

## **Market developments in 1998 - long-term perspective**

**The investment strategy of the Government Petroleum Fund is based on a long time horizon, and the return on the Fund may show wide year-on-year fluctuations. This article begins by examining movements in international equity and capital markets in 1998. We then consider what the return would have been over the past 20 years on a portfolio corresponding to the Government Petroleum Fund's benchmark portfolio. One of our conclusions is that the market return in 1998 was normal in the context of this time horizon, but that the fluctuations were unusually large. This year's experience illustrates the advantage of maintaining a portfolio that is widely diversified across a number of countries and different types of investment.**

### **Equity and capital markets in 1998**

Economic growth in major countries in the world economy varied substantially in 1998. The year was also unusual in that price inflation was subdued in an environment of turbulent financial markets. For many countries growth forecasts were revised downwards considerably during the year.

At the beginning of 1998 the outlook for economic growth and price inflation around the world was highly uncertain due to the crisis in Asian economies. In the US and the UK the prolonged cyclical upturn, with brisk growth recorded in 1997, was expected to slow, and GDP growth was projected at about 2.5 per cent in 1998. Fiscal policy in many EU countries was tightened in preparation for EMU, with GDP growth expected to stabilise at a level on a par with the US and the UK. Zero economic growth was projected for Japan.

In Japan, the trend was far more negative than anticipated, partly as a result of the economic problems experienced by its trading partners in Asia. Substantial structural problems in the country's financial system contributed to the sluggish performance of both Japan and other Asian countries. The problems in Asia resulted in a marked slowdown in the growth in international trade that gradually also had an effect on Western OECD countries.

The most important economies in both Europe and North America showed pronounced growth in the first six months of the year, ie an annual rate of 3-4 per cent. Growth was weaker in the second half of the year, particularly in Europe where the growth rate in the EU area fell to about 2 per cent towards the end of the year. The Federal Reserve and the major European central banks lowered interest rates to stimulate their economies in the last half of the year.

Over the summer it became evident that Russia, even with support from the International Monetary Fund (IMF), would not find any quick solutions to its burgeoning economic problems. On 17 August, Russia devalued its currency and the country no longer serviced its government debt. The economic problems in Russia had a contagion effect on countries which, like Russia, depended on short-term loans from international financial markets in order to finance substantial government budget deficits. In September, the central bank of Brazil was compelled to raise its key interest rate from about 20 per cent to nearly 50 per cent in order to counter a considerable outflow of capital from the country. These developments may prove to have a severe contagion effect on other Latin American countries.

Table 1: Projections for economic growth in 1999 were revised during 1998

Forecast	March	June	Sept.	Dec.
World	2,7	2,0	2,5	1,5
US	2,2	2,1	2,3	2,3
W-Europe	2,7	2,4	2,7	2,0
Japan	1,0	0,3	0,9	-0,6

Source: Consensus Forecast

Inflation in industrial countries has been low in recent years, and even more moderate in 1998. This primarily reflects the sharp fall in oil prices and other commodity prices over the last year, along with intensified competition as a result of cheaper imports of manufactured goods from Asia, where currencies have weakened. Strong competition and surplus production capacity in several major European countries also contributed to low price inflation. Measured by the CRB index, which includes a number of important commodities such as oil, commodity prices fell by 16.1 per cent in 1998.

Chart 2: Equity and bond prices in 1998, measured by the Petroleum Fund's benchmark index

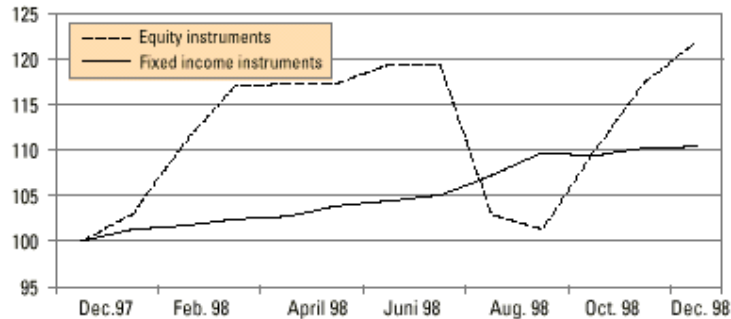


Chart 2 shows movements in equity and bond prices through the year, measured in relation to the Petroleum Fund's benchmark portfolio at year-end. Prices are indexed at 100 at the beginning of 1998, and are measured in local currency.

