

Non-Government-Guaranteed Bonds in the Petroleum Fund

From 2002, the Government Petroleum Fund will be investing a large portion of the portfolio in non-government bonds. The benchmark index initially held only government bonds, but bonds not guaranteed by a government will gradually be added. A certain amount of credit risk will be associated with the new bonds in the benchmark. The issuers of these bonds have a high credit rating, nevertheless. This article considers the background to the change. It also presents characteristics of the market for non-government-guaranteed bonds, and the main features of Norges Bank's plans for managing bonds with credit risk.

Relationship between the benchmark index and actual investments

The benchmark is defined by the owner (the Ministry of Finance) and shall serve two purposes:

It provides an expression of the long-term balance the owner (of the Petroleum Fund) tries to achieve between the objectives of achieving a high return and maintaining low risk in the portfolio.

It serves as a basis of comparison for the actual portfolio, so that the owner and the general public can judge management performance. If the manager opts for a portfolio composition that is different from the benchmark, a higher return must also be required over time than the return on the benchmark. If the manager is not attempting actively to exploit a particular market opportunity, the actual portfolio should be composed in such a way as to minimise the return differential against the benchmark.

Since 1998, Norges Bank has been allowed to invest in non-government-guaranteed bonds with a credit rating of BBB or better (high credit rating or investment grade) from the major credit rating agencies. As long as non-government-guaranteed bonds were not included in the benchmark, however, investing in paper of this type involved the Bank taking active risk in relation to the benchmark. This changed with effect from March 2002. The Bank will then in fact be taking active risk if it fails to invest in non-government-guaranteed bonds. The restructuring of the benchmark will therefore provide Norges Bank with a strong incentive to make similar changes in the actual bond portfolio, and invest more extensively in bonds without a government guarantee.

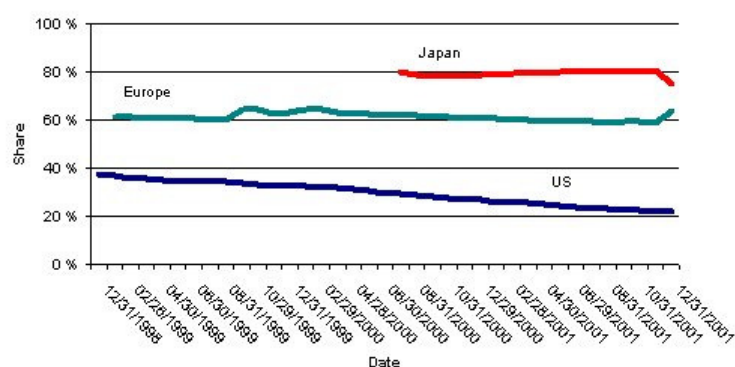
The background to the change

In a submission of 15 March 2001 to the Ministry of Finance, Norges Bank referred to three factors that justified the inclusion of non-government-guaranteed bonds in the Petroleum Fund's fixed income benchmark.

- The benchmark will be more representative of the Fund's investment opportunities.
- The expected long-term return on the benchmark will be somewhat higher if the benchmark is expanded.
- Developments in government outstanding debt (excluding Japan) indicated that government bonds will constitute a steadily smaller share of bond markets in the years ahead.

Chart 1 shows the share of the total market for bonds with a high credit rating¹ accounted for by domestic government bonds in the US, Europe and Japan in the period 1999-2001 [2 3 4](#).

Chart 1: Government bonds issued in domestic currency as a share of all bonds with a high credit rating



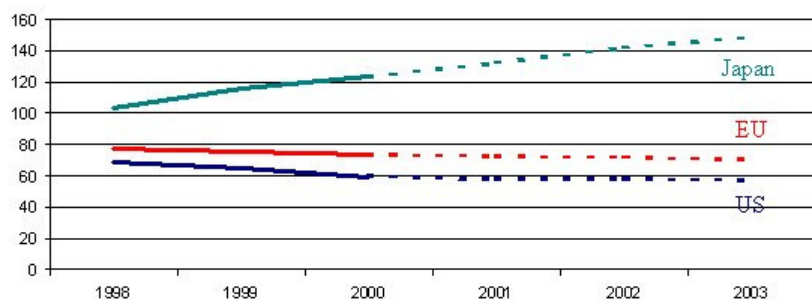
The chart shows that, relatively speaking, government bonds issued in the domestic currency account for a smaller share of the market in the US than is the case in Europe, and particularly in Japan. The US has long had a large, well diversified bond market in which the federal government, foreign governments, international organisations, financial enterprises and

industrial enterprises have all been active borrowers. Outside the US, the bond market has traditionally not been as important a source of funding for borrowers other than national governments.

