portion of the equity benchmark was just short of 49 percent. Adaptations to the new geographical distribution will continue in line with the targets outlined in Report No. 17 (2011-2012) to the Storting. It follows from the new benchmarks that the equity and corporate fixed income portions of various regions and countries will depend on market developments, whilst the government fixed income portions will depend on relative GDP developments.

Report No. 17 (2011-2012) to the Storting also presented the background to, and experience from, rebalancing of the benchmark index of the GPF. The purpose of rebalancing is to ensure that the benchmark does not deviate significantly from the strategic distribution across various asset classes over time. Rebalancing may also contribute to increasing the return on the Fund, if one sells equities when equity prices are high and purchases them when prices are low. Rebalancing does, on the other hand, involve transaction costs because, *inter alia*, the necessary trades may affect market prices. New guidelines for rebalancing the benchmark index were adopted with effect from 8 October 2012; cf. the detailed discussion in Report No. 1 (2012-2013) to the Storting – The National Budget for 2013. The equity portion shall be rebalanced back to the strategic weight of 60 percent if the equity portion of the benchmark deviates by more than four percentage points from the strategic benchmark index as per month end.

Norges Bank provides investment strategy advice to the Ministry of Finance. Advice may be provided on the initiative of the Bank or on request from the Ministry. This report discusses various pieces of advice provided by Norges Bank, as well as discussion notes prepared as background to the advice provided by the Bank. These are available on the website of the Bank (www.nbim.no).

A Strategy Council, comprising external experts, has also been appointed to evaluate the work of the Ministry and provide professional inputs to further enhance the investment strategy. The mandate and the composition of the Council vary over time. The Strategy Council for the GPF in 2013 evaluates the overall responsible investment strategy of the Fund, cf. section 4.4.5.

In addition, the Ministry commissions advice and assessments from academics and other recognised experts on relevant topics on a regular basis. This report discusses a report from MSCI on so-called systematic risk factors in the stock market, as well as a report from Professors Frank de Jong and Joost Driessen on liquidity. The reports are available on the Ministry website (www.government.no/gpf).

2.1.2 Main features of the investment strategy

The long-term investment strategy of the GPF stipulates a fixed equity portion of 60 percent. The fixed income portion was 40 percent until 2010. The mandate was changed in 2010. Over time, Norges Bank will invest up to 5 percent of the fund capital in a separate real estate portfolio. The fixed income portion will be reduced correspondingly. The distribution between equities, fixed income and real estate is reflected in the

strategic benchmark index of the Fund, cf. figure 2.2. The benchmark index constitutes a detailed description of how the fund capital would be invested if Norges Bank refrained from utilising its scope for deviating from the benchmark.

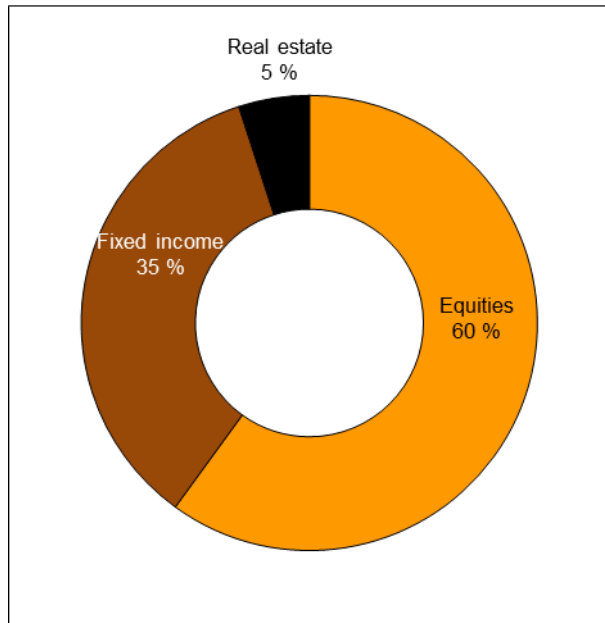


Figure 2.2 Strategic benchmark index for the GPFG. Percent

Source: Ministry of Finance.

The development of the investment strategy of the GPFG is premised on seeking to maximize the international purchasing power of the fund capital, given a moderate level of risk. The strategy is based on assessments about expected risk and return in the long run and is derived from the purpose of the Fund, the special characteristics of the Fund, as well as assumptions regarding the functioning of the financial markets.

Over time, the Ministry of Finance and Norges Bank, in their respective capacities as the owner and manager of the Fund, have developed an investment strategy with the following characteristics:

- harvesting risk premiums over time;
- diversification of investments;
- exploitation of the Fund's long investment horizon;
- responsible investment practices;
- cost effectiveness;
- a moderate degree of active management; and
- a clear governance structure

The investment strategy is based on a premise that one has to accept a certain level of risk in order to achieve a satisfactory expected return over time. This expected additional return is referred to as a *risk premium*. Equities are, for example, more risky than bonds. Investors will expect compensation for this in the form of a higher expected return on equity investments. The size of this additional return, or equity premium, is uncertain and will vary over time.

The choice of equity portion is the decision with the main impact on the overall risk associated with the Fund. Other risk premiums are, *inter alia*, related to the fixed interest rate period of bonds (term premium) and to the risk of the borrower defaulting on its liabilities (credit risk). In section 2.2 assessments of potential systematic risk factors in the stock market are discussed.

The management of the Fund is not aimed at minimising the return volatility. Such a strategy would produce a significantly lower expected return. The GPFG has a greater ability to bear risk than many other investors. This is, *inter alia*, because the Fund has no clearly defined future liabilities, as well as a very long time horizon.

When *investments are diversified* across many securities, the overall risk may become smaller than the sum of the risk associated with each individual investment. The investments of the Fund have been diversified across several asset classes over time, and the Fund is currently invested in equities, bonds and real estate. Moreover, the investments of the Fund are diversified across markets in many countries. In each market, the investments are distributed across a number of individual companies and bond issuers. The new equity and fixed income benchmark indices discussed above, as well as a global real estate investment mandate, contribute to further diversification of the investments across various countries and regions.

The investments of the GPFG are of a *long-term* nature. It is unlikely that the State will need to withdraw large sums from the Fund during a short period. The Fund is a general savings instrument, and unlike a traditional pension fund it is not earmarked for any specific liabilities. Moreover, the Fund does not depend on short-term financing, and is not subject to regulations which could force sales at undesirable points in time.

The long horizon makes it easier to endure major fluctuations in the return on the Fund from year to year. Hence, this long-term nature supports the decision to invest 60 percent of the Fund in equities. The equity investments, which give us ownership stakes in global production capacity, are expected to contribute substantially to return over time. They do, at the same time, entail increased fluctuations in fund performance.

The strategy of the GPFG also exploits its long-term nature by investing in assets which are, for short or long periods, less liquid. The market for unlisted real estate investments is an example of a large market requiring a long time horizon as the result of, *inter alia*, low liquidity. Studies of the strategies of other funds show that large investors hold larger portions of unlisted investments than do small investors. This may indicate that there are advantages of scale in the management of such investments, which may originate in both lower costs and higher returns.

The time horizon of the Fund is also exploited by pursuing a strategy in which the equity portion is maintained over time through so-called rebalancing.

The GPFG shall adopt *responsible investment practices* that promote good corporate governance and take social and environmental factors into account, in accordance with international best practice. Responsible investment practices support the goal of achieving a satisfactory return over time, in addition to being a prerequisite for ensuring that the management of the Fund is supported by the Norwegian population. The Fund's role as a responsible investor is expressed in, *inter alia*, the Guidelines on the Observation and Exclusion of Companies, of 1 March 2010. The Council on Ethics advises the Ministry on observation and exclusion, based on these guidelines. Norges Bank exercises the ownership rights of the Fund on the basis of internationally recognised principles and standards. The exercise of ownership rights shall contribute to ensuring that the interests of companies are better aligned with the interests of the GPFG as a long-term investor. Besides, Norges Bank shall integrate corporate governance, environmental and social considerations into its investment activities. Responsible investment practice is discussed in more detail in section 4.4.

The mandate stipulated for Norges Bank requires the Bank to seek to maximize the return net of *costs*. This is consistent with the stated aim of realising economies of scale in asset management. Nonetheless, the objective is not low costs per se, but high net returns. Comparisons with other large funds show that Norges Bank's management costs are relatively low. Over time, management costs as a proportion of the fund capital have fallen; cf. the discussion in section 4.1. Management costs will vary more in unlisted markets than in listed markets, and can be high. However, large investors have historically incurred lower management costs than small investors, measured as a proportion of assets under management.

The mandate for the GPFG contains a framework for the fund's management. It defines, *inter alia*, equity and fixed income benchmark indices. Most of the risk associated with the Fund over time is principally the result of developments in these benchmark indices. At the same time, the mandate also specifies the scope for deviations from the benchmarks, which implies a moderate element of *active management* of the Fund.

Norges Bank shall achieve the highest possible return within the limits set by the mandate. The Bank describes its strategy through NBIM's strategic plan. Norges Bank's fund managers use fundamental analysis of individual stocks or bonds to identify securities that are expected to generate good earnings and returns over time. When the strategic benchmark indices are changed or when the Fund receives a transfer of capital Norges Bank makes the necessary adjustments in the Fund in the most efficient way, for example by avoiding unnecessary transaction costs.

Norges Bank has developed operational benchmark portfolios for the management of the Fund, cf. the further discussion in sections 2.2, 2.3 and 4.1. These are tools for managing and communicating long-term adjustments made by the Bank in its management of the equity and fixed income investments, relative to the benchmark

index from the Ministry of Finance. The objective is to achieve a better ratio between expected return and risk, net of costs.

The management of the GPFG is premised on a *clear governance structure* in which the Storting, the Ministry of Finance, the Executive Board of Norges Bank and the asset management unit Norges Bank Investment Management (NBIM), as well as internal and external asset managers, all have different roles and responsibilities. Duties and authorisations are delegated downwards through the system, whilst reports on results and risk are passed upwards, cf. chapter 5 and Report No. 15 (2010-2011) to the Storting - The Management of the Government Pension Fund in 2010.

2.2 Systematic risk factors in the equity portfolio

2.2.1 Introduction

The management of the equity portfolio of the GPFG is premised on a benchmark index defined by the Ministry. The composition of the equity benchmark is based on a principle of market-value weights. This means that each company is included in the benchmark with a weight equal to the market value of the company as a proportion of the aggregate value of the equity market. A market-value weighted benchmark reflects the investment opportunities available to a typical investor and may be considered the average portfolio held by all investors. Developments in a market-value weighted benchmark show developments in the overall stock market value.

The risk associated with developments in the overall stock market tends to be termed market risk. Investors who are willing to accept market risk expect to be compensated in the form of higher expected returns over time than that of less risky investments. The expected additional return is often termed the stock market risk premium. The market risk premium is the key risk premium for equities.

Over time, a number of systematic return patterns for equities have been uncovered. Research shows that several different stock characteristics appear to influence their value over time. It is common to focus on characteristics like *value*, *size*, *momentum*, *liquidity* and *volatility*. These characteristics have turned out to explain the returns on a broad range of stocks, and are therefore often called systematic risk factors, cf. definitions in table 2.1.