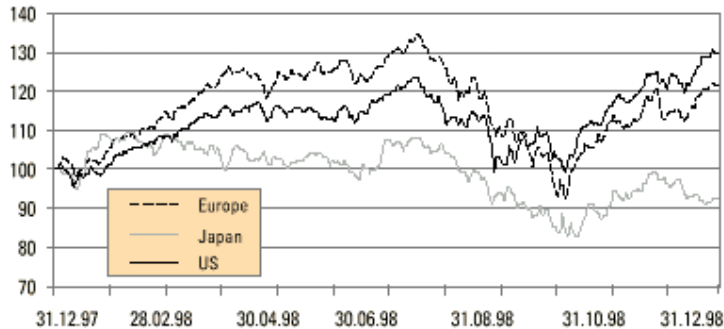
### From January to July

Movements in international equity and bond markets in 1998 may generally be divided into three periods, with clear changes in market participants' perception of economic developments. Table 1 shows revisions of growth projections for 1999 during 1998. Projections for Europe and Japan, in particular, were revised downwards by a substantial margin in the period from March to December 1998.

The first period lasted until mid-July, with equity markets included in the Petroleum Fund's equity index showing strong growth (see Chart 2). Measured by the Financial Times/Standard & Poor's (FT/S&P) World Index, the increase was 22.9 per cent on a worldwide basis. All major markets showed an increase, but there was considerable regional variation. The highest gains were recorded by Europe, at 34.6 per cent, while the US and Japan recorded increases of 23.3 and 7.9 per cent, respectively. Bond markets also exhibited positive developments. Salomon Smith Barney's World Index for government bonds moved up by 4.4 per cent. Once again, the highest increase in

prices was recorded by Europe at 5.6 per cent, compared with 4.2 and 2.0 per cent for the US and Japan, respectively.

Chart 3: Financial Times/Standard & Poor's indices for equity prices for selected countries/regions (31 Dec. 1997=100)



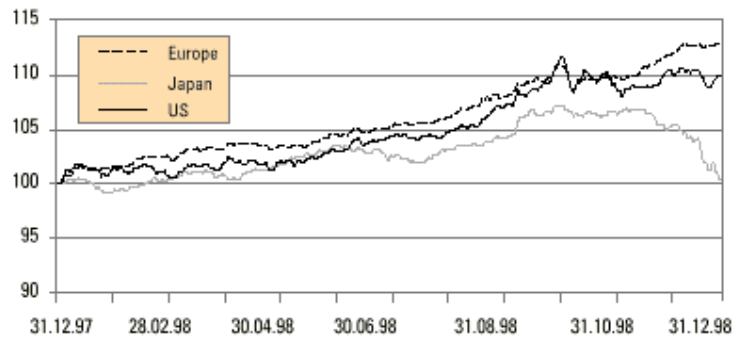
Source: Datastream

The positive trend in equity markets in the US and Europe was basically a continuation of developments that started in 1995, with robust growth in the real economy and low inflation. Spillover effects from Asia towards the end of 1997 were largely perceived to be of little consequence for the rest of the global economy. Equity prices in the US and Europe reached record levels during the end of the period. Bond yields in the US and particularly in Europe fell sharply during this period. Yields in German markets declined by more than half a percentage point to below 4.7 per cent for government bonds. Following the EU summit in May, yields in euro countries fell towards the German level. In Japan, the substantial problems in the country's financial industry and property markets continued to affect both equity and bond markets.

