

June 2006

# Norwegian Government Petroleum Fund Annual Performance Evaluation Report 2005

**Prepared for:**  
Norwegian Ministry of Finance

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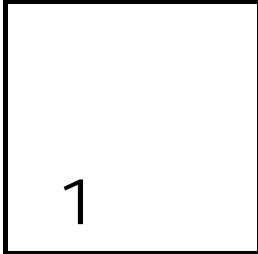
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- A. Calculation Methodology
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- C. Style Research Portfolio Analysis Definitions



## The Role of Mercer Investment Consulting and Mellon Analytical Solutions

### 1.1 Background

- This report was commissioned by the Norwegian Ministry of Finance (“the Ministry”) and has been prepared by Mercer Investment Consulting (“Mercer”) in accordance with the terms of the contract awarded by the Ministry in relation to the Norwegian Government Petroleum Fund (“the Petroleum Fund”). Prior to 1 December 2004, the Petroleum Fund consisted of the “Ordinary Portfolio” and the “Environmental Fund”. On 1 December 2004, when new ethical guidelines were adopted for the Petroleum Fund as a whole, the Environmental Fund’s investments were transferred to the Petroleum Fund. The terms of reference for this work are set out in the Invitation to Tender issued by the Ministry to Mercer on 13 May 2002.

### 1.2 Role of Mercer

- The purpose as set out in the Public Procurement document is for Mercer to verify Norges Bank’s internal performance measurements and to strengthen the Ministry’s basis for evaluating the competence and actions of Norges Bank. Mercer outsources the role of performance verification to Mellon Analytical Solutions, an independent performance measurer appointed by Mercer.

### 1.3 Role of Mellon Analytical Solutions

- The function of calculating and verifying Norges Bank’s internal performance measurement is carried out by Mellon Analytical Solutions under the guidance of Mercer who retains overall responsibility for the process. Mellon Analytical Solutions calculates performance for the Petroleum Fund based on portfolio data and market values supplied by the custodians, JP Morgan Chase and Citigroup.

- Mellon Analytical Solutions employs the “time weighted” rate of return as the base performance statistic. This return measure is consistent with the one employed by Norges Bank and takes into account investment income, as well as realised and unrealised capital profits or losses. The use of this statistic minimises distortions due to cash flows into and out of a portfolio which are, in general, outside the control of the investment manager. Further details about Mellon Analytical Solutions’ calculation methodology are contained within Appendix A.

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## Summary of Control Function

### 2.1 Scope of Control Function

- Mercer has, in conjunction with Mellon Analytical Solutions, performed control and verification functions throughout 2005, in accordance with the terms of the contract awarded by the Ministry.
- The objective of this process has been to check Norges Bank's internal performance measurements and to perform wider verification checks, both at portfolio and benchmark levels according to instructions received from the Ministry.

### 2.2 Controls conducted in 2005

- During the course of 2005 Mercer has, in conjunction with Mellon Analytical Solutions, measured and verified the monthly returns of the Petroleum Fund, along with both the respective benchmark returns in accordance with the currency basket measure and Norwegian Kroner terms.
- Throughout the report, performance for 2005 in respect of the Equity and Fixed Income segments of the Petroleum Fund and longer term performance (with the exception of the currency basket return and benchmark calculations prior to 31 December 2003) has been sourced from Mellon Analytical Solutions.
- The monthly performance of the Petroleum Fund at the Total, Equity and Fixed Income level has been reported to the Ministry by means of a report issued directly by Mellon Analytical Solutions.
- In the event of discrepancies in performance calculation between Norges Bank's internal performance measurement and Mellon Analytical Solutions' calculations, when measured to two decimal places (e.g. 0.01% difference), further checks are made. The results of which are reported to

the Ministry by means of a letter accompanying the monthly report. Additionally, Norges Bank provides a summary explanation of the differences in market values and performance reporting between Norges Bank and Mellon Analytical Solutions on a monthly basis.

- A comprehensive summary of the data processing and reporting process that Mellon Analytical Solutions carries out as a result of its role in the Control Function is contained within Appendix B.

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## Petroleum Fund Details

### 3.1 Performance objective

- The Ministry has delegated the operational management of the Petroleum Fund to Norges Bank who manage the Petroleum Fund in accordance with a mandate stipulated by the Ministry in public regulations. The performance objective is to maximise returns given the restrictions imposed by the regulations and the desired risk profile. The risk tolerances for the Petroleum Fund is an ex-ante tracking error of 1.5% p.a.
- The Ministry specifies the benchmark portfolio comprised of equity and fixed income instruments reflective of the Petroleum Fund's investment strategy.

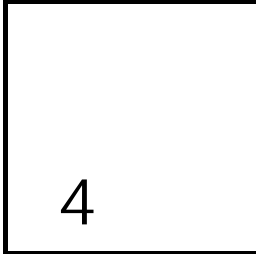
### 3.2 Petroleum Fund Benchmark

- The current strategic benchmark consists of 60% fixed income and 40% equities.
- A new fixed income benchmark was introduced in 2002, which is constructed from the Lehman Global Aggregate family of indices.
- The equity benchmark uses FTSE All-World indices and market capitalisation weights. The strategic weights within the customised equity benchmark are Europe 50% and Americas/Asia/Oceania/Africa 50%. The strategic weights within the customised fixed income benchmark are 55% Europe, 35% Americas and 10% Asia/Oceania.
- The reader should note that extraordinary transaction costs are incurred when new transfers are made into the Petroleum Fund. Such costs are not deducted when the index supplier calculates the return on the benchmark. For the purpose of this report the benchmark return has not been adjusted for such costs, despite the presence of such extraordinary transaction costs detracting from the Petroleum Fund's returns. In addition to the

transaction costs outlined above, the Petroleum Fund pays tax on share dividends in a number of countries. As from 2004 the equity benchmark is adjusted for tax on share dividends.

- Further detailed information on benchmarks is contained within Appendix B.





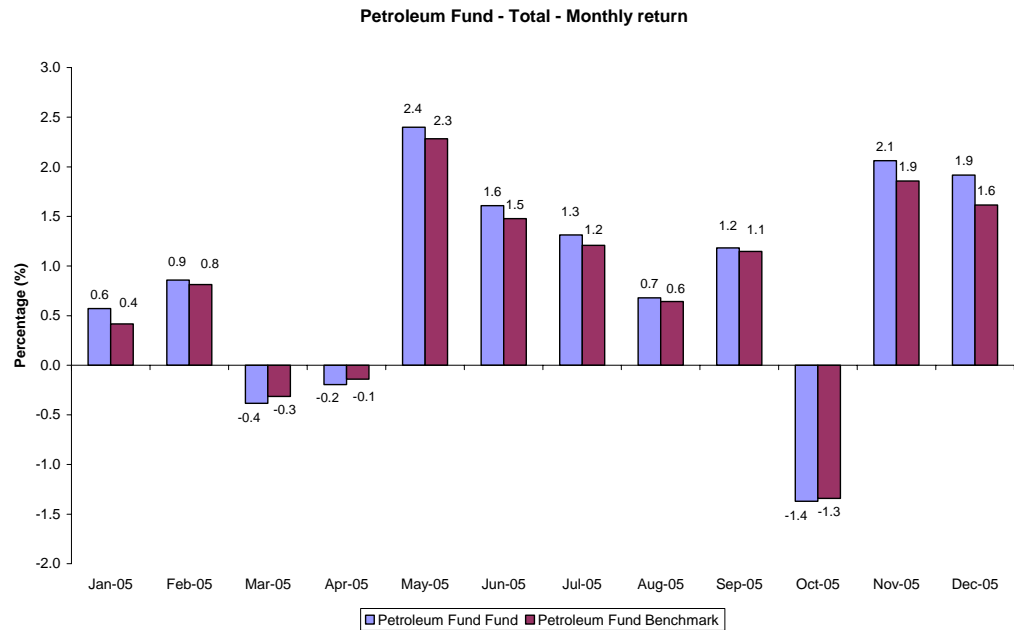
## Fund Performance

This section of the report analyses the Petroleum Fund's monthly performance and corresponding benchmark performance over the twelve month period to 31 December 2005, along with longer term analysis. Numerical performance shown in the charts is given to one decimal place. Performance commentary considers performance to two decimal places.