Table 2.1 Well-known risk factors in equity markets

Risk factor	Definition
Value	Stocks of companies with low valuations (value stocks) have had a different and over time higher return than stocks with high valuations. Valuation is measured by the market value of equity relative to fundamentals like the company’s book value of equity, profits, sales or

	dividends. The value factor is calculated as the return on stocks with low valuations less the return on stocks with high valuations.
Size	Stocks of small companies have had a different and over time higher return than stocks of large companies. Size is measured by the market value of the company. The size factor is calculated as the return on stocks of small companies less the return on stocks of large companies.
Momentum	Stocks that have recently had high returns (stocks with high momentum) have had a different and over time higher return than stocks that have recently had low returns. The momentum factor is calculated as the return on stocks with high momentum less the return on stocks with low momentum.
Liquidity	Stocks that are not readily tradable (low liquidity stocks) have had a different and over time higher return than stocks that are more readily tradable. This is particularly the case when stock liquidity declines during periods of market turbulence or when the liquidity of the overall stock market declines. It is difficult to measure liquidity, and many different measures are therefore being used. The liquidity factor is calculated as the return on stocks deemed to have low liquidity less the return on stocks deemed to have high liquidity. See also box 2.3.
Low volatility	Stocks with small price fluctuations (low volatility stocks) have had a different and over time higher risk-adjusted return than stocks with large price fluctuations. By risk-adjusted return is meant the return per unit of risk, and more specifically market risk. Price fluctuations are measured as the standard deviation of stock prices. The factor low volatility is calculated as the return on stocks with low volatility less the return on stocks with high volatility.

Source: Ministry of Finance.

Statistical analyses show that tilting the composition of an equity portfolio towards these factors has delivered higher returns over time historically. For example, it has been profitable to hold somewhat more of the smallest companies and somewhat more of the stocks with the highest return preceding the time of investment. The factors have therefore received considerable attention, also in practical asset management.

Historical excess returns cannot in themselves justify expectations of future excess returns. They should be underpinned by theoretical models. However, the academic literature on systematic risk premiums shows there is no agreement as to the causes of the factors and why they have generated excess returns, cf. box 2.1 and chapter 6 in part II of this report.

Box 2.1 Underpinnings of the risk factors

There is extensive research on the underpinnings of systematic risk factors. Important points from this research include:

- Systematic risk factors are important in explaining the return differences between stocks. Similar patterns have been uncovered in a number of different markets and time periods. Most patterns have already been known for more than twenty years. Hence, systematic risk factors are well-established and robust historical phenomena.
- Over time, tilting investments towards systematic risk factors has delivered higher returns than a market value-weighted portfolio. A key issue is whether such excess returns can also be expected in the future.
- The factors describe highly dissimilar phenomena. There is no unified economic model capable of explaining all the factors simultaneously. Instead, there are several different types of explanatory models.
- Risk-based explanatory models are based on the premise that excess returns compensate for increased risk. This type of explanation appears to fit for several of the factors, including value and liquidity, but not for all of them. In particular, it has proven difficult to find good risk-based explanations for the factors momentum and low volatility.
- Behavioural models are based on psychological studies of how humans make decisions and handle information. These show, *inter alia*, that people tend to misjudge probabilities, that they do not always interpret information rationally and that it takes time for them to change their opinions. These observations are often highlighted as explanations for factors like both value and momentum.
- Models based on institutional considerations are based on the premise that asset managers do not act in perfect alignment with the interests of the capital owners. This may be due to skewed incentives in the investment mandate, and may result in asset managers adopting a more short-term perspective or assuming unnecessary risks. Such explanations appear to be of importance in explaining, *inter alia*, the low volatility factor.
- There is, generally speaking, a low degree of consensus in the literature as to the causes of these factors and whether they will produce excess returns in the future. Risk factors remain a very active field among both researchers and practitioners.

The world's capital markets are characterised by intense competition to achieve high returns. Consequently, there is little reason to expect that any excess return from risk factors can readily be exploited by an average investor. However, some investors may have special characteristics or qualities that make them better positioned to exploit various risk factors than others.

One example of a characteristic that may make investors well positioned to exploit systematic risk factors is a long time horizon for their investments. Strategies exploiting such factors may involve long periods of underperformance. Many professional asset managers would under such circumstances risk redemption and liquidation, and therefore choose to refrain from pursuing these strategies. However, long-term investors will be able to maintain their commitment to the strategy, and reap any potential excess returns over time.

In Chapter 6 in part II of this report the academic literature about systematic risk factors is presented in more detail.

2.2.2 Advice and recommendations

The work on systematic risk factors in the GPFG is a long-term effort. The Ministry has previously received advice and recommendations about risk factors from various sources.

Advice from external experts

In 2009, professors Ang, Goetzmann and Schaefer evaluated the active management of the GPFG. They found that active management had contributed significant positive excess returns until 2007, but that it delivered significant negative excess returns during the financial crisis in 2008, cf. the discussion in Report No. 10 (2009-2010) to the Storting, The Management of the Government Pension Fund in 2009. The professors noted that a major part of the excess returns delivered by active management, both before and during the financial crisis, could be explained by systematic risk factors.

Professors Ang, Goetzmann and Schaefer emphasised that they deemed it appropriate to tilt the investments in the Fund towards systematic factors, to the extent that the factors can be associated with risk premiums that a patient long-term investor may seek to reap over time. In their report, they argued that tilting investments towards systematic risk factors should be done deliberately, as part of the investment strategy of the Fund. The professors noted that if the Fund's exposure to systematic risk factors had been communicated, and if the possibility of low returns as a result of these factors were known, the losses sustained by the Fund during the financial crisis in 2008 would not have been surprising.

In 2010, the Strategy Council for the GPFG prepared a report setting out recommendations on the further development of the investment strategy of the Fund. The Council argued that the investments in the Fund should be tilted towards the factors liquidity and value, cf. the discussion in Report No. 15 (2010-2011) to the Storting, The Management of the Government Pension Fund in 2010. The Council noted that tilting the investments in this way would be consistent with the long-term objectives of the Fund.

The Council observed that investment strategies focused on the value factor are patient and supply liquidity and stability to the market. Value stocks have typically experienced price declines and waning investor interest. This makes value strategies more appropriate for long-horizon investors.

The Strategy Council noted, in its report, that the need for liquidity in the Fund is very limited. It is unlikely that the State, as the owner of the Fund, will need to withdraw large amounts within a short space of time. This gives the Fund an inherent advantage in exploiting that less liquid investments may entail higher expected returns. In 2011, the Ministry, in cooperation with the Strategy Council, held an international seminar on the investment strategy of the Fund. One of the topics was how the Fund might exploit such liquidity premiums. The conclusions from the seminar are outlined in Report No. 17 (2011-2012) to the Storting, The Management of the Government Pension Fund in 2011.

Advice from Norges Bank

Norges Bank has given advice about systematic risk factors several times in recent years.

In a letter of 23 December 2009 to the Ministry of Finance, the Bank argues that systematic risk factors must be considered in the context of the other aspects of the active management efforts of the Bank. The Bank writes:

«Active management will expose the fund to systematic risk factors to a greater or lesser extent. The management and control of systematic risk must therefore be part of our management task. Some systematic risk factors may result in high short-term return variability. It is important that a strategy which aims to profit from systematic risk is properly communicated, understood and anchored in the management structure. In the long term, the exclusion of such opportunities will probably be a cost for the fund. Strategies of this kind can improve the trade-off between expected return and risk. Norges Bank must therefore take an active approach to systematic risk.»

Norges Bank notes, in a letter of 6 July 2010 to the Ministry of Finance, that discretion must be exercised in formulating strategies aimed at exploiting systematic risk factors. The Bank is of the view that such discretionary assessment must form part of the operational management effort. The Bank writes:

«There are no generally accepted definitions or ways of constructing risk factors. Nor is there any answer as to what the optimal composition of dynamic factors of this type might be. An approach where the owner attempts to define a benchmark portfolio which reflects all dimensions of risk to which the fund should be exposed would, to a great extent, need to be based on discretion. This discretion should be part of the operational management of the fund. The Ministry of Finance should avoid introducing

systematic risk factors in the benchmark portfolios which undermine transparency and verifiability or which increase transaction volumes or are not investable in practice.»

Norges Bank has examined, in designated discussion notes, the impact of well-known risk factors in the stock market, as well as weighting principles that may serve as alternatives to market-value weights.¹ The analyses show, *inter alia*, that there are several different ways of exploiting systematic risk factors, that it is difficult to isolate each individual risk factor in the asset management and that alternative weighting principles to market-value weights often imply tilts towards systematic risk factors. The discussion notes are available on the Bank's website (www.nbim.no).

Norges Bank recommends, in a letter of 2 February 2012 to the Ministry of Finance, that systematic risk factors be exploited in the management of the GPFG. The Bank writes:

«A global market-weighted benchmark index will not necessarily offer the best possible trade-off between risk and return for a fund such as the Government Pension Fund Global. The investment strategy should therefore be designed in such a way that the Fund can harvest risk premia dynamically, and the portfolio can be constructed in ways that build on its natural advantages. »

Regarding the Fund's advantages, the Bank writes:

«The combination of a long time horizon, no short-term liquidity requirements and a patient owner means that the Fund may be particularly well-suited to taking on certain types of risk. This will, above all, be the case in periods of great uncertainty about future returns. »

The Bank is of the opinion that exploiting systematic risk factors can best be done as part of the operational management effort, rather than by changing the benchmark index of the Fund. The Bank writes:

«Norges Bank believes that the strategic benchmark index should not be adjusted to take account of systematic risk premia for equity investments. »

¹See the notes «Capturing Systematic Risk Premia» and «Alternatives to a Market-value-weighted Index».

The Bank writes the following with regard to the benchmark index:

«The strategic benchmark index should be a long-term, objective yardstick for the operational management of the Fund and must be based on a leading, readily available market-weighted index. »

In 2012, Norges Bank introduced an operational benchmark portfolio for equities. This is a tool used by the Bank in its management of the Fund to better tailor the investments to the purpose and special characteristics of the Fund. The operational benchmark portfolio assists the Bank in changing the composition of the portfolio to take systematic risk factors into account. These adjustments seek to improve the ratio between expected return and risk.

In the annual report on the management of the GPF in 2012, the Bank provided a more detailed account of the design and workings of the operational benchmark portfolio for equities. Norges Bank writes the following with regard to systematic risk factors:

«NBIM may also use alternative principles for weighting and portfolio construction to obtain exposure to various systematic risk factors.

The fund's characteristics mean that we may take a different view of long-term investment opportunities from the typical investor. We also consider whether, and to what extent, the portfolios' exposure to different risk factors should change over time. The desired exposure to systematic risk factors can be achieved in various ways, and expected return and risk characteristics may vary significantly depending on the method chosen. Adjusting the operational reference portfolios to harvest systematic risk premiums is an integral part of NBIM's management mission.

NBIM has so far introduced exposure to two such risk factors in the operational reference portfolio for equities: the value effect and the small-firm effect.»

In the autumn of 2012, Norges Bank published two discussion notes on the foundations for the factors value and size.² The notes are available on the Bank's website (www.nbim.no).

²See the notes «The Value Effect» and «A Survey of the Small-firm Effect».

2.2.3 Analyses of return and risk

A key issue is how return and risk may be affected if the composition of the GPFG's equity portfolio is tilted towards the risk factors value, size, momentum, liquidity or volatility.

Extensive research has been conducted on the properties of systematic risk factors. However, academic studies will rarely take account of whether the findings from such studies can be implemented in practical asset management. The issue of investability is of decisive importance to large funds like the GPFG.

The index and analytics provider MSCI has been commissioned by the Ministry to calculate the implications of tilting large equity portfolios towards systematic risk factors. The assignment was to analyse simple rule-based factor strategies, with an emphasis on risk, return and investability. Simple rule-based strategies provide a good basis for analysing the effects of exploiting systematic risk factors in the management of the GPFG. The purpose of the analysis is to provide a basis for the Ministry's assessment and further development of the Fund's investment strategy. MSCI has not provided advice on whether or how one should exploit systematic risk factors in the management of the Fund. The work carried out by MSCI is summarised in a report available on the Ministry's website (www.government.no/gpf).