### From July to October

The second period continued to mid-October, and was marked by volatility in international financial markets. In mid-July, the Federal Reserve indicated that it might be necessary to raise interest rates in the US. A sharp fall in equity prices followed, but government bond prices continued to rise sharply in main markets. When Russia announced the postponement of government debt payments on 17 August, turbulence spread through the markets. At the same time, a large US hedge fund encountered severe problems. This created uncertainty and led to a marked shift of funds into the most liquid and safest bonds, issued by countries in the OECD area. The differential between returns on bonds with a government guarantee and bonds with credit risk widened considerably. Expectations of lower global economic growth also had an impact on developments. In the period from June to September, projections for growth in the international economy in 1999 were revised downwards from 2.5 per cent to 2.0 per cent (according to Consensus Forecast figures).

Chart 4: Salomon Smith Barney's World Government Bond Index 1998



Source: Datastream

Measured by FT/S&P's World Index, equity markets fell as much as 24 per cent. All main markets showed a substantial fall; Europe dropped by 31.5 per cent, while the US and Japan declined by 19.7 and 23.7 per cent, respectively. Developments in government bond markets, on the other hand, were very positive. On a global basis, bond prices rose by a good 4 per cent in this period. The highest return, 5.3 per cent, was in the US, while the figures for Japan and Europe were 4.6 and 3.9 per cent, respectively. Government bond yields in Europe fell to new record lows, and at the beginning of October yields on 10-year government bonds in Germany were under 4 per cent.

The Federal Reserve lowered its Fed Funds rate by 0.25 percentage point on 15 October. This came as somewhat of a surprise as it occurred in the period between two meetings of the Federal Open Market Committee. The rate was lowered to counter tendencies towards a more serious financial crisis and thereby a further slowing of economic growth. The Fed Funds rate was again reduced by 0.25 percentage point on 17 November. Other central banks followed suit with reductions in their key rates. The new European Central Bank lowered, in effect, interest rates in the euro area by announcing on 3 December that the key rate would be set at 3 per cent on 1 January 1999 when the euro was to be introduced.

#### **From October to the end of the year**

The reduction in central bank key rates led to a shift in the assessment of equity markets, and was the start of the third period of the year. By the end of the year, the US market had climbed back to the record levels prevailing in the summer. European equity markets recouped most of what they had lost. The impact on bond markets was more modest, reflecting to a larger extent the prospect of a slowdown in the world economy in 1999. The difference in return between government bonds and bonds with credit risk remained substantial, clearly reflecting the uncertain economic situation. The equity markets included in FT/S&P's World Index rose by 27.2 per cent in the fourth quarter. All main markets showed an increase, with Europe and the US at about 30 per cent and Japan at 11.4 per cent. Hesitant government bond markets caused prices to rise by an average of only 0.3 per cent in this period. Europe showed the highest return at 2.9 per cent, against 0.3 per cent for the US. Returns in Japan declined by 5.8 per cent, and at the end of the year the yield on German ten-year government bonds was 3.9 per cent.

Equity and bond prices in emerging markets fell sharply for the year as a whole. This is partly attributable to economic developments in Asia in the autumn of 1997 as well as to developments in the major western economies. Market indices for equities and

bonds showed losses of 24 and 10 per cent, respectively, but with wide variations among markets.

### **Fluctuations in equity and capital markets since 1978**

1998 was a year of financial market turbulence, particularly in the third quarter, as equity prices fell sharply. This section presents both a comparison of developments in 1998 with those of previous years and an overview of some of the important long-term trends in major markets. The period from 1978 to 1998 has been selected because data are readily accessible for all markets. The period has not been chosen because it is representative of future 20-year periods (see discussion in feature article 2). Compared with the 20 years prior to 1978, the period 1978-1998 is marked by particularly high returns on equities relative to bonds.

### **Historical returns**

We have attempted to calculate what the return on the Petroleum Fund would have been since 1978 if the Fund had been invested in the various markets represented in the present bench-mark portfolio (see separate box on indices used in the calculations).

The equity portion has been maintained at 40 per cent and the country distribution has been the same as that of the Petroleum Fund's benchmark portfolio for the entire period.

All return figures are taken from the commercial database, Datastream, and are measured in local currency in order to exclude effects of exchange rate changes.

### **Some features of equity and bond markets**

The key parameters in evaluating equities in relation to bonds are expected excess return, the risk associated with the returns on the two asset classes and covariance between the returns. The following charts illustrate the developments in these variables since 1978.