For the purpose of this report all fund and benchmark returns contained within sections 4.1 and 4.3 of this report, are expressed in terms of the basket of currencies contained within the benchmark. The currency basket measure is relevant when assessing the Petroleum Fund's performance against the stated objective of maximising the Petroleum Fund's international purchasing power. Section 4.2 shows performance expressed in Norwegian Kroner.

Sections 4.1 and 4.2 consider the Petroleum Fund's performance along with the monthly performance for the Equity and Fixed Income segments of the Petroleum Fund Portfolio over the twelve month period to 31 December 2005. Section 4.3 considers longer term performance for the Petroleum Fund.

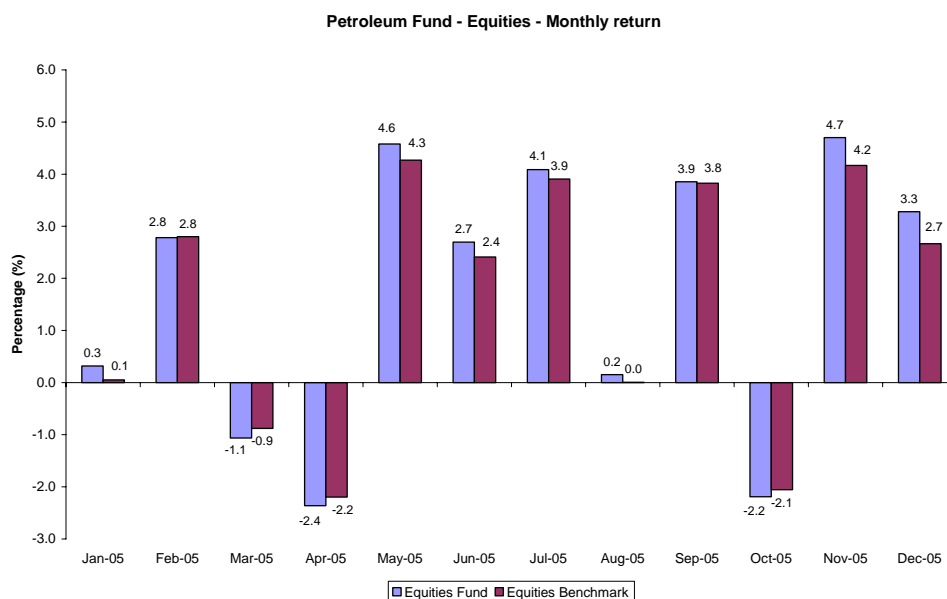
#### 4.1 Petroleum Fund Returns (Currency Basket)



Data source: Returns calculated by Mellon Analytical Solutions Ltd. (c)  
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- Over the twelve month period to 31 December 2005, the Petroleum Fund produced a cumulative return of 11.10% ahead of the benchmark return of 10.04% by 1.06%.
- Total Fund performance exceeded the benchmark in each month of 2005 with the exception of March, April and October where performance was marginally below benchmark. Outperformance was greatest in November and December, where performance exceeded the benchmark returns of 1.86% and 1.61% by 0.20% and 0.30% respectively.

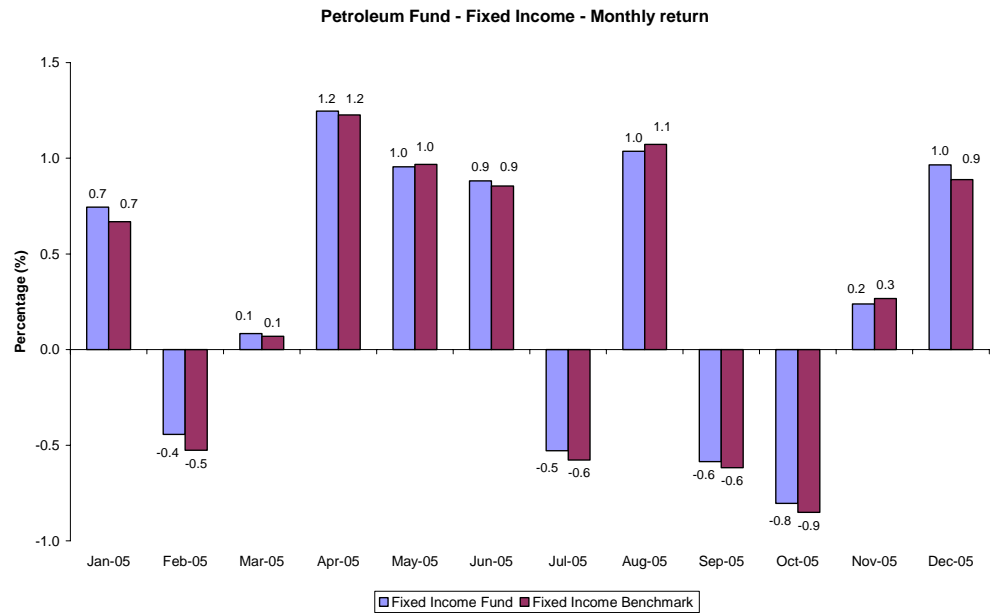
### 4.1.1 Petroleum Fund - Equity Returns (Currency Basket)



Data source: Returns calculated by Mellon Analytical Solutions Ltd. (c)  
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- Over the twelve month period to 31 December 2005, the Equity segment of the Petroleum Fund produced a cumulative return of 22.49%, ahead of the benchmark return of 20.33 by 2.16%.
- On a month-by-month basis, the performance of the Petroleum Fund's Equity segment exceeded the benchmark in each month, with the exception of February, March, April and October, where performance was marginally behind benchmark. Outperformance was greatest during November and December, where performance exceeded the benchmark by 0.53% and 0.61% respectively.