MSCI's report shows that the size of an equity portfolio restricts the extent to which its composition can be tilted away from market-value weights towards systematic risk factors. When the composition of the portfolio is changed, both the ownership stakes in individual companies and the volume of rebalancing trades can become large, cf. box 2.2. MSCI demonstrates that many weighting principles that are popular amongst smaller investors cannot be practised for equity portfolios of the magnitude of that held by the GPFG. These include, *inter alia*, equal-weighted portfolios and portfolios weighted to minimize volatility.

Box 2.2 Investability

In practice, the size of an equity portfolio is of decisive importance in determining portfolio composition. A composition based on *market values* implies equal pro-rata ownership stakes in every company. Generally speaking, this entails a limited need for buying and selling stocks in the portfolio, and facilitates low management costs. The principle of market-value weights, on which the equity benchmark index of the GPFG is premised, gives high investability. It is fairly straightforward to invest according to such a benchmark, even for a large fund like the GPFG.

Portfolio compositions that deviate from market-value weights will have lower investability. If the GPFG's equity portfolio is tilted towards systematic risk factors it would, *inter alia*, involve the following challenges:

- *Large ownership stakes in individual companies.* Whilst market-value weights imply equal pro-rata ownership stakes in each listed company, a tilt towards risk factors implies that ownership stakes will be larger in some companies and smaller in others.

The size of the Fund means that the ownership stakes in individual companies may readily become very large.

- *Large trading volume upon rebalancing.* Unlike market-value weights, a bias in favour of risk factors implies that one will not have a fixed ownership stake in a company over time. When the strategies indicate that ownership stakes should be changed (rebalancing), one will purchase the stocks of some companies and sell others. The size of the Fund implies that the trading volume in many individual stocks may readily become very large.

It is fairly straightforward to invest in accordance with a market-value weighted index, even for a large fund like the GPFG. Against this background, MSCI has calculated alternative indices that take market-value weights as their point of origin, but then cautiously tilt their composition towards a systematic risk factor. The report calls this a factor index. A factor index will feature larger portions of stocks exhibiting the characteristics of the factor in question. A factor index for size will, for example, include larger portions of companies with low market capitalisations and smaller portions of companies with high market capitalisations, compared to a market-value weighted index. This approach implies that one retains all stocks included in a market-value weighted index, but somewhat modifies the weight of each stock. MSCI shows that this broad-based approach is preferable for large portfolios, since investability is increased considerably when compared to more purely factor-based alternatives. The factor indices have been calculated for large and medium-sized listed companies in the world’s developed markets for the period 1992–2012.

MSCI’s calculations indicate that it may be possible to tilt the composition of the equity portfolio of the GPFG towards systematic risk factors to a certain extent. As a technical assumption, MSCI has examined factor indices for portfolios of USD 100 billion. This is approximately NOK 600 billion, or currently about one fourth of today’s equity portfolio of the GPFG. The findings suggest that it should be possible, at that scale, to tilt the composition of the portfolio towards the factors value, size and low volatility. Concerning the factor momentum, the scale of a tilt would be considerably more limited.

Table 2.2 Key figures for factor indices over the period 1992-2012

	Individual factor indices					Combined index
	Market weighted	Value	Size	Low volatility	Momentum	Value, size and low volatility

Gross annual return (percent)	7.2	8.4	7.9	8.2	8.1	8.1
Annual standard deviation (percent)	15.5	16.1	15.7	13.2	15.8	14.9
Return divided by standard deviation	0.47	0.51	0.50	0.62	0.51	0.55
Sharpe ratio	0.23	0.29	0.27	0.34	0.28	0.30
Annual tracking error (percent)		3.2	2.6	3.4	3.6	2.2
Information ratio		0.32	0.25	0.27	0.22	0.41
Highest number of consecutive years of negative excess return over the period		3	6	2	2	3
Average number of days to trade at rebalancing	3.1	4.7	5.5	5.0	11.1	3.1
Average annual turnover (percent)	4.3	18.6	12.4	12.5	41.0	12.0
Annual trading cost as a portion of total assets, assuming a cost of 0.5 percent for each trade (basis points)	4.3	18.6	12.4	12.5	41.0	12.0

The table assumes a portfolio of USD 100 billion invested in large and medium-sized listed companies in the world's developed stock markets. All indices are calculated in U.S. dollars.

Source: MSCI.

The calculations show that the overall risk of the factor indices is largely in line with the risk of a market-value weighted index, cf. table 2.2. Developments in the factor indices are dominated by general stock market fluctuations. There is, nonetheless, a considerable risk that factor indices will either over- or underperform a market-value weighted index. These return differences vary considerably from year to year and from quarter to quarter. The factor indices have delivered positive excess returns in just over half of the periods, and negative excess returns in the remaining periods. In its report, MSCI emphasises that a tilt towards systematic risk factors may entail periods of consecutive negative excess returns lasting for several years. Small company stocks, for example, generally performed relatively poorly during the 1990s.

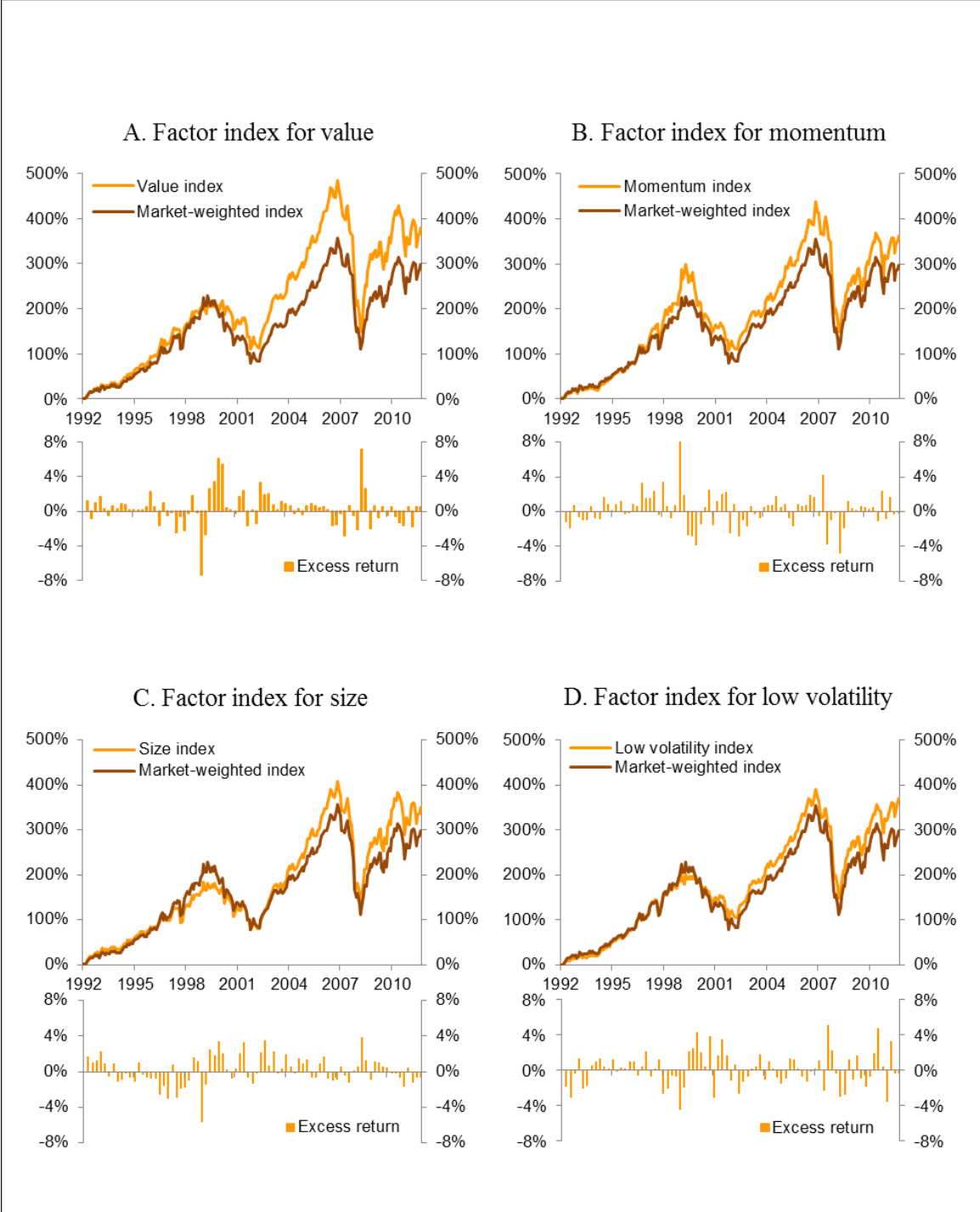


Figure 2.3 Accumulated total return and periodical excess return on factor indices over the period 1992-2012. Percent

Sources: MSCI and the Ministry of Finance.

The return contribution from risk factors depends on economic and financial developments, as well as on the characteristics of the factors, cf. figure 2.3. Important observations include:

- A tilt towards the value factor implies increased holdings in companies with low valuations. Lower valuations may reflect that these companies are more vulnerable to recessions than other companies. During the financial crisis in the years 2008-2009, a tilt towards the value factor would have increased the losses incurred by an equity portfolio.
- However, a tilt towards the value factor may also protect the investments against potential overpricing of individual equities or sectors, like during the so-called technology bubble at the turn of the millennium.
- A tilt towards the low volatility factor implies increased holdings in companies with less volatile stock prices. The value of these companies tends to be less exposed to broad stock market fluctuations. Generally speaking, a tilt towards low volatility has therefore reduced the volatility of an equity portfolio.
- One must be prepared for the possibility that a tilt towards low volatility may entail negative excess returns during periods of high returns in the general stock market. An example of this is the recoupment in the wake of the financial crisis from the autumn of 2008 onwards.
- A tilt towards the momentum factor implies increased holdings in companies that have recently delivered high returns, and lower holdings in companies with low returns. Such a tilt may reinforce strong up- and downturns, such as was the case for example with technology stocks during the years 1999-2000.
- A tilt towards momentum will be attractive when trends hold steady, but unattractive when trends are reversed. Historically, the return contribution from the momentum factor has often been more volatile in times of uncertainty, which often coincide with periods of major changes in the economy or the financial markets.

MSCI's analysis demonstrates that there are benefits from combining tilts towards several systematic risk factors. The patterns generated by each factor are smoothed out, cf. figure 2.4 and table 2.2. Over the period analysed by MSCI, a combination of risk factors would have delivered a more stable contribution to the portfolio return. The periods of consecutive negative excess returns were fewer and shorter for the combination of several factors than for each individual factor taken in isolation. MSCI also notes that it becomes easier to invest when the composition of the portfolio is tilted towards several factors simultaneously.

MSCI shows that the return contributions from the factor indices are, by and large, similar to the returns described in leading academic studies of systematic risk factors, cf. figure 2.5. However, the magnitude of this contribution is considerably smaller in the factor indices than in the academic studies. MSCI notes that for large portfolios, the investability requirement restricts the magnitude of potential excess returns that can be derived from systematic risk factors.