Chart 5: Half-year return on the benchmark portfolio for the current Petroleum Fund

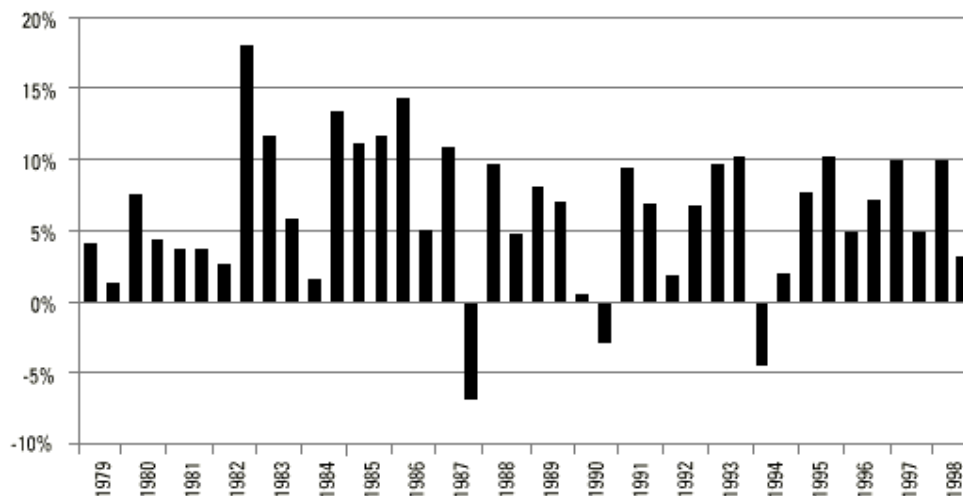


Chart 5 shows the total returns on the Petroleum Fund's benchmark portfolio since 1978. The total hypothetical return for 1998 is only slightly below the normal level

for the 20-year period. The return for the first half-year would have been about 10 per cent if the equity portion had been 40 per cent, while the return in the second half of the year would have been about 3 per cent. These returns are not abnormal for a portfolio corresponding to the Petroleum Fund.

In the period from February 1978 to December 1998, the average annual excess return on equity investments was approximately 7.5 percentage points. However, one should be cautious about using this as an estimate of future expected excess return. In its letter to the Ministry of Finance in which it was recommended that portions of the Petroleum Fund be invested in equities (sent in April 1997 and published in the Revised National Budget for 1997), Norges Bank referred to studies indicating a normal excess return of 4 per cent. These studies are based on a longer time horizon than the 20 years considered here. From an historical perspective, the last 20 years have been particularly favourable in terms of equity returns.

indices in its benchmark portfolio, and the return on these indices was used from the beginning of February 1986 to end-December 1998. FT/S&P's indices were introduced in January 1986, and the country indices of Morgan Stanley Capital International (MSCI) were used from January 1978 to end-January 1986. The difference in composition of the country indices for FT/S&P and MSCI is relatively small. However, the composition of FT/S&P's indices is broader, with more countries and companies represented. Returns for the indices are nevertheless approximately the same. The correlation between the two indices in the 1990s has been 0.998 for the US and 0.997 for the UK.

The return on equities is calculated as a weighted average of the local monthly returns for various country indices, with the country weights equal to those of the Government Petroleum Fund's benchmark portfolio at the beginning of 1998. The Petroleum Fund uses the Financial Times/Standard & Poor's (FT/S&P) country indices from the beginning of February 1986 until end-December 1998. From the beginning of February 1986 until end-December 1998, the country indices of the Salomon Brothers World Government Bond Indices (SBWGBI) were used for bonds. The Salomon Brothers Government Bond Indices (BPI) were used from January 1978 until January 1986. These indices differ from SBWGBI in that they are composed exclusively of bonds with a residual maturity of more than five years. The composition of these indices is also somewhat narrower: a selection of the relevant maturity segments in each country is used. The return on the bond index is calculated as a weighted average of the bond return for each country, with the land weights equal to those of the Petroleum Fund's benchmark portfolio at the beginning of 1998. Some bond return figures from certain periods, particularly early in the period measured, are not available for a few minor markets. In these cases, the country weights for the remaining countries have been adjusted upwards on a pro rata basis.