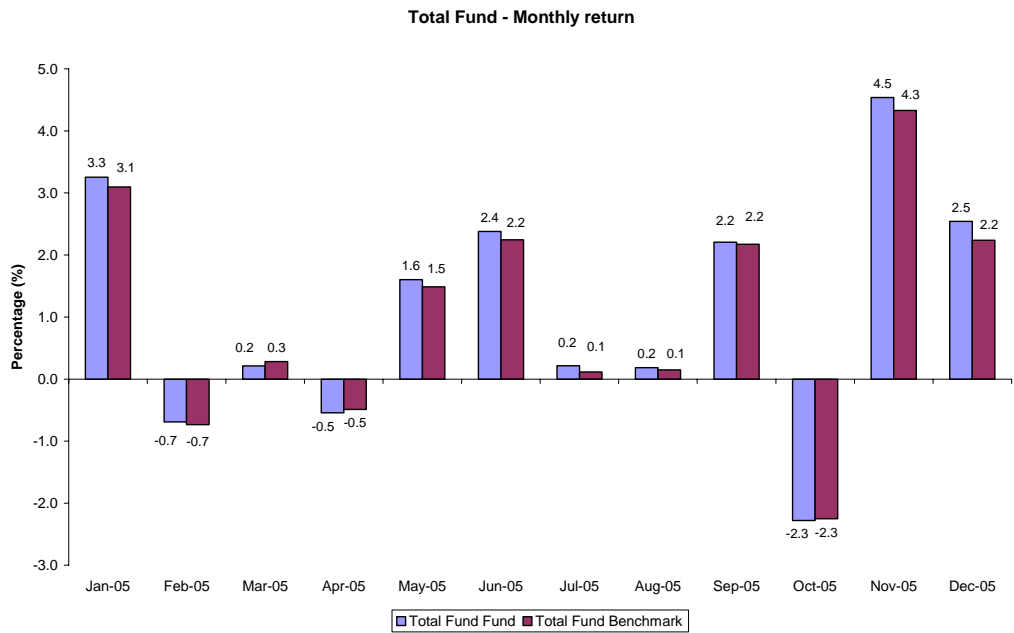
#### 4.1.2 Petroleum Fund - Fixed Income Returns (Currency Basket)



Data source: Returns Calculated by Mellon Analytical Solutions Ltd. (c)  
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- Over the twelve month period to 31 December 2005, the Fixed Income segment of the Petroleum Fund returned 3.82%, ahead of the benchmark return of 3.47% by 0.35%.
- On a month-by-month basis, the Petroleum Fund's Fixed Income segment exceeded the benchmark in each month, with the exception of May, August and November, where performance was marginally behind benchmark. Outperformance was greatest during January, February and December where performance exceeded the benchmark by circa 0.1%.

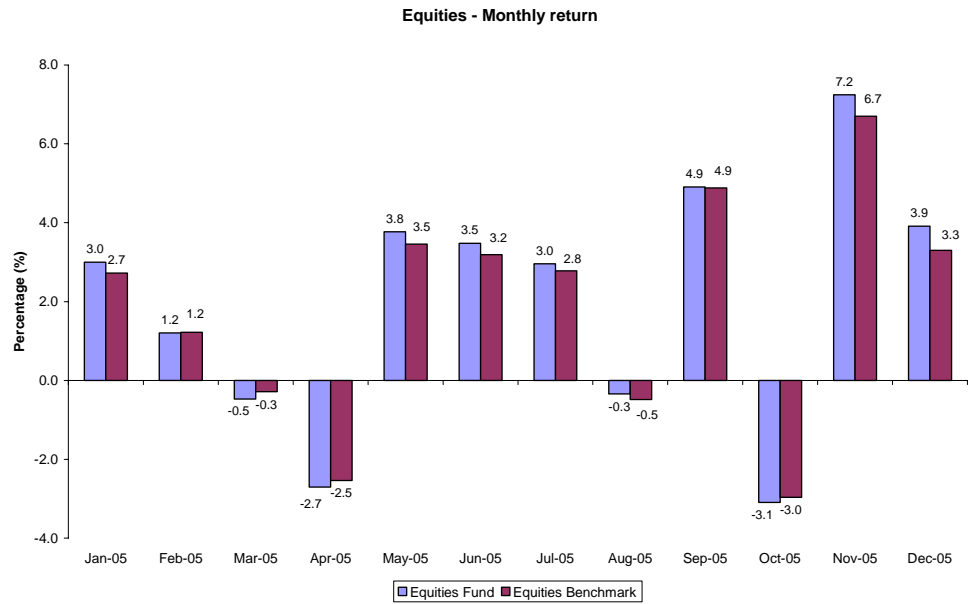
## 4.2 Petroleum Fund Returns (Norwegian Kroner)



Data source: Returns Calculated by Mellon Analytical Solutions Ltd. (c)  
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- Over the twelve month period to 31 December 2005, the Petroleum Fund produced a cumulative return of 14.28%, outperforming the benchmark return of 13.19% by 1.09%.
- Total Fund performance exceeded the benchmark in each month with the exception of March, April and October where performance was marginally below benchmark. Outperformance was greatest in November and December, where performance exceeded the benchmark returns of 4.33% and 2.24% by 0.21% and 0.30% respectively.

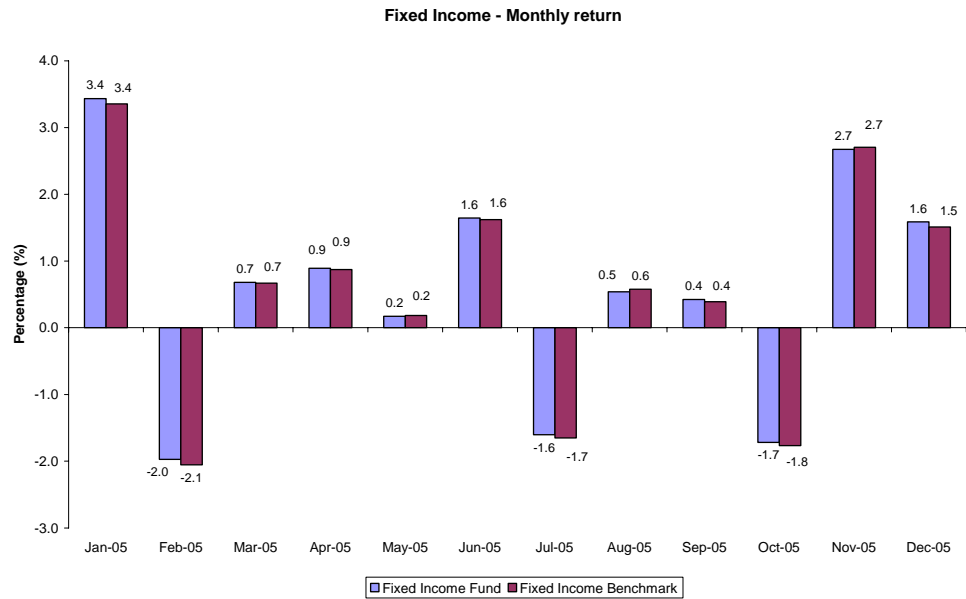
#### 4.2.1 Petroleum Fund - Equity Returns (Norwegian Kroner)



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- Over the twelve month period to 31 December 2005, the Equity segment of the Petroleum Fund returned 26.00%, outperforming the benchmark return of 23.77% by 2.23%.
- On a month-by-month basis, the performance of the Petroleum Fund's Equity segment exceeded the benchmark in each month, with the exception of February, March, April and October, where performance was marginally behind benchmark. Outperformance was greatest during the months of November and December, where performance exceeded the benchmark return of 6.70% and 3.30% by 0.54% and 0.62% respectively. During the month's of January, May and June, performance exceeded the benchmark by circa 0.3%.