The chart also shows that the share has been falling throughout the period in the US. At end-2001, the share of government bonds issued in domestic currency was almost half that at end-1998. During the intervening period, a strong US economy led to the federal government buying back some of its bond debt.

A year ago, it was expected that federal bond debt would be sharply reduced in the years ahead. The downturn in the US economy and the events of 11 September in the US have changed this assumption to some extent. Chart 2 shows developments in government gross financial commitments as a share of nominal GDP in the US, the EU and Japan in the period 1998-2000, and the most recently published OECD forecasts for developments in the period 2001 to 2003⁵. The chart shows that government debt as a share of GDP is expected to fall slightly in the US and the EU, while it is expected to rise sharply in Japan.

Chart 2: Gross government commitments as a share of nominal GDP in the US, the EU and Japan, 1998-2000, projections 2001-2003



Bonds issued by operators other than governments will normally have a higher effective yield to maturity than government bonds. Some of the yield differential can be explained as being due to the credit risk associated with these bonds. There is a greater probability of private issuers having payment problems than governments. An investor will therefore want compensation for this higher probability in the form of a higher yield. Within the universe of investment grade bonds, however, this probability of a loss will be very limited. Only a small portion of the actual yield differential can therefore be explained as compensation to investors for an objectively assessed probability of bankruptcy. In the period 1970-99, the annual average loss due to payment problems on bonds with the lowest rating within the class of investment grade (BBB bonds) in the US was 0.06 per cent⁶.

Most investors have a shorter investment horizon than the average maturity of the bonds. The return differential in relation to government bonds therefore depends not only on the yield differential today, but also on the yield differential at the end of the investors' evaluation horizon. In the class of investment grade bonds there is a greater probability that the average credit rating of the bonds will fall over time than that the reverse will happen. A higher rating than AAA (best rating) cannot be achieved regardless, whereas there are many possible lower rating levels. When a bond's rating relative to government bonds falls, the yield differential widens. An investor with a shorter evaluation horizon than the average maturity of the bonds will therefore also want compensation for an anticipated lowering of the credit rating of the bond portfolio.

Yield differentials over and above those due to the probability of downgrading give rise to an expected excess return on non-government-guaranteed bonds compared with government bonds. This expected excess return can be viewed partly as a liquidity premium and partly as a premium for the risk of downgrading described above. Non-government-guaranteed bonds are less liquid than government bonds, and investors will normally require a higher expected return for owning less liquid investments. The Petroleum Fund is a long-term investor with a limited need for high liquidity. If the liquidity premium is high, it will be desirable to make less liquid investments.

It must be stressed that this excess return is expected, not guaranteed, in the long term. There may be long periods during which non-government-guaranteed bonds have a lower yield than government bonds. This was the case in the US for the period June 1998 – December 2001 overall. Whereas investment grade non-government-guaranteed bonds have outperformed government bonds by an annual average of 1.4 percentage point over the past 20-year period, government bonds have had an average annual excess return of 0.28 percentage point since January 1998.

Chart 3: Yield differential between bonds with credit risk and government bonds, US 1990 - 2001