Chart 6: Half-year equity returns measured by the Petroleum Fund's benchmark index.

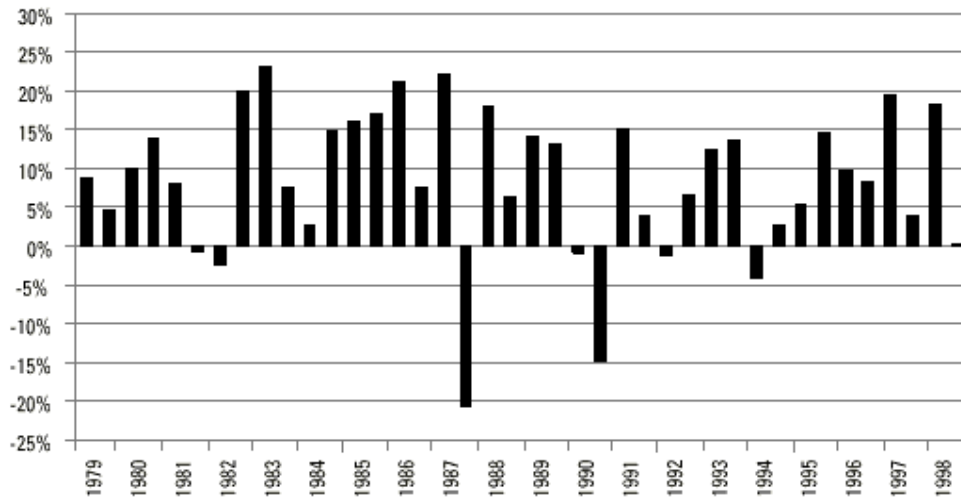


Chart 6 shows half-year return figures for the Petroleum Fund's equity index from the last half of 1978. The chart shows that the last six months of 1998 was a weak period, with almost zero return on equities. Since 1978, however, there have been seven six-month periods recording even poorer returns. The second half of 1987 in particular, as well as the second half of 1990, showed a very weak performance, with negative returns of 21 and 15 per cent, respectively. The return in the second half of 1998 is not among the worst, and such low returns must also be expected in the future. Similarly, periods such as the first half of 1998, which resulted in equity investment returns as high as 18 per cent, will also occur.

Chart 7: Half-year returns on bonds measured by the Petroleum Fund's benchmark index

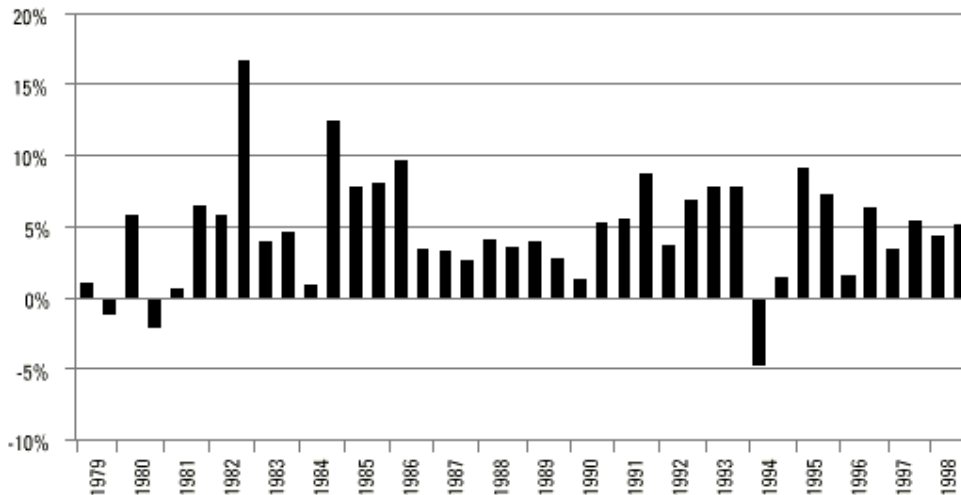


Chart 7 shows movements in international bond markets. The returns recorded on the Petroleum Fund's bond portfolio for both the first and the second half of 1998 were around 5 per cent. The year-end total is only slightly above the average for the 20-year period.