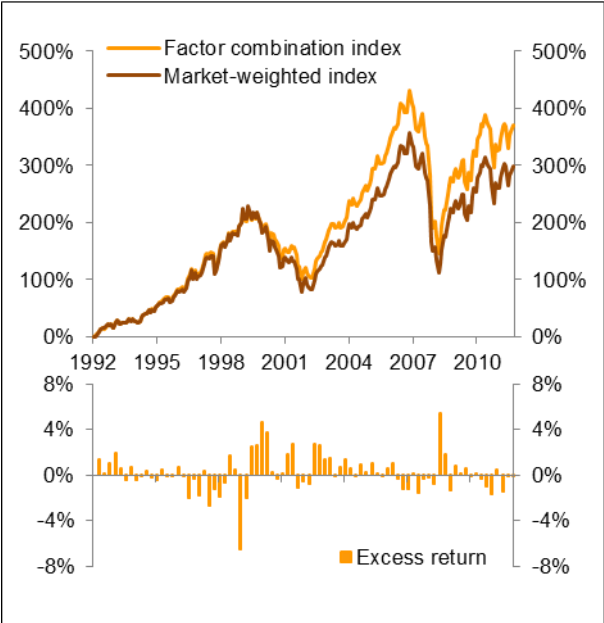


Figure 2.4 Accumulated total return and periodical excess return from a combination of factor indices for value, size and low volatility over the period 1992-2012. Percent

Sources: MSCI and the Ministry of Finance.

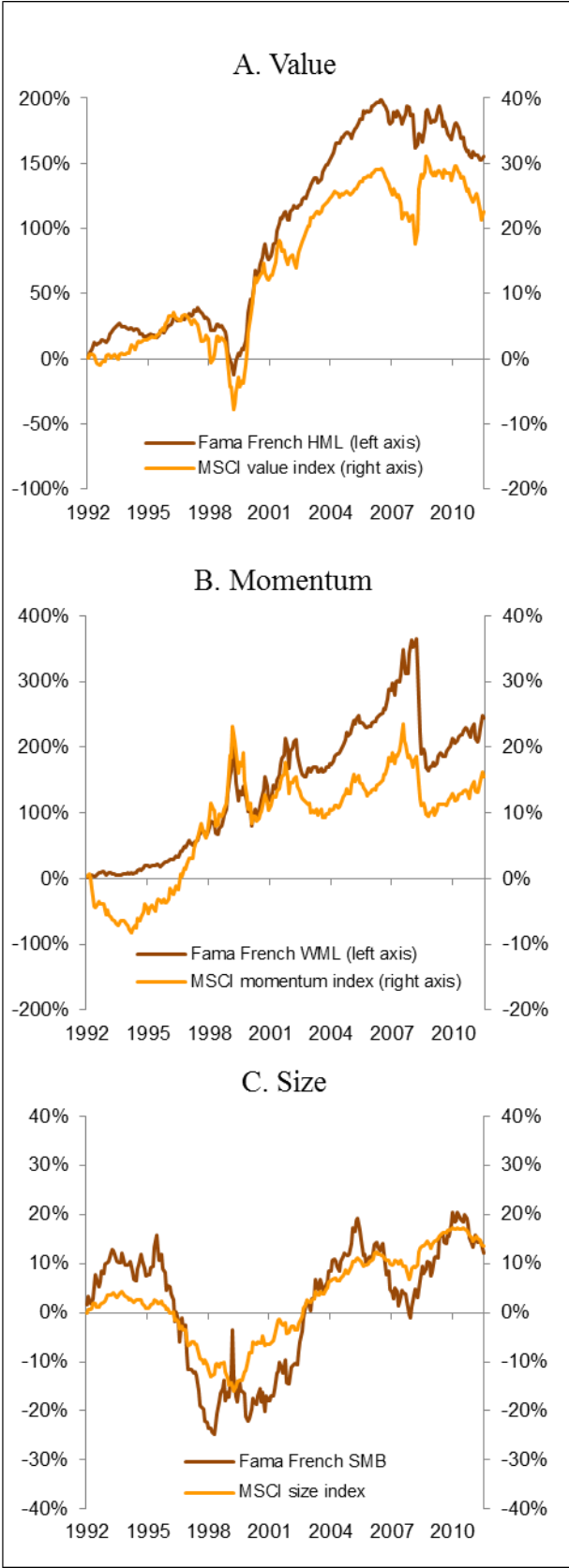


Figure 2.5 Accumulated excess return from a tilt towards systematic risk factors over the period 1992-2012. Percent
Sources: MSCI, Kenneth French’s website and the Ministry of Finance.

MSCI's calculations show that the factor indices have delivered higher gross returns (returns before the deduction of costs) than a market-value weighted index over the period 1992–2012 as a whole, cf. table 2.2. Since the risk level of the factor indices is largely in line with that of a market-value weighted index, the calculations indicate that a tilt towards systematic risk factors would have offered a more attractive ratio between return and risk over that period. MSCI emphasises that all calculations in the report are based on historical data and, consequently, are not necessarily good indicators of future expected returns from systematic risk factors. MSCI also emphasises that the calculations do not take into account what it would actually cost to implement the investments in line with the computed indices. Besides, there is a major difference between the first and second halves of the period they study. For the factors value, momentum and low volatility, most of the excess return was generated in the first half, whilst it was the opposite for stocks in smaller firms.

The report from MSCI attaches special emphasis on investability. Investability is closely related to management costs. A tilt towards systematic risk factors implies more trades in the portfolio (increased turnover), compared to a market-value weighted portfolio, cf. table 2.2. Stock trades entail various transaction costs, such as commissions charged by brokers or electronic market places. For a large fund, however, a tilt towards systematic risk factors means that the volume of trades in individual stocks may readily become very large, cf. box 2.2. Consequently, one may incur costs, in addition to ordinary transaction costs, as the trades influence the price at which one is able to purchase or sell the stock, i.e. so-called market impact. MSCI emphasises that its report does not provide a basis for determining the potential amount of such costs, although these may be considerable for large portfolios. MSCI notes that few funds have adjusted the composition of their equity portfolios on the scale examined in the report.

MSCI's report provides no dedicated analysis of trading costs. MSCI has assumed, for technical calculation purposes that costs were 0.5 percent (50 basis points) per trade. Based on this estimate, MSCI concludes that overall trading costs would increase considerably for certain factor indices, cf. table 2.2. Nonetheless, the estimated cost increase is less than the aggregate gross excess return on the factor indices over the period examined by MSCI.

The factor indices computed by MSCI are simple and rule-based. They have not been developed with a view to providing the maximum possible investability. In its report, MSCI notes the scope for further improving investability. One may, for example, restrict large ownership stakes in individual companies and reduce or smooth out the volume of rebalancing trades. MSCI observes that such adjustments may be of major importance to large portfolios, although these adjustments would need to be tailored. MSCI emphasises that it will be a challenging task to identify the most suitable adaptations. Which adaptations are the most suitable may also change over time.

MSCI's work does not focus on the liquidity factor, but the Ministry of Finance has requested professors de Jong and Driessen to prepare a report on the consequences of tilting investments towards the liquidity factor, both in listed markets for equities and bonds and in unlisted markets, cf. box 2.3. The considerations in the report are based on a survey of relevant academic research. Distinction is made between premiums for investing in less tradable assets (termed liquidity premiums) and risk premiums for assets that become less tradable during periods of market turbulence or when overall liquidity declines. The report concludes, as far as the market for listed equities is concerned, that there is limited evidence to support the existence of any significant liquidity premiums. On the other hand, professors de Jong and Driessen are of the view that there is a certain potential for the Fund to exploit liquidity premiums in the bond market, and that there may be a somewhat greater potential for exploiting risk premiums for liquidity more generally.

Box 2.3 Liquidity

A security or asset is deemed to be liquid or easily tradable if the purchase and sale of large orders can be executed swiftly at a low transaction cost without appreciable changes to the price as the result of the transactions. How prices are affected by changes in liquidity may be a characteristic of an asset class or a market.

Differences in how easy it is to purchase or sell an asset reflect how easy it is to find a counterpart to trade with. It is reasonable to expect that one gets paid for offering liquidity because it makes it possible for others to execute a desired transaction. Such payment will here be referred to as a liquidity premium.

A strategy premised on offering liquidity will involve risk. Historical data show that the liquidity of risky assets is correlated over time. Consequently, differences in liquidity may give rise to a risk premium in addition to a liquidity premium. A liquidity premium reflects differences in expected returns as the result of differences in tradability between individual assets. A risk premium for liquidity reflects differences in expected returns as the result of assets reacting differently to changes in the overall liquidity in the market.

In academic research, distinction is made between four strategies for profiting from liquidity premiums and liquidity risk premiums. The strategies require investors to adopt a long time horizon and to not be forced to sell securities when market prices decline:

- Strategies that vary with market levels, i.e. to purchase assets that have a high liquidity premium or liquidity risk premium when the market slumps.
- Invest passively in an asset class characterised by low liquidity, for example unlisted real estate.
- Selecting securities with low liquidity within an asset class, for example the least

liquid companies traded on a stock exchange.

- Operate as a so-called market maker, for example by offering liquidity for large holdings of stocks or bonds.

The Ministry has commissioned a report from Professors Frank de Jong and Joost Driessen of Tilburg University in the Netherlands, for purposes of examining the prospects for the GPFG to harvest liquidity premiums. Professors de Jong and Driessen base their advice on available research literature. The most important conclusions of the report are as follows:

- There is limited scope for profiting from liquidity premiums in the markets for listed equities. The scope for reaping liquidity risk premiums is somewhat higher, but the magnitude of the premium varies quite considerably between various studies.
- Prospects for reaping liquidity premiums in the market for corporate bonds seem better. However, liquidity premiums are highest in those segments of the market that involve the highest credit risk and the least liquidity. Transaction costs are high in both of these segments. Hence, it may be challenging for a large fund like the GPFG to implement active strategies for reaping liquidity premiums. A passive strategy based on overweighting market segments with high credit risk and low volatility in the fixed income portfolios of the GPFG may be considered. The market for corporate bonds appears not to offer any significant liquidity risk premiums.
- It also seems possible to reap liquidity premiums in the markets for bonds with a government guarantee, as well as for inflation-linked bonds. The size of the GPFG will represent less of a challenge in these markets.
- There exist no reliable data that can form the basis for recommendations for unlisted markets.
- Nor is there any research literature that can form the basis for recommendations with regard to the profitability of, and the risks associated with, time-dependent liquidity strategies.

The report from professors de Jong and Driessen will form part of the basis for the Ministry's ongoing effort to assess the importance of liquidity for the investments of the GPFG.

The report is available on the Ministry's website (www.government.no/gpf).

2.2.4 The Ministry's assessment

The Ministry has, based on previous advice and recommendations assessed the prospects for tilting the composition of the Fund's equity investments towards various systematic risk factors like value, size, momentum, liquidity and low volatility. In particular, the Ministry has assessed whether the equity benchmark index of the Fund

should be adjusted for such factors. The assessments are based, *inter alia*, on analyses of how tilts towards such factors might affect expected return and risk, and which restrictions and challenges result from the large size of the Fund.

The analyses carried out by MSCI suggest that it may be possible to tilt the composition of the equity portfolio of the GPFG towards systematic risk factors to a certain extent. Investment strategies focused on exploiting systematic risk factors may therefore become important in the Fund. The analyses show, at the same time, that very large portfolios face a number of restrictions. The Fund's equity portfolio is already about four times the size of the portfolios used in MSCI's calculations, and it is expected to increase further in coming years. Investability will be a constraint to exploiting such strategies in the equity portfolio. Any strategies should therefore be designed with special regard to investability.

The constraints implied by the size of the Fund imply that the overall risk in the equity portfolio will under any circumstance be dominated by the fluctuations in the general stock market, as it is today. If the equity portfolio of the GPFG is tilted towards one or more systematic risk factors, the overall risk in the Fund will not be changed materially.

At the same time, a tilt towards systematic risk factors implies a considerable risk of either over- or underperformance relative to a market-value weighted index. These return differences vary considerably from year to year and from quarter to quarter. One needs to be prepared for the possibility that a tilt towards systematic risk factors may result in consecutive negative excess returns over periods of several years. One also needs to be prepared for the possibility that a tilt may increase the losses incurred in the equity portfolio of the Fund during periods of major stock market slumps, as was the case during the financial crisis in 2008.