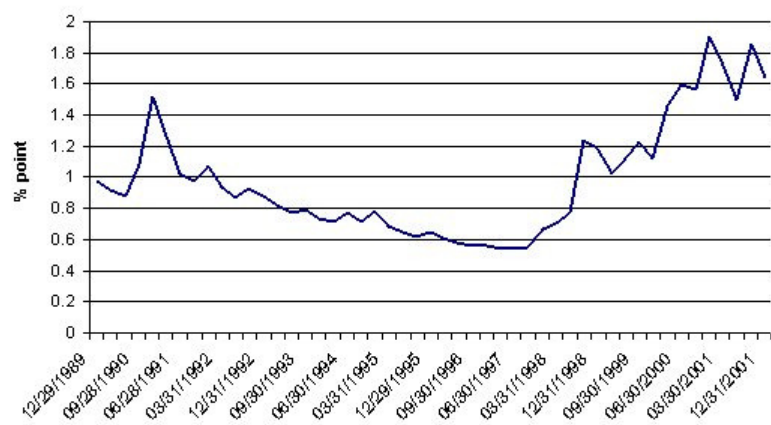


Chart 3 shows developments in the option-adjusted yield differential between corporate and government bonds in the US in the period 1990 – 2001⁷. The poorer performance of bonds with credit risk compared with government bonds in the period 1998-2001 is a consequence of the larger yield differential during this period⁸.

The market for non-government-guaranteed bonds

The fixed income instruments in the Petroleum Fund's benchmark for 2002 can be grouped into the following categories:

- government bonds issued in domestic currency (which made up the whole benchmark until 2002)
- bonds issued by companies with an explicit or implicit government guarantee, or bonds issued by local authorities in the domestic currency ("Local government domestic bonds"). Ordinary bonds issued by the large federal credit institutions⁹ in the US to finance their own activities provide an example of this.
- corporate bonds, such as bonds issued by banks, telecoms operators or manufacturing enterprises
- other bonds with credit risk which are not issued by companies. Examples of such issuers are international organisations or nation states that issue bonds in a foreign currency.
- mortgage-backed bonds, primarily with real property as collateral.

Bonds issued by federal credit institutions in the US are an important part of the category "mortgage-backed bonds". The large credit institutions buy up individual housing loans and package them into bond series which are offered to institutional investors. The individual borrower has the right to repay the housing loan faster than the payment plan calls for. The credit institutions provide guarantees for the borrowers in relation to the bond purchasers. These institutions have a very high credit rating. The yield differential between these bonds and government bonds is therefore not due primarily to credit risk, but must be viewed to a large extent as compensation for the investors' giving the borrowers the right to choose when to repay their loan. The borrowers must be expected to use this right to their own advantage, and investors must have compensation for this through the yield differential.

Tables 1-3 show the number of bonds and the share the individual categories made up in each region as at 31 December 2001, according to Lehman's broad bond indices.^{10 11}

Table 1: Number of bonds and the share represented by the individual categories as at 31 December 2001. North America

Category	Number of bonds	Share of market value in region (per cent)
Domestic government bonds	164	23.9
Local government domestic bonds	777	11.7
Corporate bonds	3651	22.6
Other bonds with credit risk	296	3.6
Mortgage-backed bonds	1900	38.3
Total	6788	100
Memorandum: Market value in billions of USD 7046		

Table 2: Number of bonds and the share represented by the individual categories as at 31 December 2001. Europe

Category	Number of bonds	Share of market value in region (per cent)
Domestic government bonds	386	64.2
Local government domestic bonds	323	6.2
Corporate bonds	1028	14.1
Other bonds with credit risk	219	4.8
Mortgage-backed bonds	430	10.7
Total	2386	100
Memorandum: Market value in billions of EUR 4859		

Table 3: Number of bonds and the share represented by the individual categories as at 31 December 2001. Asia and Oceania

Category	Number of bonds	Share of market value in region (per cent)
Domestic government bonds	287	75.1
Local government domestic bonds	441	11.0
Corporate bonds	565	13.2
Other bonds with credit risk	33	0.6
Mortgage-backed bonds	1	0.0
Total	1327	100
Memorandum: Market value (in billions of JPY) 339050		

The tables illustrate the following central features of the new benchmark index:

The number of bonds in the benchmark is being sharply increased. The average amount outstanding for the individual bond series is far lower than in the case of government bonds issued in the domestic currency, resulting in lower liquidity. The difference in liquidity between government bonds and corporate bonds is particularly marked.

The expansion of the benchmark has greatest consequences in the US, where government bonds issued in domestic currency only constitute a small portion of the total market. In Europe and Asia/Oceania domestic government bonds are still the most important category in the market.