Chart 8: Moving average 12-month differential - equity return less bond return

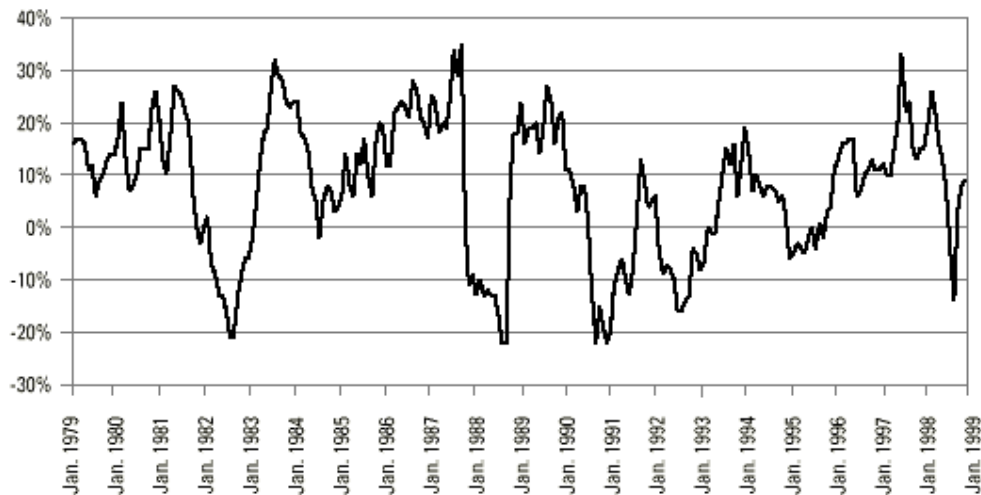


Chart 8 shows the moving average 12-month excess return (ie the excess return over the 12 months prior to the date specified) on equities in relation to bonds, measured from January 1979. The return figures are calculated for the equity and bond portions of the benchmark portfolio of the Petroleum Fund.

The standard deviation for the return on equities has varied widely since 1978, whereas the trend for bonds appears to be negative. The standard deviation for equities for the 20-year period is approximately 13 per cent, and for bonds just under 5 per cent. Over the last year, however, returns on equities have fluctuated to an unusually large extent, with a standard deviation of about 20 per cent for a diversified world index. At the same time, bonds have had a mere 2.7 per cent standard deviation over the past year. It is interesting to note that the equity market had a standard deviation of slightly under 7 per cent in 1995, ie volatility has increased nearly threefold in the past three years. It is difficult to determine whether this is due to turbulence in equity markets or whether these new levels will persist. For bond markets, it appears that this volatility may have stabilised at a level just below 3 per cent. However, these figures may change quickly in the future.

Chart 9 shows that the uncertainty associated with returns on a world equity index has increased over the past three years. This is partly due to an increase in the degree of co variation between equity markets during this period. Chart 10 shows the moving 12-month correlation between equity returns in three markets, the US, Germany and Japan.



Chart 9: Moving 12-month standard deviation for equity and bond returns measured by the Petroleum Fund's benchmark portfolio