The Ministry is of the view that the GPFG seems well positioned to take on the additional volatility that might be implied by tilts towards systematic risk factors. This is because the Fund is invested with a very long time horizon, and because the State, the owner of the Fund, has limited liquidity needs and a high ability to absorb risk.

Analyses of historical data indicate that tilting the equity investments towards systematic risk factors would have delivered higher returns without any material change in risk, compared to a market-value weighted portfolio. Historical excess return does not in itself justify expectations of future excess returns. They should be underpinned by theoretical models. The Ministry notes that there is no broad agreement as to the causes of the factors and why they should produce expected excess return. This makes assessments of future returns uncertain.

The analyses of risk factors value, size, momentum, liquidity and low volatility are based on historical data. It is not certain that the same factors will explain future patterns in stock returns. Expectations towards these risk factors cannot be compared to expectations towards the risk premium for variations in the overall stock market,

which is comprehensively supported by theoretical models and verified by more than a hundred years of data.

The size of the Fund entails some important challenges if one chooses to tilt the portfolio towards risk factors. One such challenge is that both ownership stakes in individual companies and trading volumes in individual stocks may readily become large. In addition to ordinary transaction costs, one may thus incur costs as the trades influence the price at which one is able to purchase or sell. The Ministry notes that the implementation costs are uncertain, and that one is not aware of other major funds internationally having adjusted the composition of their equity portfolios on a scale similar to the size of the GPFG. In the Ministry's view, this favours a gradual approach

The Ministry agrees with the assessment of Norges Bank that tilts towards systematic risk factors in the equity portfolio is best achieved as part of the operational management, rather than through a change in the Fund's benchmark index. The development of strategies for exploiting systematic risk factors must be based on discretionary assessment. Moreover, the size of the Fund makes it highly necessary to tailor the strategies with regard to investability. Identifying the most suitable adaptations will be a challenging task, and which adaptations are the most suitable may change over time. The work of the Ministry of Finance on the strategic benchmark of the GPFG is therefore not a process suited to making these decisions. Changes to the benchmark index are the outcome of a lengthy decision-making process. This provides a solid basis for overarching decisions with the most impact on the overall risk in the Fund. This process is not, however, suitable for decisions that to a large extent involve adjustments based on discretionary assessments, and that require continuous maintenance and modification.

To the extent that systematic risk factors are to be exploited, it should therefore be done within the scope of Norges Bank's management framework. The Bank may design factor strategies based on the characteristics and advantages of the Fund, including the size and long time horizon. The design of such strategies forms an important part of the management mission of the Bank.

The Ministry notes that Norges Bank has embarked on the development and assessment of factor strategies. This work is in an early phase. Norges Bank has chosen to introduce an operational reference portfolio for equities that implies, *inter alia*, a certain degree of tilt towards the risk factors value and size. The purpose of the adjustments is to achieve an improved ratio between expected return and risk.

The Ministry is of the view that strategies for exploiting systematic risk factors must be long term and designed such that they can still be followed in periods during when expected returns fail to materialise. This makes it necessary to identify, manage and communicate the risks associated with the strategies in a good manner.

The work on systematic risk factors in the GPFG is of a long-term effort. Strategies for exploiting such factors will have to be developed gradually over many years. It is appropriate to revisit this work in the context of the planned evaluation of Norges Bank's management of the GPFG in 2014.

2.3 The fixed income benchmark index

2.3.1 Introduction

In Report No. 17 (2011-2012) to the Storting, the Ministry presented a new fixed income benchmark index. The new benchmark index is made up a government fixed income portion (70 percent) and a corporate fixed income portion (30 percent), thus highlighting the roles of the various parts of the fixed income portfolio. The role of the government fixed income portion is, in particular, to reduce the total risk of the Fund. The benchmark comprises nominal government bonds issued in 21 currencies, including emerging markets, inflation-linked government bonds that are only issued in developed markets, as well as bonds issued by international organisations like the European Investment Bank and the World Bank. The weight accorded to each country in the government fixed income benchmark index is determined by the size of its economy, as measured by GDP.

The corporate fixed income portion of the benchmark index is expected to contribute more to the return on the Fund due to, *inter alia*, an expected compensation for credit risk associated with investments in such bonds; so-called credit premium. It comprises both corporate bonds and covered bonds. Covered bonds are issued by banks and secured by an underlying portfolio of bank loans. The corporate fixed income portion weights each bond by its share of the market value of all bonds in this benchmark component. Seven currencies are approved for benchmark component.

The new fixed income benchmark is simpler than the previous, as a result of the removal of several sub-markets. Following advice from Norges Bank, the Ministry has examined whether the fixed income benchmark should be further simplified by removing the sub-market for inflation-linked government bonds.

Unlike nominal bonds, inflation-linked bonds offer protection against unexpected changes in inflation. Investors earn a real return, and a compensation for developments in a price index agreed in advance

Inflation-linked government bonds have formed part of the fixed income benchmark index since 2005. The Ministry's decision to include inflation-linked bonds was made in 2004 and was in line with advice provided by Norges Bank in letters of 21 March 2002 and 6 September 2004, cf. the discussion in the National Budget for 2005. At that time, the Ministry attached weight to the analyses carried out by Norges Bank, which showed that the ratio between expected return and risk in the Fund would improve, under reasonable assumptions, although this effect would be modest. The Ministry also attached weight to the anticipated growth in the issuance of inflation-linked bonds.

2.3.2 Advice from Norges Bank

In a letter of 9 August 2012, Norges Bank proposed that inflation-linked bonds be removed from the benchmark index of the GPF. The reason given for this by the Bank is that inflation-linked and nominal bonds have different, and in some cases conflicting, characteristics during periods of variations in real interest rates and

inflation risk. The Bank also writes that the market for inflation-linked bonds is not sufficiently broad, deep and uniform to provide diversification of the risk associated with the GPFG in the event of a swift and unexpected increase in inflation. The Bank is therefore of the view that no specific strategic allocation for such bonds should be established.

The Bank believes that such a change will clarify the strategic role played by government bonds in the benchmark and make the benchmark simpler, more transparent and more readily verifiable.

The Bank also notes that inflation-linked bonds may exhibit different characteristics across countries. Important differences between countries include, *inter alia*, the tax treatment of the inflation compensation and the degree to which the nominal value of the bonds, or their principal, is subjected to downward adjustment in the event of deflation. Norges Bank has published its own discussion note on the market for inflation-linked bonds³. It follows, *inter alia*, from the note that the United Kingdom and Japan do not guarantee repayment of the original principal upon maturity if the price index were to decline over the loan term. Such guarantee is called a «deflation floor».

The return on nominal bonds is more vulnerable to an increase in inflation than is the return on inflation-linked bonds. The Bank is of the view that the inflation risk associated with nominal bonds is a type of risk that the Fund is particularly well placed to take on. The combination of a long time horizon, limited ongoing liquidity needs and a patient owner are characteristics that may, generally speaking, make the Fund well placed to assume various forms of systematic risk, including inflation risk.

During periods of financial turbulence, the market for inflation-linked government bonds is less liquid than the market for nominal government bonds. However, it is not necessarily the case, according to the Bank, that one can expect to systematically harvest a liquidity premium through a strategic allocation to inflation-linked bonds.

The Bank writes that the overall composition of the investments should enable the Fund to take part in the real growth of the world economy. The Bank is of the view that inflation-linked bonds will provide a safeguard against inflation, but not necessarily a return that reflects the real growth of the economy.

Norges Bank has developed an operational benchmark portfolio for bonds. This portfolio is a tool for managing and communicating long-term adaptations made by the Bank in its active management, cf. the discussion in sections 2.2 and 4.1. In 2012, the Bank chose to remove inflation-linked bonds from the operational benchmark portfolio. The Fund's holdings of such bonds declined from NOK 105 billion to NOK 42 billion during the course of the year.

³ See NBIM Discussion Note 9-2012 (www.nbim.no)

2.3.3 The market for inflation-linked bonds since 2004

In 2004, inflation-linked government bonds accounted for 3.8 percent of the fixed income benchmark index, cf. the National Budget for 2005. At present, inflation-linked bonds account for about 6 percent of the new fixed income benchmark index. In general terms, the portion of inflation-linked bonds in the market for government bonds has increased from about 6.5 percent in 2004 to 9.5 percent in 2012.⁴

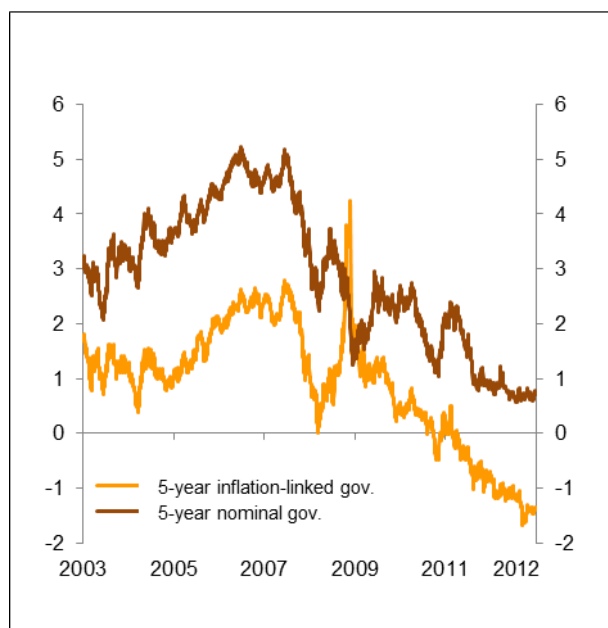


Figure 2.6 Yield on U.S. nominal and inflation-linked government bonds with a five-year maturity. 2003-2012. Percent

Source: U.S. Department of the Treasury.

In 2004, inflation-linked government bonds were issued in 14 countries, cf. letter of 6 September 2004 from Norges Bank. At present, inflation-linked bond indices include up to 20 countries.⁵ The Barclays World Government Inflation Linked Bond Index (WGILB) comprises nine developed countries and has an aggregate market capitalisation of about USD 2,000 billion. The market for inflation-linked government bonds remains focused on a small number of countries. The main issuers of such bonds are the United States, the United Kingdom and France, with market shares of 43 percent, 28 percent and 11 percent, respectively.

⁴See NBIM Discussion Note 9-2012.

⁵See NBIM Discussion Note 9-2012.

Developments in the interest rate level and sensitivity to interest rate changes

Figure 2.6 shows that both U.S. nominal interest rates and real interest rates declined over the period 2003-2012. The difference between nominal interest rates and real interest rates is made up of expected inflation and various risk premiums. It follows from the figure that the difference between nominal interest rates and real interest rates has remained fairly stable over the last nine years, with the exception of a brief period during the financial crisis in 2008–2009. The figure also shows that interest rates are currently very low.

Table 2.3 Interest rate sensitivity (duration) of the various components of the fixed income benchmark index as per 30 June 2012

Sub-market	Duration	Portion of the benchmark (percent)
<i>A. Sensitivity to changes in nominal interest rates</i>		
Corporate bonds	5.5	30.0
Bonds issued by international organisations	5.1	2.9
Nominal government bonds	6.5	60.5
<i>B. Sensitivity to changes in real interest rates</i>		
Inflation-linked government bonds	10.9	6.6

Source: Barclays

The market value of bonds declines when the interest rate level increases, and vice versa. Long-term bonds are more sensitive to changes in the interest rate level. Duration is, in simplified terms, a measure of how much a bond declines in value when the interest rate level increases by one percentage point. A duration of 6 means that the value of the fixed income portfolio will decline by about 6 percent if the interest rate increases by one percentage point. The Ministry has not adopted any target for the duration of the fixed income benchmark index. The effect of changes in market interest rates on the value of the benchmark follows from the characteristics of the fixed income instruments included in the benchmark at any given time. For nominal bonds, duration shows how much the bonds decline in value when nominal interest rates increase. For inflation-linked bonds, duration shows how much the bonds decline in value when real interest rates increase. Table 2.3 shows the duration of the various components of the fixed income benchmark index as per 30 June 2012. Inflation-linked bonds have a longer time to maturity (duration) than nominal bonds.