Changes in the framework for management of the Petroleum Fund's fixed income portfolio

Acting on the advice of Norges Bank, the Ministry of Finance amended the Regulation relating to the Petroleum Fund and the appurtenant guidelines. The changes were made to adapt the management of the Fund to the expanded benchmark.

Previously, there was an absolute limit that a maximum of 10 per cent of the portfolio in terms of market value and duration¹² could be invested in non-government-guaranteed bonds. This restriction has been lifted, because these bonds constitute over 10 per cent of a market-weighted portfolio. The restriction of a maximum of 5 per cent invested in bonds with the lowest rating (BBB) in the high credit rating class has also been lifted.

There was previously a restriction to the effect that issuers of bonds had to be either a resident of one of the countries that were approved for fixed income investment or an international organisation. This meant that the Fund could not invest, for example, in a bond issued by the Korean Development Bank in Japanese yen, because Korea was not an approved market for fixed income instruments. This restriction has now been lifted. Nor is there any such restriction on bonds that are included in the commonly used bond indices, and it has therefore become easier to use bond indices in the market as a reference index without having to exclude individual bonds. The minimum rating requirement has been retained (with the exceptions in the next point), and the list of approved markets has been retained. For example, the Fund may not invest in domestic Korean government bonds, although it may buy bonds issued by Korean companies in USD, yen and other approved currencies, provided they have an approved credit rating.

The requirement that both the major rating agencies Moody's and Standard & Poor's should have issued a credit rating of at least Baa (Moody's) /BBB (S&P) has been changed to a requirement that at least one of the two must have given the issuer in question a high credit rating. The earlier requirement was more stringent than that used by suppliers of broad bond indices. With the change that has been made now, less customisation of the benchmark is necessary.

In the interests of flexible management, Norges Bank is permitted to hold up to 0.5 per cent of the bond portfolio in bonds with a BB rating (the highest rating outside the investment grade class). This ensures that Norges Bank is not compelled to sell a bond if it should be downgraded. Experience shows that there is considerable market impact just before and just after such a downgrading.

The Ministry of Finance has assessed in particular the share of mortgage-backed bonds in the US. The bulk of these bonds are issued by two federal credit institutions without an explicit government guarantee. To avoid too strong a concentration in the portfolio on paper from individual issuers who are assumed to have a certain amount of credit risk, the Ministry of Finance has elected to reduce the share of mortgage-backed bonds in the US to 25 per cent of what a purely market-weighted share would have been.

On the advice of Norges Bank, the Ministry of Finance has stipulated that the new benchmark, after the phasing in period is over, shall be as shown in Table 4.

Table 4: New benchmark index for fixed income portion of Government Petroleum Fund

Region	North America	Europe	Asia
Benchmark	Lehman Global Aggregate US + Canada	Lehman Global Aggregate Europe + Lehman Swiss Aggregate government bonds ¹	Lehman Global Asia/Pacific
Share	30%	50%	20%
Adjustments	The weighting of the category "mortgage-backed loans" has been reduced to 25% of their market-weighted share, corresponding to a relative increase in the weighting of domestic government bonds and bonds with credit risk	Bonds denominated in Norwegian kroner are not included in the Fund's benchmark	The markets not included in the Fund's investment universe (Korea, Thailand, Taiwan, Malaysia) are not included in the benchmark

¹ At present, Lehman Swiss Aggregate is not included in the European or global indices published by Lehman. To avoid an effect whereby the actual choice of index supplier influences the choice of market, the individual index for Swiss government bonds has been added. Such bonds are included in the Salomon World Government Bond Index, which has formed the basis for the benchmark up to 2002.

Plans for Norges Bank's management

The guidelines laid down by the Ministry of Finance place emphasis on cost-effectiveness in connection with the phasing in of the new benchmark portfolio. In markets where low liquidity is a real problem (this applies to the market for corporate bonds in particular) the rate of phasing in must be weighed up against against the transaction costs. The average purchase price of the new products may be higher if the Fund wishes to buy corporate bonds rapidly than if the purchases were spread over a longer period.