#### 4.2.2 Petroleum Fund - Fixed Income Returns (Norwegian Kroner)



Data source: Returns Calculated by Mellon Analytical Solutions Ltd. (c)  
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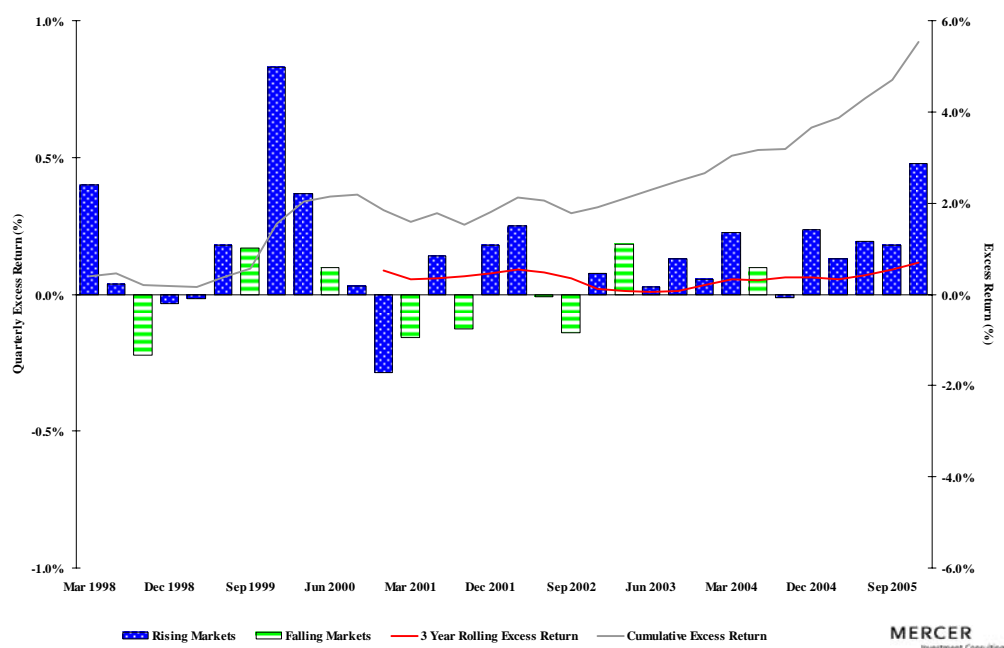
- Over the twelve month period to 31 December 2005, the Fixed Income segment of the Petroleum Fund returned 6.80%, outperforming the benchmark return of 6.43% by 0.37%.
- On a month-by-month basis, the Petroleum Fund's Fixed Income segment exceeded the benchmark in each month with the exception of May, August and November, where performance was marginally behind benchmark. Outperformance was greatest during January, February and December, where performance exceeded benchmark by circa 0.1%.

### 4.3 Petroleum Fund (Currency Basket) Longer term performance

The following charts show quarterly performance relative to benchmark for the eight-year period ending 31 December 2005 for the Petroleum Fund and the Fixed Income segment, and the seven and three-quarter year period ending 31 December 2005 for the Equity segment. In addition, the charts illustrate the three-year rolling and cumulative excess returns over the period ending 31 December 2005. As the charts evaluate relative performance, they can be used as a measure to assess the manager's ability to add value in excess of benchmark over a period of time.

- The charts are generated using Mercer Manager Performance Analytics (MPA) and uses local returns from the currency basket measure. This is done to ensure that the rising/falling market indicator is not influenced by changes in the value of Norwegian Kroner.
- Performance since 1 January 2004 has been sourced from Mellon Analytical Solutions. Prior performance has been sourced from Norges Bank.

#### 4.3.1 Petroleum Fund – Total Returns (Currency Basket)



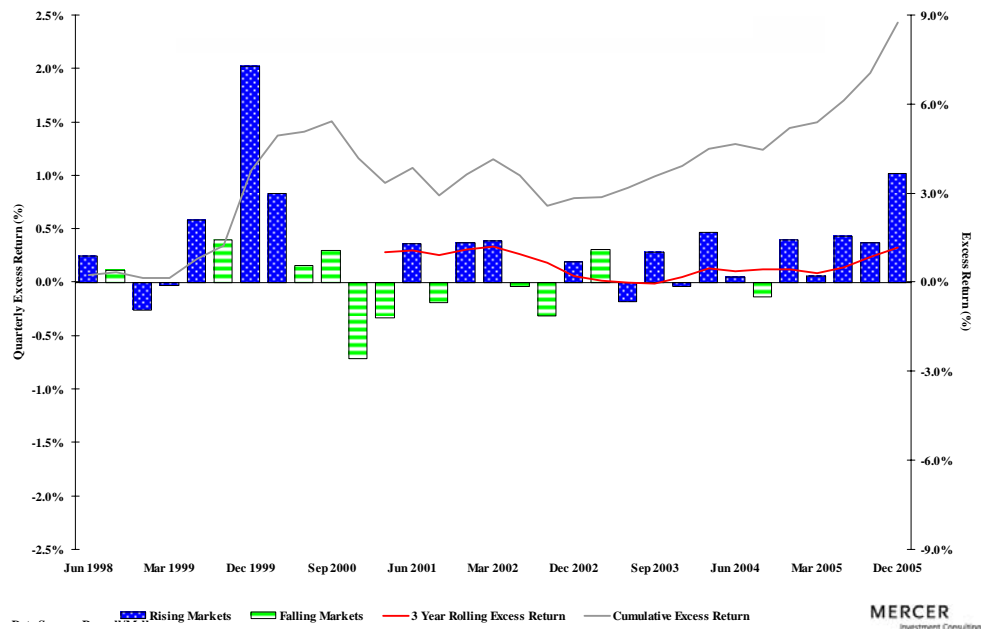
Source: Mercer MPA , Norges Bank and (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd.

- The Petroleum Fund outperformed its benchmark on a quarterly basis in twenty three of the thirty two quarters under review.



- Relative performance between 1 January 1998 and 31 December 2002 has been mixed, with eight quarters of underperformance. With the exception of one quarter, relative performance since the end of 2002 has been consistently above benchmark.
- It is notable that during periods of rising markets, the portfolio has had the tendency to outperform.
- Long term relative performance remains healthy and continues to improve with cumulative excess return over the eight years ending 31 December 2005 close to 5.6%. Rolling three-year excess returns have been consistently positive.

#### 4.3.2 Petroleum Fund - Equity Returns (Currency Basket)

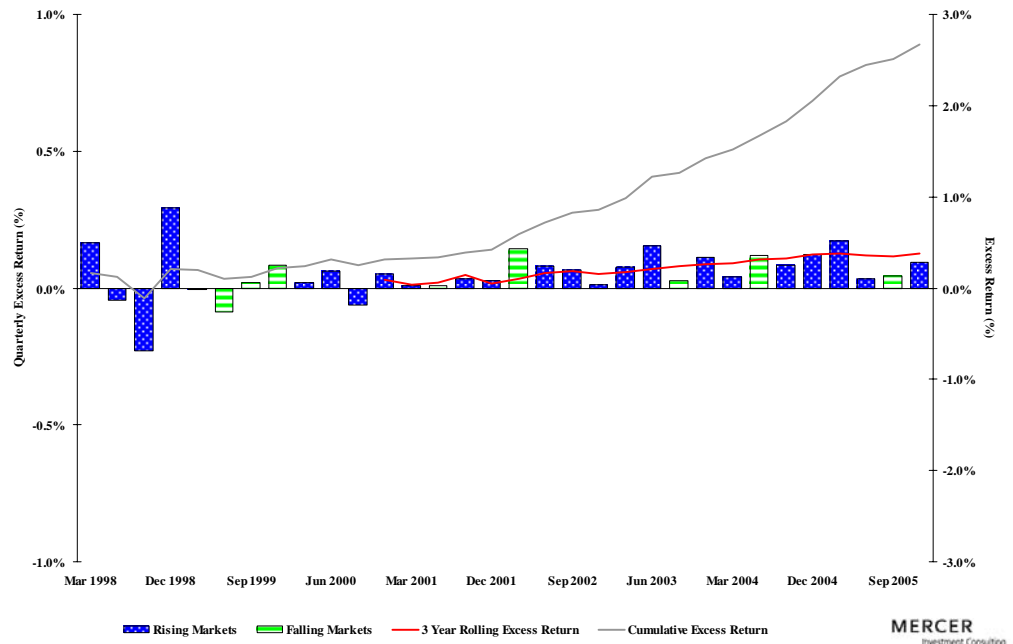


Source: Mercer MPA, Norges Bank and (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd.