Changes in the general interest rate level may be caused by changes in both real interest rates and inflation expectations. Compared to nominal bonds, the return on inflation-linked bonds will be more exposed to changes in real interest rates and less exposed to changes in inflation expectations.

Return

In return analyses, the Ministry has examined inflation-linked bonds issued by the U.S. government, so-called TIPS (Treasury Inflation Protected Securities). These account for more than 40 percent of the market for inflation-linked bonds. TIPS were first issued in 1997. Over the period from January 1997 to December 2012, these have delivered a higher return than U.S. nominal government bonds, U.S. corporate bonds with high credit ratings, so-called «investment grade» bonds, and the U.S. stock market (S&P 500), cf. figure 2.7. Since the decision was made in 2004 to include inflation-linked bonds in the benchmark index of the GPF, TIPS have also delivered the highest return of these four assets.

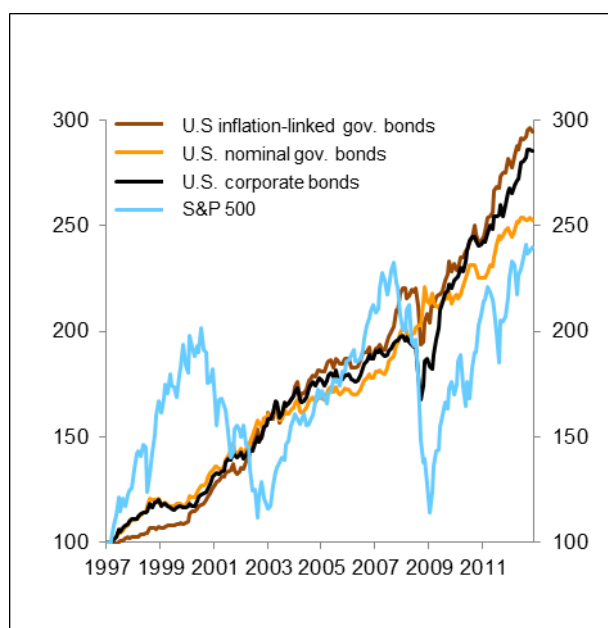


Figure 2.7 Returns on U.S. inflation-linked and nominal government bonds, investment grade corporate bonds and equities (S&P 500). Index 1 January 1997 = 100

Source: Thomson Reuters Datastream and the Ministry of Finance.

The high return on U.S. inflation-linked bonds is primarily caused by their long maturities and the fact that the period in question has been characterised by declining real interest rates.

Risk and correlation with the stock market

The annual standard deviation of returns is a common measure of risk. It is a statistical measure of return fluctuations and is also referred to as volatility.

Since 1997, risk as measured in this way has been higher for U.S. inflation-linked government bonds than for U.S. nominal government bonds. The annual standard deviation has been 5.8 percent, as compared to 4.6 percent. The standard deviation has also been somewhat higher than for U.S. investment grade corporate bonds, with the latter being measured at 5.6 percent.

The return on U.S. inflation-linked bonds has exhibited low correlation with the U.S. stock market, but not as low as the return on nominal government bonds, cf. figure 2.8. Nonetheless, the correlation with the stock market has been considerably lower than for U.S. corporate bonds. The correlation increased during the financial crisis in 2008, but has now reverted to negative territory. Over the period since 1997, the correlation between the U.S. stock market and U.S. inflation-linked government bonds, nominal government bonds and corporate bonds has been 0.02, -0.27 and 0.23, respectively.

The inflation-linked bonds low correlation with the stock market and high return have improved the ratio between return and risk in the GPF. However, the effect has been small since inflation-linked bonds constitute a minor component of the benchmark index.

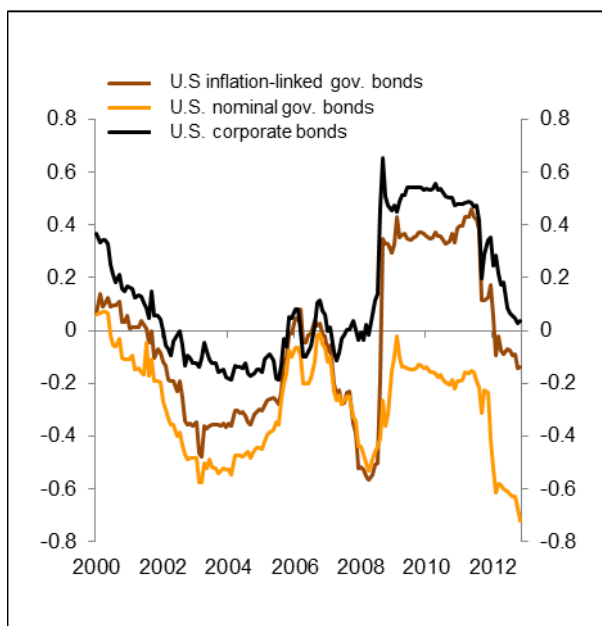


Figure 2.8 36-month rolling correlation with the U.S. stock market (S&P500) for U.S. inflation-linked and nominal government bonds and investment grade corporate bonds

Source: Thomson Reuters Datastream and the Ministry of Finance.

2.3.4 Preservation of purchasing power

Inflation-linked bonds are often considered to be the closest one gets to risk-free investments, under certain assumptions. When an inflation-linked bond is purchased and held until maturity, the real rate of return for the entire period as a whole is known to a great extent at the time of purchase. Although the price of the bond may vary over the period, the long-term real rate of return will be virtually risk-free.

The issue of the Fund's need for safeguarding long-term purchasing power or obtaining inflation protection is of relevance to the assessment as to whether inflation-linked bonds should be included in the benchmark. However, other types of investment may also offer elements of inflation protection.

In its discussion note «Risks and Rewards of Inflation-Linked Bonds»⁶, Norges Bank writes the following:

«In future work, we therefore intend to broaden this research project on ILB into a wider study of long-term inflation and real assets».

A more comprehensive analysis of the need for inflation protection and real asset investments may thus be carried out.

2.3.5 The Ministry's assessment

Inflation-linked government bonds and nominal government bonds differ somewhat in their characteristics. The Ministry is of the view that both types of bonds may reduce the risk associated with the Fund over time. Differing characteristics may mean a low correlation of returns, which creates opportunities for risk diversification and an improved ratio between expected return and risk.

Besides, inflation-linked bonds are often considered to be as close as one can get to risk-free investments, provided that the bonds are held until maturity, involve no credit risk and are linked to a price index of importance to the investor's purchasing power. Inflation-linked bonds therefore fit well into the government fixed income benchmark index, which is intended to reduce the risk associated with the overall portfolio.

In order to invest in nominal bonds, investors will normally require some compensation for the uncertainty associated with future inflation, so-called inflation premium. This is not the case for inflation-linked bonds. Everything else being equal, the expected return on inflation-linked bonds will therefore be somewhat lower than for nominal bonds. It is not obvious that a long-term investor like the GPFG should invest in inflation-linked bonds. In its advice, Norges Bank writes that the inflation risk

⁶See NBIM Discussion Note 10-2012 (www.nbim.no).

associated with nominal bonds may be a type of risk that the Fund is particularly well placed to bear.

The Ministry is of the opinion that the ability of the Fund to take on inflation risk should be examined in more detail before a conclusion can be drawn in this regard. The market for inflation-linked bonds is, at the same time, less liquid than the market for nominal government bonds. This characteristic became especially clear during the financial crisis in 2008–2009⁷. The economic literature reviewed by the Ministry indicates that inflation-linked bonds have historically offered a liquidity premium of about the same magnitude as the inflation premium offered by nominal government bonds. The estimates for these premiums are uncertain, since both vary over time and are difficult to calculate. See box 2.3 for a more detailed discussion of liquidity risk.

Nonetheless, the scope for earning a liquidity premium in the market for inflation-linked bonds means that the special characteristics of the Fund as a long-term investor is not a decisive argument for removing inflation-linked bonds from the benchmark.

Moreover, the Ministry has attached weight to the fact that most large countries adhere to the same type of contract structure for inflation-linked bonds. Consequently, differences between the markets for such bonds would not appear to be a major problem in practice.

All in all, the Ministry has not identified arguments that are sufficiently weighty to remove inflation-linked bonds from the benchmark. In making this assessment, more weight has been attached to risk diversification considerations than to the need for further simplifying the fixed income benchmark index. However, one may want to revisit the question of inflation-linked bonds in the presence of a more comprehensive analysis of the need for inflation protection and real asset investments.

The Ministry has considered whether inflation-linked bonds should be separated from the government fixed income portion and instead be assigned a separate strategic allocation. However, such a solution would violate the rule adopted by the Ministry last year, to the effect that the weights of the government bonds of various countries should be equal to the relative GDP weights of the countries. The Ministry has therefore concluded that inflation-linked bonds should remain a component of the government fixed income benchmark index, alongside nominal government bonds and bonds issued by international organisations.

2.4 Listed real estate equities in the real estate portfolio

2.4.1 Introduction

On 1 March 2010, the Ministry of Finance laid down guidelines for real estate investments, cf. Report No. 10 (2009-2010) to the Storting – The Management of the Government Pension Fund in 2009. According to the mandate for the GPF, Norges

⁷Even if inflation-linked bonds were to become illiquid, they may be used to secure loans from central banks.

Bank shall invest up to 5 percent of the Fund in a separate real estate portfolio. The portion invested in bonds shall be reduced correspondingly.

The Ministry has, as described in Report No. 10 (2009-2010) to the Storting, operated on the assumption that it will take several years to build up the real estate portfolio. At the outset, the portfolio has been focused on a small number of selected real estate markets. The mandate for the GPFG includes a provision to the effect that Norges Bank shall seek to build the real estate portfolio over several years and across relevant risk factors. Moreover, the establishment of the real estate portfolio shall be based on the Bank's long-term expectations with regard to net returns and risks in the real estate market and potential investments made by the investment portfolio in other markets. The development of the management organisation at Norges Bank will also be of importance to the establishment of the real estate portfolio.

At the end of 2012, the real estate portfolio comprised unlisted investments in office and retail properties in England, France and Switzerland, valued at NOK 22 billion. This represents 0.7 percent of the value of the Fund. Besides, Norges Bank has signed agreements for purchases of additional real estate, which are expected to be completed in 2013.

The mandate for the GPFG has since 2010 allowed for Norges Bank to invest in the real estate portfolio in several ways, including in equities of listed real estate companies. Section 3-1 c) of the mandate is worded as follows:

«The real estate portfolio may be invested in real estate, equity and interest-bearing instruments issued by listed or non-listed companies, fund structures and other legal entities whose primary business is the acquisition, development and management or financing of real estate. The investments may be made through Norwegian or other legal entities. Investments in unlisted equity instruments shall be carried out on regulated and recognised markets. Real estate means rights to land and buildings that are found upon it.»

The mandate laid down by the Ministry of Finance implies that Norges Bank may hold real estate equities in both the equity portfolio and the real estate portfolio. It follows from the mandate that Norges Bank shall specify, in its internal guidelines, limits as to the portion of the real estate portfolio that may be invested in listed equity instruments. Norges Bank has specified 25 percent of the strategic real estate allocation of up to 5 percent as an upper limit for such investments, cf. chapter 5.