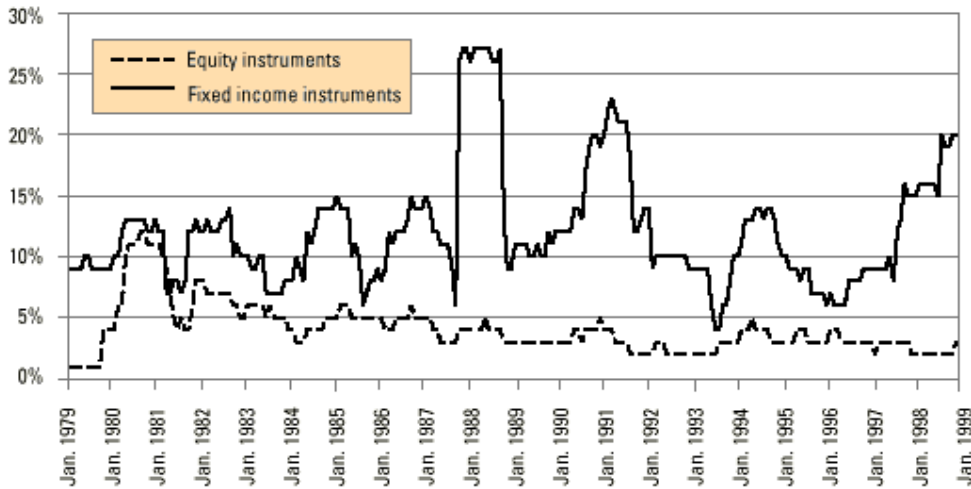


Chart 9 shows the standard deviation for annual returns, based on moving 12-month periods for equities and bonds. The standard deviation indicates the extent to which the return rate has varied from month to month within the 12-month period up to the date specified.

Chart 10: Co variation between equity markets in the US, Germany and Japan. Moving 12-month correlation.

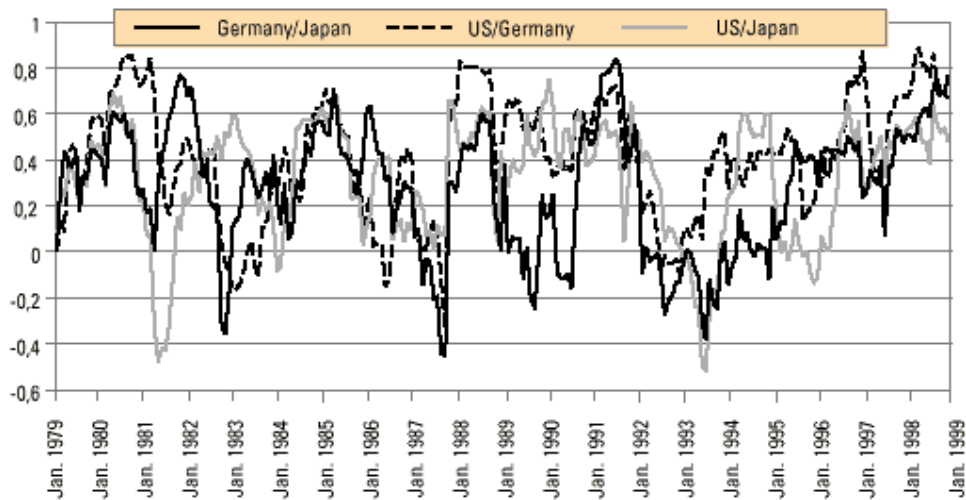


Chart 10 shows the correlation between G3 equity markets based on 12-month moving windows. The correlation coefficients indicates the degree of co variation between returns.

Returns in 1993 for these three equity markets show virtually no co variation. Later, however, there is a rise in the correlation coefficients, and they were between 0.5 and 0.8 in 1998. The chart shows that this is not the first time the correlation has been at such a high level. It has often been pointed out that the correlation between the returns in equity markets is very high in times of turbulence. The correlation coefficients for 1988 (which encompass the fall in share prices in October 1987) also show particularly high covariation between markets. It is therefore difficult to determine

whether the high correlations now observed are due to turbulence in equity markets or whether this is a sign of a trend towards more integrated global equity markets. Chart 11 shows the corresponding moving 12-month correlation for returns in G3 country bond markets. It is more difficult to identify any clear trends from this chart. If anything, correlations have weakened since 1987. There are fewer indications of increasing global integration for bond markets than for equity markets. In Europe, however, EMU has already led to a closer integration of bond markets. It is also interesting to note that bond markets did not show a higher degree of co variation than equity markets in 1998. Thus the advantages of spreading bond investments across regions appear to be as great as those offered by diversifying investments in equities.