- Performance has been mixed over the seven and three-quarter year period ending 31 December 2005; the Equity segment has outperformed its benchmark in twenty one out of the thirty one quarters, underperforming in the remainder.
- Rolling three-year performance was strong throughout 2001 and the first part of 2002. Performance fell to a low point mid 2003 however has since remained above benchmark and has risen steadily through to 31 December 2005.

- Cumulative excess returns for the seven and three-quarter year period to 31 December 2005 are positive and in excess of 8.8%, having risen sharply during 2005.
- During periods of rising markets, the portfolio has had the tendency to outperform.

#### 4.3.3 Petroleum Fund - Fixed Income Returns (Currency Basket)



Source: Mercer MPA, Norges Bank and (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd.

- With the exception of the first three years, where performance was mixed, the Fixed Income segment of the Petroleum Fund has consistently outperformed its benchmark over the eight-year period to 31 December 2005.
- Rolling three-year excess returns have been consistently positive in the eight year period under review.
- Cumulative excess returns over the eight year period to 31 December 2005 are positive, and in excess of 2.7%. Cumulative performance has risen steadily over the eight year period.

## 5

## Style Research Portfolio Analysis

### 5.1 Introduction

- This report takes a closer look at the style characteristics of the Equity segment of the Petroleum Fund.
- When analysing the Equity segment's style characteristics we have utilised an analytical software package called Style Research Portfolio Analysis ("SRPA") provided by Style Research Limited. SRPA looks at the individual securities held within a portfolio at any one point in time (a 'snap-shot') and uses a bottom up approach to analyse the style adopted and risk taken by the investment manager. The snap-shot analysis is based on a detailed, multi-dimensional examination of the equity portfolio's composition – not historical returns.
- The SRPA risk attribution model is different from the risk model used by Norges Bank. Norges Bank use a RiskManager risk model from Riskmetrics to measure expected tracking error. The RiskManager model makes direct use of security price series to estimate the Covariance matrix, whereas the SRPA model uses quarter-end security prices in determining the Covariance matrix.
- The charts shown in section 5.2 highlight specific style characteristics of the Equity segment as at 31 March 2005, 30 June 2005, 30 September 2005 and 31 December 2005. The set of charts shown in Section 5.2 emphasise the key style features of the Equity segment in terms of any "value" tilts (represented by the first group of blue bars) and "growth" (represented by the second group of green bars). The analysis is conducted relative to the customised benchmark of the equity segment of the Petroleum Fund. Any figure (represented as Standard Deviations away from the benchmark mean) greater than  $\pm 1$  is treated as significant.

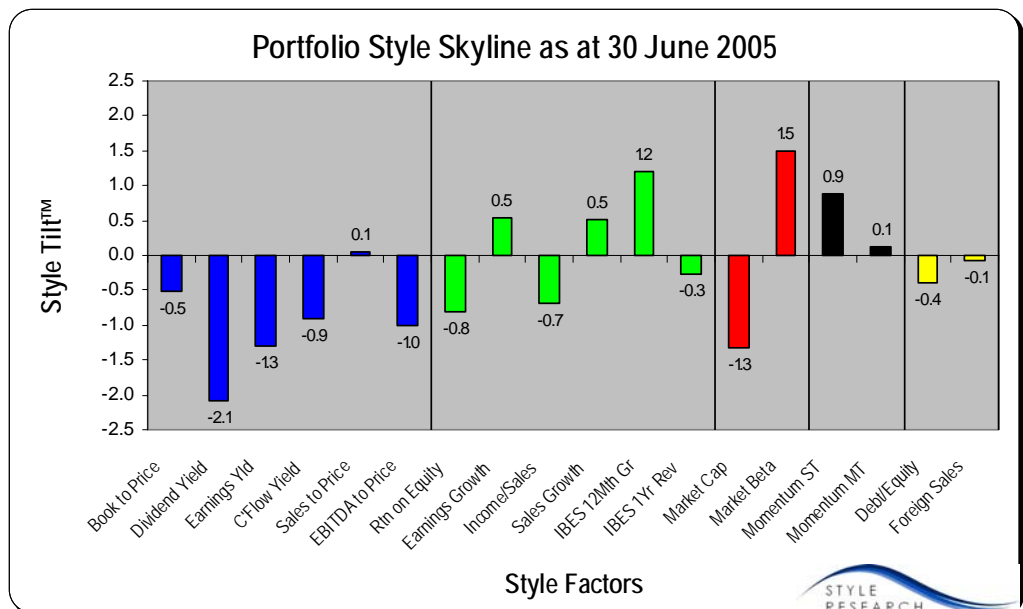
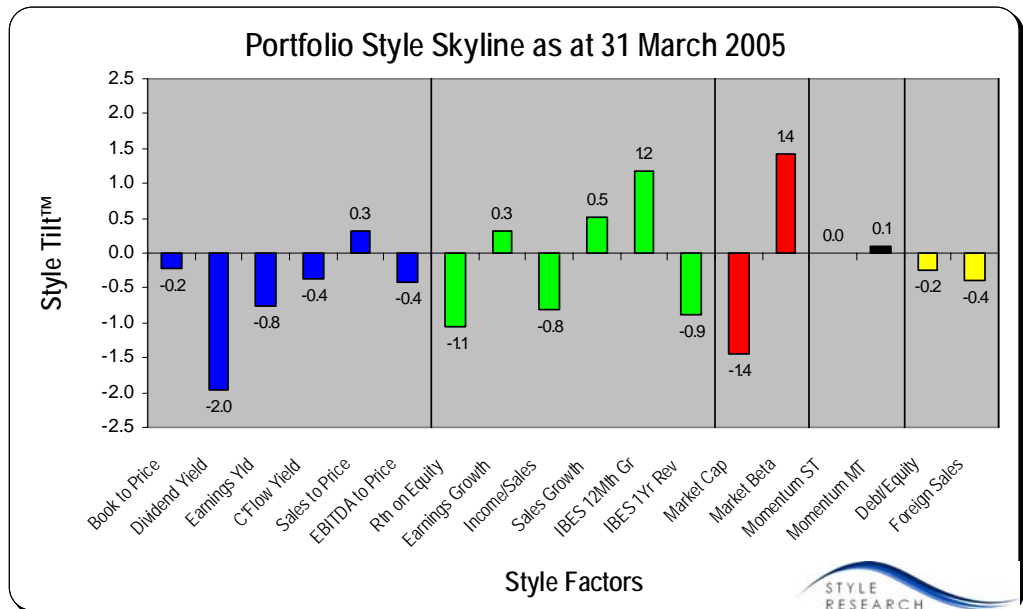
- The second set of charts shown in Section 5.3 plot the breakdown of the portfolio in terms of industry sector weightings and is again compared with the benchmark.
- The term “coverage” referred to in the charts contained within Section 5.3 is a measure of the Equity segment’s exposure to the indices it is benchmarked against. The output shown in Section 5.3 indicates a coverage level of circa. 75% indicating that the Equity segment is similar in constituents to the indices against which the Equity segment is benchmarked. Please refer to Appendix C for a more detailed explanation of the term “coverage”.
- The final chart shown in Section 5.4 analyses the risk profile of the Equity segment of the Petroleum Fund as at 31 March 2005, 30 June 2005, 30 September 2005 and 31 December 2005 and breaks it down into its key risk segments. For further explanation of Style Research Portfolio Analysis definitions please refer to Appendix C.