The return and risk characteristics of listed and unlisted real estate may differ. Norges Bank is in the process of expanding the real estate investments to countries and regions with large markets for listed real estate companies. This makes it more likely that such investments will be included in the real estate portfolio in the near future. Section 2.4.2 therefore describes differences between equity capital investments in unlisted real estate and listed real estate companies.

2.4.2 Listed real estate equities compared to unlisted real estate

The index provider IPD has estimated that the value of real estate managed by professional real estate managers was about NOK 31,000 billion in 2011. Professional real estate managers include, *inter alia*, sovereign investment funds, life assurance companies, pension funds, real estate funds and listed and unlisted real estate companies. However, the aggregate value of all real estate is much higher. Small investors and companies that are primarily engaged in other activities than real estate management do, for example, also own real estate. Just under $\frac{1}{4}$ of the estimated value of NOK 31,000 billion for 2011 was held by listed real estate companies. This shows that a major part of the real estate market is only accessible through unlisted investments.

Furthermore, the data from IPD show that the portion of the real estate market held by listed real estate companies is highest in North-America and Asia, and lowest in Europe. Real Estate Investment Trusts (REITs) constitute the largest group of listed real estate companies. REITs are companies that invest in, and manage, real estate or real estate mortgages. What distinguishes REITs from other limited liability companies is that they do not pay corporate tax on income that is distributed to their shareholders, as long as they comply with certain requirements. The requirements that their revenues shall originate from real estate, that the investments shall be made in developed real estate and that their profits shall be distributed, mean that REITs are more readily comparable to direct real estate investments. A separate topic article in chapter 7 of this report provides a more detailed discussion of listed REITs.

Although the revenues of listed REITs have their origin in real estate investments, historical return and risk data show that there is a low degree of correlation between the index return on listed REITs and that of unlisted real estate in the short run. Generally speaking, the return on listed REITs fluctuates more than the return on unlisted real estate, and more in line with the stock market.

A possible explanation for the weak short-term correlation is that good data for the market return on unlisted real estate are not available. Studies seeking to adjust for various weaknesses in the unlisted real estate indices find more of a correlation between these two parts of the real estate market.

A weakness of unlisted real estate investment indices is that the real estate included in an index has a low turnover. The low turnover in the unlisted real estate market means that broad indices are typically based on developments in real estate appraisals. In contrast, equity indices are based on market prices. Historical data show that index values based on real estate appraisals are less volatile and lag the return of listed real estate companies. Some unlisted real estate indices are instead based on actual transactions. Low and variable turnover mean that such indices do not reflect overall market returns either. Transaction-based indices may nonetheless provide a more accurate impression of fluctuations in the real estate market than indices based on real estate appraisals.

Figure 2.9 shows developments in the value of an index comprising listed REITs and two indices comprising unlisted real estate in the U.S. market. One of these is based on real estate appraisals (NCREIF Property Index, NPI) whilst the other one is based on actual transactions (NCREIF Transaction Based Index, NTBI). In order to make the indices more comparable, the return on REITs is adjusted for leverage and differences in sectoral composition. The figure shows that the index value based on real estate appraisals (NPI) reacts more slowly and is less volatile than the two other indices. The REIT index appears to lead the two other indices. This is in conformity with a number of other studies of historical returns.

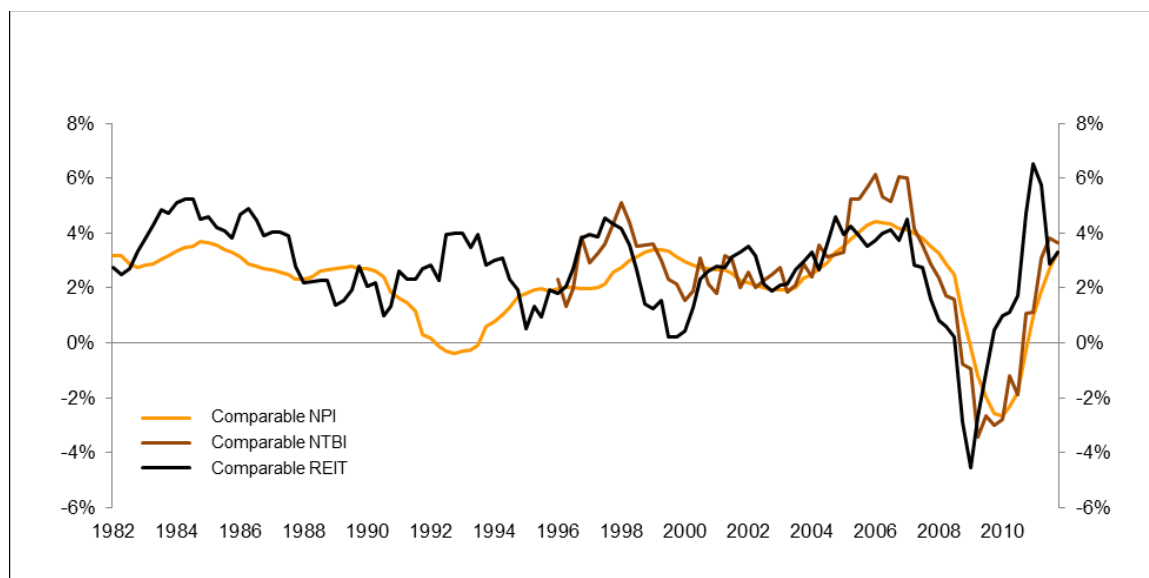


Figure 2.9 Two-year average quarterly returns on comparable indices of listed and unlisted real estate in the United States. 1st quarter 1982 – 4th quarter 2011

Source: Ang, A., Nabar, N., and Wald, S. (2012), Searching for a Common Factor in Public and Private Real Estate Returns, Working paper.

Figure 2.9 shows that real estate returns have rarely been negative over periods of two years. The return of the indices represents real estate investments without leverage. This leads to lower volatility. However, all the real estate indices underwent major contractions in 2008–2009, during the financial crisis.

Most real estate investments are leveraged. Hence, problems in the credit markets may affect real estate returns. During the financial crisis, listed REITs exhibited a high correlation with the stock market in general and the banking sector in particular. The topic article in chapter 7 examines the correlation between listed REITs and the stock market in more detail.

In the long run, it would be reasonable to expect developments in the value of listed REITs to reflect developments in the underlying real estate markets. The average quarterly return on the REIT index in the United States over the period 1994–2011 was 2.4 percent, whilst the corresponding return on the unlisted real estate index based on

appraisals (NPI) was 2.3 percent. Consequently, returns have not differed significantly between the two indices over this period overall.

Compared to unlisted real estate, listed REITs are characterised by high liquidity and represent a cost- and tax-effective investment form for many investors. Low transaction costs make it easier to diversify the investments across many properties, when compared to unlisted investments. However, a negative characteristic from the perspective of investors may be that listed REITs offer less transparency and control over real estate management. This may make it more attractive to invest in unlisted real estate through forms of investment that permit higher ownership stakes and provide better opportunities for following up on, and influencing, real estate management, including the selection of the properties in which investments are to be made. Stable performance may also be of value to many investors. If such is the case, they will prefer unlisted investments because the volatility of appraisals is less than that of listed REITs in the short run. It is also possible that investors are compensated for the low liquidity in the unlisted real estate market or that individual investors or investor groups may achieve special advantages in the management of unlisted investments, such as economies of scale.

Box 2.4 Return targets selected by other investors for their real estate portfolios

A number of the largest funds internationally have selected different return targets for their real estate investments. Data from CEM Benchmarking, for 12 large funds internationally shows that most of the return targets for real estate investments are based, in full or in part, on unlisted real estate indices, like the indices from IPD and NCREIF. This probably reflects the fact that the real estate portfolios are primarily invested in unlisted real estate.

Some investors, like the New Zealand Superannuation Fund, use indices of listed real estate companies as return target for their entire real estate portfolio. This is often based on the premise that the asset manager may choose freely between listed and unlisted investments. Using indices of listed real estate companies may make it more challenging to evaluate the performance of the asset managers as far as unlisted investments are concerned. Such indices may, on the other hand, reflect the long-term risk associated with the real estate portfolio in a good manner if adjusted for differences in leveraging, country and property composition. An index of listed real estate companies will also constitute an investable and transparent alternative for the asset manager. In comparison, indices of unlisted real estate will include properties that are not necessarily for sale, nor does the index provider disclose which assets are encompassed by the index. However, a weakness of the listed real estate market is that it is small, and that its country and sectoral composition deviates from that of the overall real estate market.

An alternative to using indices of listed real estate companies may be to use a return

target comprising listed equities and bonds. The Canada Pension Plan Investment Board (CPPIB) does, for example, apply a benchmark comprising 65 percent listed equities and 35 percent bonds in determining its return target for unlisted investments. The CPPIB aims to preserve the risk characteristics of the fund, as expressed through the equity and fixed income portions of its benchmark, when making new investments. It therefore defines an equity and fixed income weight for each new investment, which may be deemed to represent the funding or opportunity cost of the investment. As per the end of September 2012, the CPPIB was invested in 10.6 percent real estate, 16.5 percent unlisted equities and 6.2 percent infrastructure.

Indices of listed equities and bonds are, like indices of listed real estate companies, simple and investable. The asset manager may reduce the scale of the real estate investments if the trade-off between return and risk is not deemed to be attractive. The weakness is that the return will not always vary in line with the real estate return, and that it may therefore be difficult to use such indices as a basis for evaluating the performance of the asset manager. On the other hand, a return target made up of listed equity and bond indices may represent a simple and investable return target that can also be used for portfolios that include other unlisted investments, such as infrastructure and unlisted equities.

The Ministry has commissioned a report examining the potential of the GPFG for reaping liquidity premiums through investments in various asset classes, cf. box 2.3 of section 2.2. However, the report notes that the available data are not robust enough to permit conclusions as to whether liquidity premiums exist in unlisted markets, such as real estate.

2.4.3 The Ministry's assessment

The mandate for the GPFG allows for the real estate portfolio to be, *inter alia*, invested in stocks of listed real estate companies in addition to unlisted real estate. This is supported by the discussion of the characteristics of listed real estate equities in section 2.4.2. Analyses of historical data suggest that there are no material differences in the return and risk characteristics of broad indices of listed real estate companies and unlisted real estate in the long run. In addition, listed real estate companies hold major parts of the real estate markets of many sub-markets and countries. Consequently, the unlisted and listed markets complement each other, and together make up the overall real estate market.

At the same time, investments in listed real estate companies differ from investments in unlisted real estate. For example, listed investments are, generally speaking, more liquid than unlisted ones. Another difference is that it is common for unlisted investments to involve higher ownership stakes. This offers investors more transparency and control over management. On the other hand, large ownership stakes in individual properties make it more challenging to diversify the investments. Besides, investors may have different prospects for developing advantages in listed and unlisted

markets. Whether it is most attractive to invest in unlisted real estate or listed real estate companies may also vary between markets and over time. The Ministry is therefore of the view that it should be up to the asset manager to choose between listed and unlisted real estate in the real estate portfolio.

On average, listed real estate companies are more leveraged than the investments Norges Bank has made in unlisted real estate so far. Higher leverage means higher expected equity return. However, the returns will be more volatile. In the short run, the method of valuation will also mean that the return on investments in listed real estate companies fluctuates more than the return on investments in unlisted real estate. Unlisted real estate is primarily valued by way of appraisals, whilst listed real estate companies are priced in the stock market. Appraisals are updated less frequently and have historically varied less than market prices.