Norges Bank and the Ministry of Finance are aiming for a management regime in which the rate of phasing in will be continuously evaluated in relation to costs. This is partly because the liquidity in the market for many of the new products may vary substantially during the year, and also from one year to the next. In practice this means that prior to the phasing in, one cannot or should not necessarily operate on the basis of rigid plans for the amounts to be phased in during a month, a quarter or a year, but should rather aim for a more flexible system or programme. The managers in Norges Bank contribute here with assessments of market conditions, including an assessment of the tempo and costs of phasing in.

The initial aim of management is to purchase a portfolio that reflects the new benchmark index as closely as possible. This index is in many ways very different from the government bond index that the Petroleum Fund has used so far. In particular, only a limited selection of the securities in the benchmark index are actually available for purchase in the market. The risk associated with corporate bonds is also different from the risk associated with government bonds.

Due to the unavailability of some of the bonds in the benchmark the Petroleum Fund may have a correspondingly larger exposure and risk in relation to the companies whose debt paper it buys. In order to limit risk in relation to individual companies, emphasis will be placed on extensive use of diversification across borrowers.

It is planned that Norges Bank itself will manage a large portion of the non-government-guaranteed bonds. But a not insignificant portion of the portfolios will also be handled by external managers. They may well be involved in some aspects of the phasing in of the new index for the Petroleum Fund, for example the phasing in of corporate bonds and mortgage-backed securities. This will provide opportunities for drawing on the specialist expertise of external managers. It will also provide a basis for comparing the results of the internal management with what others can achieve.

A last important point about the new index concerns relations with our counterparties. Because the new index contains less liquid and less standardised securities, and because transaction costs associated with the purchase and sale of these securities are generally higher than for government paper, our relationship with the individual counterparties will be more important than before. It will be important, for instance, for us to be able to direct trades to the counterparties who can help to minimise our trading costs. To achieve this, all trades in new securities will be closely monitored. At the same time, a cost account provides a basis for attaching a figure to the costs associated with managing the new benchmark index.

1 The class with high credit ratings is defined as bonds rated as investment grade by credit rating agencies Moody's or Standard & Poor's.

2 Sources: Lehman US Aggregate Index, Lehman Pan European Index, Lehman Japan Aggregate Index.

3 Japan from July 2000.

4 The changes in relative market weights for Europe and Japan shown in the chart are due to technical adjustments in underlying indices, not changes in market values or new bond issues.

5 Source: OECD Economic Outlook, December 2001

6 Source: Moody's Investor Service: "Historical default rates of Corporate Bond Issuers, 1920 – 1999".

7 Some corporate bonds have a call option. This is a right (but not an obligation) for a borrower to redeem a bond in part or in its entirety at certain times prior to maturity. The bond issuer's option of repaying the loan earlier has a value in itself for the issuer. The price can be calculated with the aid of financial models. The call premium is found by deducting this price from the market price of the bond. From this price, the yield adjusted for the call premium can easily be found. The adjustment is made so that it is possible to arrive at yield differentials due purely to credit risk.

8 The price of a bond moves by definition in the opposite direction of the yield. If the yield on a bond with credit risk rises more than the yield on a government bond with a similar final maturity, the price will fall more. If the yields on both bonds fall, but most on the government bond, the price increase will be smallest for the bond with credit risk. In both cases, the yield differential widens, and the return over a short period is highest for the government bond, even though the absolute yield quoted in the market is lowest for this bond.

9 The three large institutions are known as Fannie Mae, Freddie Mac and Ginnie Mae, and only the last of these has an explicit government guarantee.

10 Lehman US Aggregate + Canada Government Index, Lehman Pan-European Aggregate Index, Lehman Asia/Pacific Aggregate Index.

11 These indices do not correspond exactly to the new benchmark index defined by the Ministry of Finance.

12 The price of a bond is the actual present value of all future promised cashflows (coupon payments and amounts due at maturity). Each of the cashflows is discounted to a net present value. The discount rate is the same as the yield on the bond. If the time from the present and up to the individual cashflow is weighted together with the individual cashflow's share of the net present value (price) of the bond expressed as a weighting, the duration of the bond is obtained. The higher the duration of the bond, the greater the impact a given interest rate change will have on the market price of the bond.