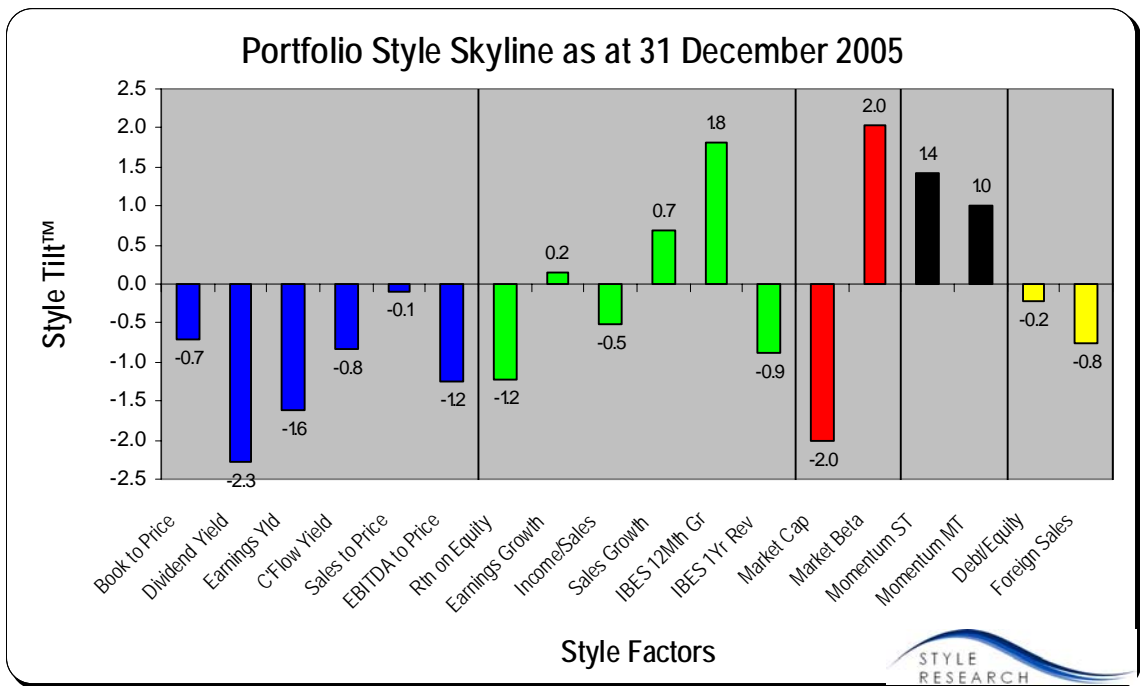
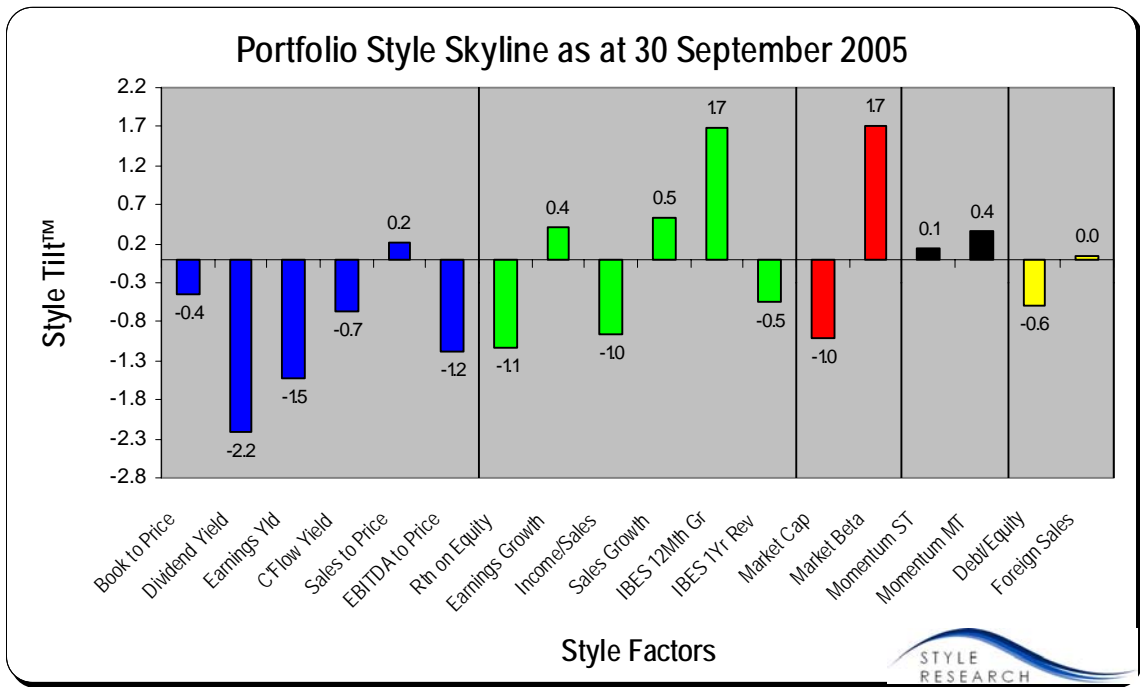
Notes on data source:

- Security holdings have been sourced from (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd.
- Benchmark data sourced from FTSE via Norges Bank.
- Risk Model output sourced from SRPA.

## 5.2 The Portfolio Style Skyline

To give a better impression of the development of the Equity segment's style and risk characteristics, the portfolio style skylines as at the end of each quarter during 2005 are shown below. Please note that each quarter's analysis is based on a historical 'snap-shot' of the stocks held in the Equity segments at an aggregate level as at the end of every quarter.