Increased leverage in the real estate portfolio as the result of listed investments will increase the overall risk associated with the Fund. However, as noted in Report No. 16 (2007–2008) to the Storting, the expected effect of a 5-percent allocation to real estate on the Fund's risk over periods of 15 years will in any case be modest. This also holds true with a certain level of leverage in the real estate portfolio.

The Ministry has chosen a tailored version of a global real estate index from the index provider International Property Databank (IPD) as the return target for the real estate portfolio of the GPF. The index is adjusted for the actual leverage in the real estate portfolio in respect of both unlisted and listed investments. IPD prepares an annual report for the Ministry on the real estate management of the GPF, including the return on the portfolio. The report for 2011 is discussed in section 4.1 and is published on the Ministry's websites (www.government.no/gpf).

Report No. 10 (2009–2010) to the Storting noted that the Ministry had assumed, in selecting the return target, that the scale of the real estate portfolio investments in listed real estate companies would be limited over time. It was further noted that if such assumption was to be modified, the Ministry would consider using an index of listed real estate companies as the return target for the listed part of the portfolio. This continues to be the case. A significant expansion of listed investments would make it appropriate for the Ministry to consider alternative return targets for the real estate portfolio. The return targets selected by other investors are described in more detail in box 2.4.

2.5 Analyses of risk

2.5.1 Introduction

The special characteristics of the Fund as a long-term investor without clearly defined liabilities means that it has a greater ability to absorb risk than many other investors. What is an appropriate risk level for the Fund will depend on the risk tolerance of its owners, represented by the Storting. The Storting's endorsement, in 2007, of an increase in the equity portion from 40 percent to 60 percent has contributed to defining what constitutes an acceptable level of risk for the Fund.

Experience shows that one needs to be prepared for periods of considerable turbulence and volatility in the return on the Fund. This section uses historical returns and model-based forward looking simulations over five-year periods to illustrate the risk level implied by the adopted strategy for the Fund.

2.5.2 Historical return and risk

The economists Dimson, Marsh and Staunton have gathered data on the return on equities and government bonds in a number of countries for the period from 1900 to 2011. The Ministry has, based on these data⁸, calculated the historical real return and risk for a portfolio comprising 60 percent equities and 40 percent government bonds over the period 1903–2012.

The calculations do not take into account the fact that a portion of the GPFG is invested in corporate bonds and real estate. Data going back to such an early date are not available for those investments. There are also other differences between the available data and the asset composition of the Fund, one of which is that the maturity of the bonds included in the historical data is generally longer than that of the fixed income investments of the GPFG. This increases their sensitivity to changes in the interest rate. Nonetheless, the calculations provide a reasonable illustration of the real return fluctuations that would have been experienced by a fund pursuing the investment strategy of the GPFG over this period.

Figure 2.10 shows the historical real return for a portfolio comprising 60 percent equities and 40 percent bonds from 1903 to 2012. Each bar in the figure shows the average annual real return over a five-year period. The figure shows that the real return has been positive over most of these five-year periods. However, it was negative over four of these periods.

There have been major variations in the real return between the periods. The return was as high as 15.5 percent annually over the best-performing five-year period, whilst it was as low as minus 5.8 percent annually over the worst-performing five-year period, cf. table 2.4. The standard deviation, which is a common measure of return volatility, is 6 percent. This indicates that fluctuations of 6 percentage points in the average real return over periods of five years have been common. When the volatility of returns is measured over shorter periods, the standard deviation is higher. For example, the standard deviation of the annual real return since 1903, for a portfolio comprising 60 percent equities and 40 percent bonds, is calculated to be 12.2 percent.

⁸ Dimson, Marsh and Staunton's world index for equities 1900-2011. Data from Thomson Reuters Datastream for 2012. The fixed income benchmark is based on the return on bonds from the same source, but weighted by using GDP weights.

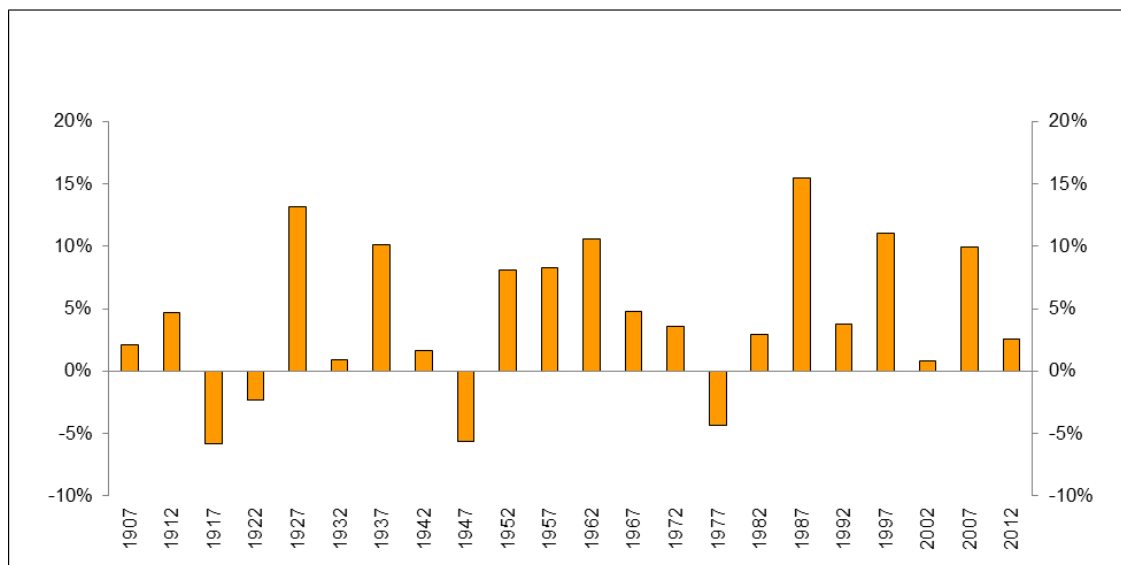


Figure 2.10 Average annual real return (geometric) on a global portfolio comprising 60 percent equities and 40 percent bonds over 22 five-year periods. 1903-2012. Percent

Returns measured in U.S. dollars for equities and in local currency for bonds.

Sources: Dimson, Marsh and Staunton, Global Returns Data (2012), Thomson Reuters Datastream and the Ministry of Finance.

Table 2.4 Historical real return and risk for a global portfolio comprising 60 percent equities and 40 percent bonds over 22 five-year periods. 1903-2012. Percent

Average annual real return (geometric) over 5-year periods	4.4
Standard deviation of average return over 5 years	6.0
68-percent confidence interval for 5-year return	-1.2 – 10.5
5-year period with the lowest average return	-5.8 ¹
5-year period with the highest average return	15.5 ²

¹ 1913-1917

² 1983-1987

Returns measured in U.S. dollars for equities and in local currency for bonds.

Sources: Dimson, Marsh and Staunton, Global Returns Data (2012), Thomson Reuters Datastream and the Ministry of Finance.

The historical calculations show that one must be prepared for the return on the GPF to fluctuate considerably from year to year, and also over periods of several

years. The risk implied by the investment strategy does, at the same time, form the basis for a higher expected return over time. On average over all the five-year periods, a portfolio comprising 60 percent equities and 40 percent bonds would have delivered a real return of 4.4 percent. This is considerably higher than the real return on bonds alone, which on average was 1.7 percent.

2.5.3 Projection of the value of the Fund

The risk associated with the management of the GPFG can also be illustrated by forward looking model projections (simulations). Such model projections make it possible to take into account several considerations that are of relevance to developments in the value of the GPFG, but not reflected in the historical return data described above. Such considerations include, *inter alia*, the following:

- There is an inflow of capital to the Fund from the net cash flow of the State from petroleum activities, and capital is contributed from the Fund to the fiscal budget in accordance with the fiscal policy guideline. Net inflows will contribute to increasing the value of the Fund, independently of the return.
- There is considerable uncertainty associated with the future return on the Fund, and it is not reasonable to expect future developments to mirror historical developments.

The model projections for the future value of the GPFG is based on the forecasted net cash flow from the petroleum activities, cf. Report No. 1 (2012–2013) to the Storting – The National Budget for 2013, as well as the fiscal policy guideline on contributions from the Fund to the fiscal budget. Return and risk for equities and bonds are based on long-run estimates, cf. Report No. 10 (2009–2010) to the Storting – The Management of the Government Pension Fund in 2009.⁹ The model simulates the Norwegian kroner value of the Fund. It takes into account the fact that both the oil price and the Norwegian kroner exchange rate may fluctuate. The projections presented below focus on five-year periods. The Ministry has previously presented corresponding analyses examining longer periods (15 to 20 years), cf. Report No. 15 (2010–2011) to the Storting – The Management of the Government Pension Fund in 2010.

⁹ The Ministry's estimates for the long-term real return on equities and government bonds are 5 percent and 2.5 percent, respectively. The estimates for the annual standard deviation (volatility) are 16 percent and 6 percent, respectively.

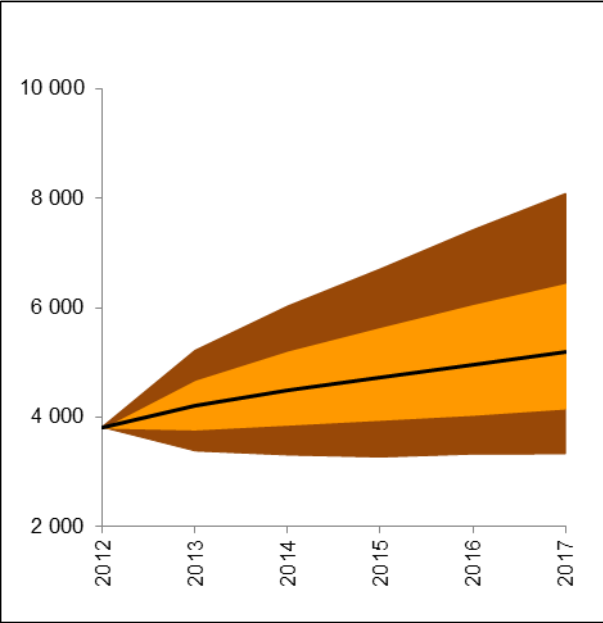


Figure 2.11 Projection of the real value of the GPFG five years into the future (until the end of 2017)¹ based on long-term assumptions. NOK billion at 2013 prices

¹ Based on the Ministry’s long-term assumptions concerning the future real return and risk, forecasted new inflows of petroleum revenues as per the National Budget for 2013, and oil price and Norwegian kroner exchange rate uncertainty. The value of the Fund as per year-end 2012 is NOK 3,816 billion.

Source: Ministry of Finance.

Figure 2.11 shows the simulated development in the real value of the Fund (after adjusting for inflation). The black line shows the expected future value of the Fund, whilst the fans around the line illustrate the uncertainty. The projections indicate a 68-percent probability that the value of the Fund will fall within the orange fan, whilst there is a 95-percent probability that the value will fall within the orange or the brown fan. The projections indicate a 68-percent probability that the real value of the Fund after five years will fall within the range from NOK 4,200 to 6,500 billion. The expected value is NOK 5,200 billion.

These forward looking model projections confirm the results from the above historical analysis which shows that one must be prepared for considerable fluctuations in future returns on the Fund.

The Ministry’s return and risk estimates are long-term assumptions. These are intended to reflect, in line with the investment horizon of the Fund, the expectations of the Ministry with regard to the real return and risk for periods that include many upturns and downturns in the financial markets. In the shorter run, for example over specific five-year periods, the financial market outlook may deviate considerably from the long-term expectations. The uncertainty in the future value of the Fund may therefore be greater than illustrated in figure 2.11.