Chart 11: Co variation between government bond markets in the US, Germany and Japan. Moving 12-month correlation coefficients

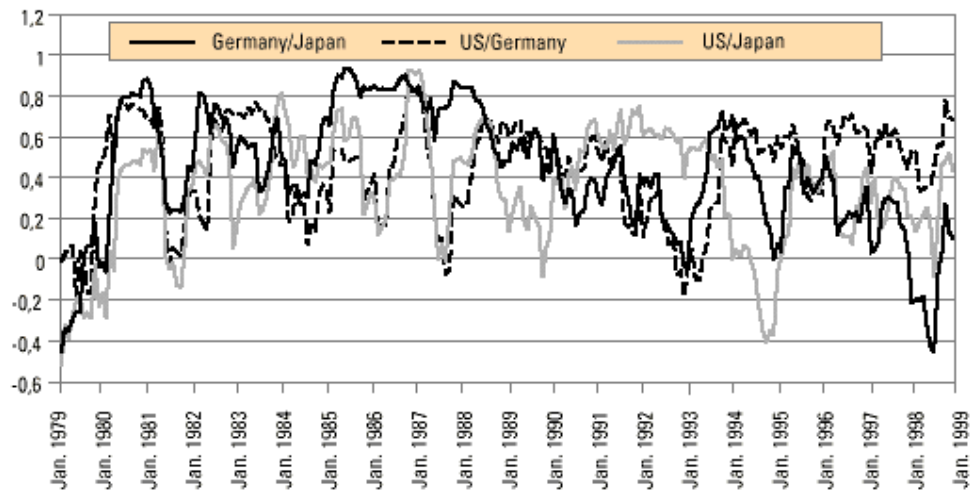
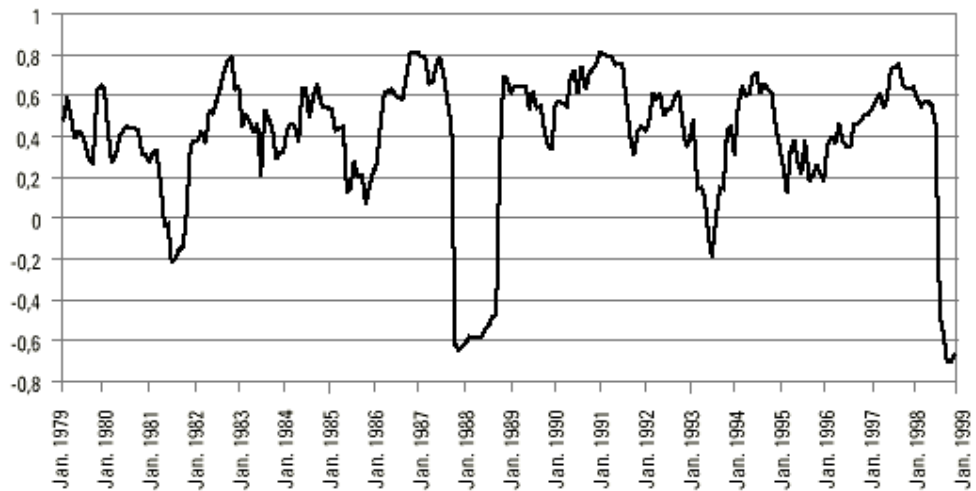


Chart 11 shows 12-month moving correlations for the returns in the bond markets of the G3-countries.

A global portfolio such as the Government Petroleum Fund's also reaps substantial diversification benefits from investing in two asset classes, equities and bonds. Chart 12 shows the moving 12-month correlation between the world equity index and the world bond index. Under normal circumstances, this correlation has been about 0.4. However, some extremely negative values can also be observed. The correlation was as low as -0.6 following October 1987 and -0.7 in the last quarter of 1998. This is actually the lowest recorded correlation between the world equity portfolio and the world bond portfolio in the period from 1979 to the present date.

Chart 12: Moving 12-month correlation between equity and bond returns measured by the Government Petroleum Fund's benchmark portfolio



The correlation between the markets can be summed up in a somewhat simplified manner: when equity prices fall, many investors become very nervous about future equity returns. Consequently, large sums of money are transferred to safer securities such as government bonds. This results in a rise in bond prices and a fall in equity prices. For investors with a relatively stable distribution of equities and bonds, this phenomenon represents diversification between asset classes. When equity returns are extremely negative, this is often matched by a positive development in the bond market.