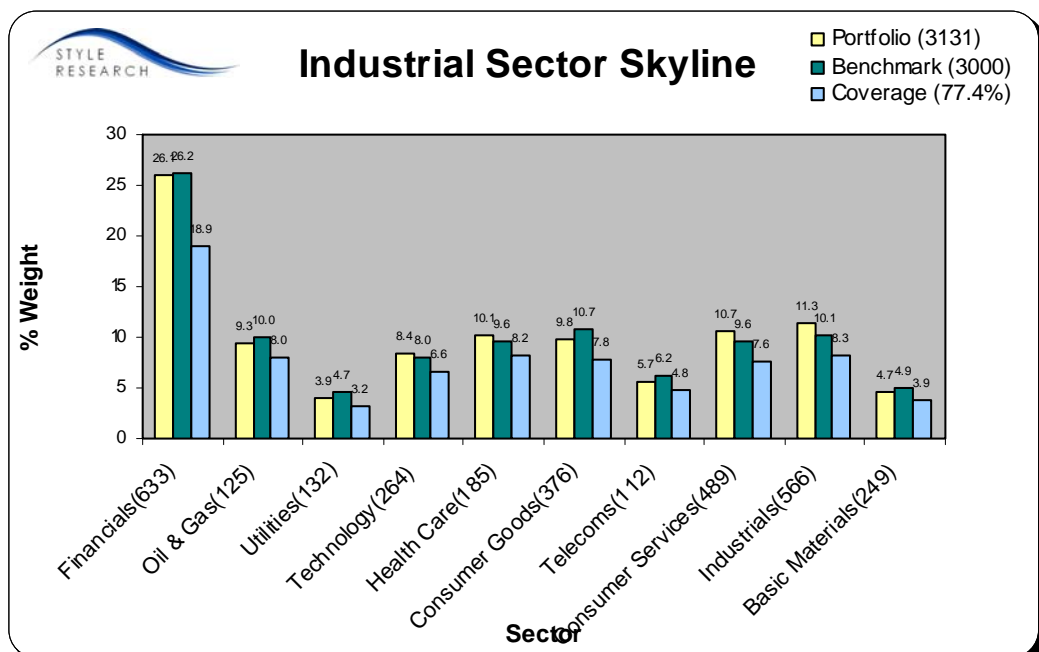
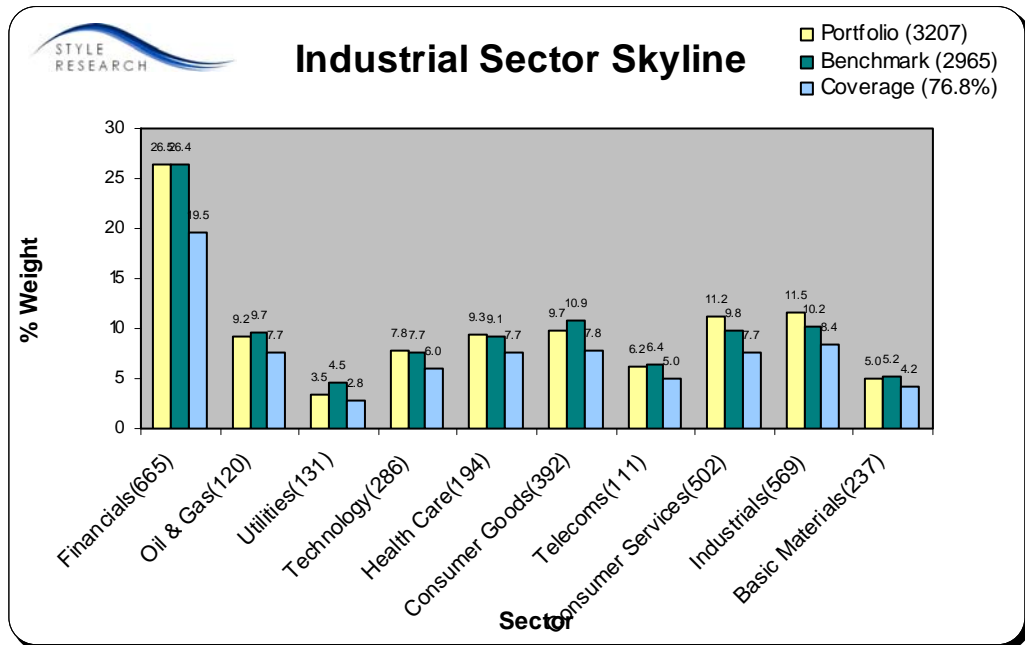




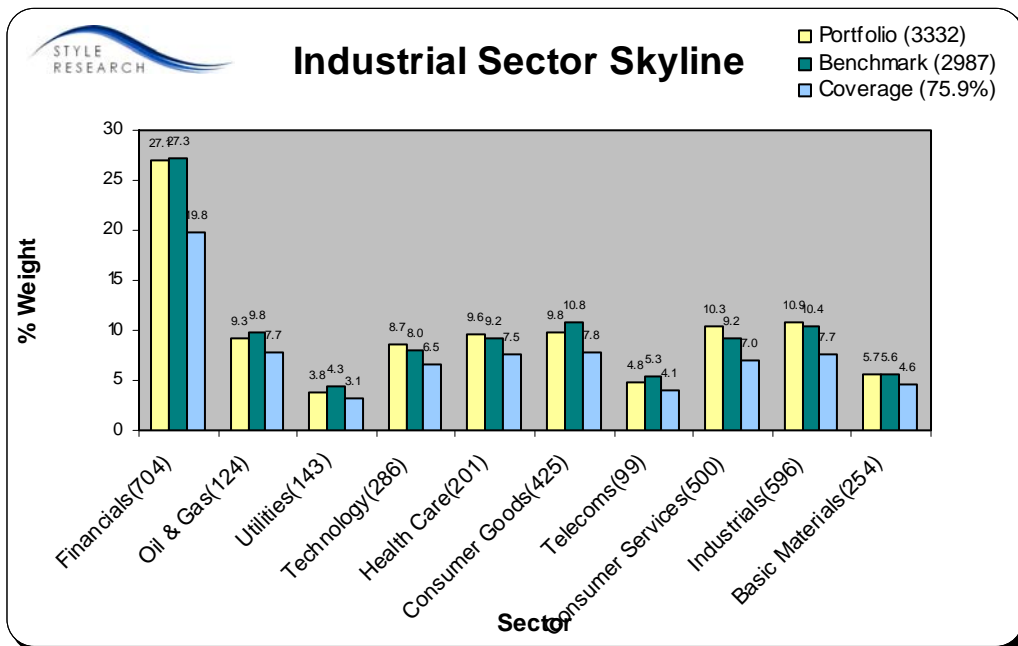
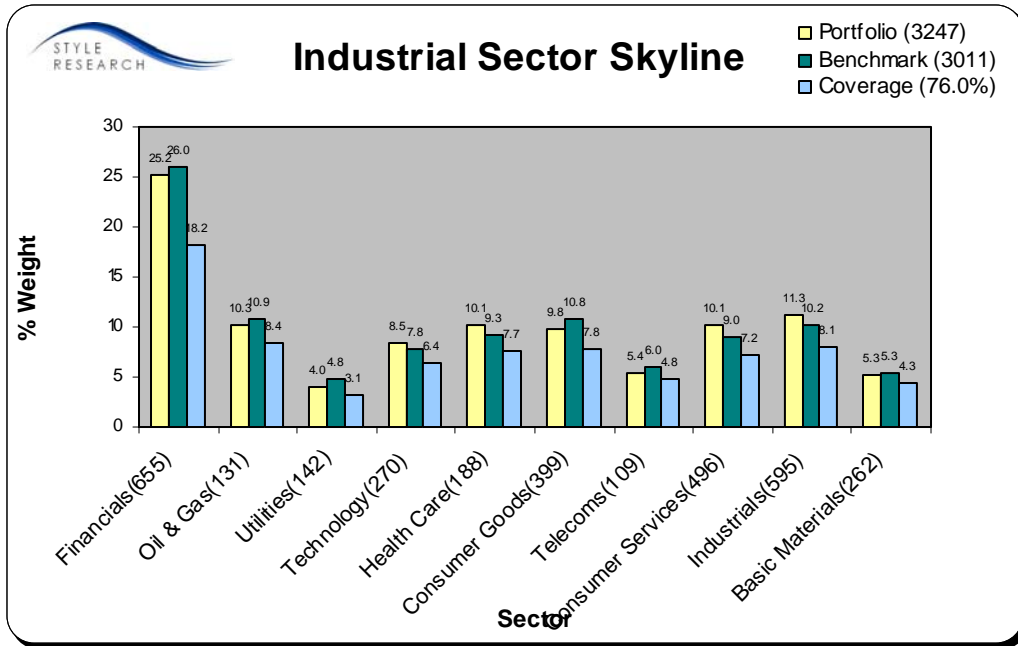
- Throughout 2005, the Equity segment has continued to exhibit a slight bias towards growth stocks and against value stocks. This bias has become more pronounced over the course of the year.
- The results of the analysis indicate that, over the course of the year there has been an increase in the number of significant deviations (illustrated by standard deviations of greater than +/-1) away from the benchmark mean.
- Notable deviations as at 31 December 2005 included the bias away from companies with high dividend yield (indicated by -2.2 standard deviations) and high earnings yield (indicated by -1.6 standard deviations). The Equity segment has a bias towards companies with above average IBES 12 month growth earnings targets (indicated by 1.8 standard deviations).
- The consistent negative 'Market Cap' indicator indicates that the Equity segment has consistently held a bias towards small cap stocks relative to the benchmark. This bias increased in the last quarter of the year.
- The consistent positive 'Market Beta' indicates that the portfolio is biased towards stocks with a beta higher than the benchmark mean. This is reflected in the monthly returns over 2005 with returns being consistently more positive or more negative than the benchmark.
- Momentum indicators over both the short-term (six months) and medium-term (twelve months) were significant as at 31 December 2005. This indicates the performance of stocks held in the portfolio as at 31 December 2005 has been above average for the six and twelve month periods.
- More detailed explanations of the terms 'Dividend Yield', 'Earnings Yield', 'IBES 12 Month Growth', 'Market Beta' and 'Momentum' can be found in Appendix C.

### 5.3 The Portfolio Sector Skyline

To give a better impression of the development of the sector characteristics of the Equity segment, industrial sector skylines as at the end of each quarter during 2005 are shown below. Please note that each quarter's analysis is based on a historical 'snap-shot' of the stocks held in the Equity segment at an aggregate level as at the end of every quarter.





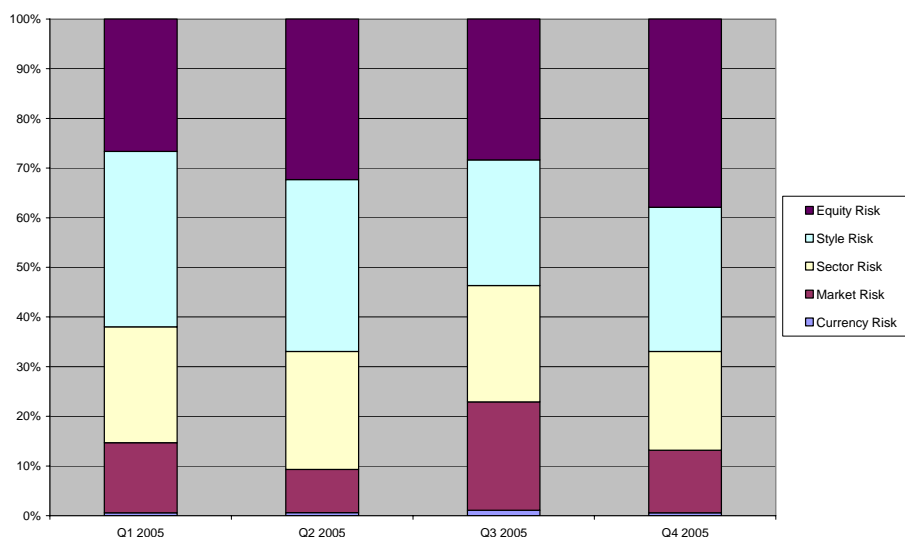


- The number of stocks held within the Equity segment at the end of each quarter exceeds the number of holdings within the benchmark; this corresponds with Norges Bank’s exposure to Smaller Cap holdings, which are not contained within the benchmark.
- Throughout 2005, the industrial sector skyline has remained largely unchanged; furthermore, the charts illustrate that Norges Bank are not taking significant sector bets away from the benchmark in the management of the Equity segment of the Petroleum Fund.

- Throughout 2005 the Equity segment's sector holdings, relative to the benchmark, was consistently underweight Consumer Goods and overweight Consumer Services. Within the Consumer Goods sector, the Equity segment held an allocation of 9.8% relative to the benchmark allocation of 10.8% as at 31 December 2005. Within the Consumer Services sector, the Equity segment held an allocation of 10.3% relative to the benchmark weight of 9.2% as at 31 December 2005.
- Throughout 2005, the Equity segment's exposure to the Technology sector, relative to the benchmark, has increased steadily.
- As at 31 December 2005, the Financials sector represented over a quarter of the Equity segment's benchmark weight; an underweight position was held in this sector throughout the year.
- Compared to 2004, the number of benchmark holdings has increased from circa 2400 to circa 3000. The number of portfolio holdings has also increased, albeit to a lesser extent.

#### 5.4 The Petroleum Fund – Equity Risk Profile

- The following chart shows the risk in the Equity segment broken down into different factors or segments as at the end of each quarter during 2005. Details of the methodology behind the analysis are set out at the end of Appendix C.
- The analysis is prepared according to a SRPA risk model for multi-market risk attribution and provides a snapshot breakdown of the different segments of portfolio risk relative to benchmark.



Note : Security holdings are sourced by (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd. Benchmark data sourced from FTSE via Norges Bank; Risk model output sourced from SRPA.

- Consistent with 2004, throughout 2005, the two largest components of risk were Equity Risk and Style Risk.
- Similar to 2004, Currency Risk remains the smallest component of total risk over 2005.
- Over 2005, Equity Risk as a proportion of overall portfolio risk has increased marginally.

6

## Petroleum Fund Assets Under Management

The table below shows the market value of the Petroleum Fund as at the end of every month during 2005.

| Month     | Market Value (NOK Millions) |              |            |
|-----------|-----------------------------|--------------|------------|
|           | Equity                      | Fixed Income | Total Fund |
| January   | 432,315                     | 639,135      | 1,071,451  |
| February  | 437,524                     | 636,998      | 1,074,522  |
| March     | 435,467                     | 654,683      | 1,090,150  |
| April     | 438,609                     | 663,233      | 1,101,841  |
| May       | 456,571                     | 681,834      | 1,138,406  |
| June      | 472,436                     | 711,625      | 1,184,061  |
| July      | 486,426                     | 718,970      | 1,205,396  |
| August    | 489,464                     | 739,781      | 1,229,245  |
| September | 522,817                     | 758,481      | 1,281,298  |
| October   | 522,506                     | 757,378      | 1,279,884  |
| November  | 560,363                     | 803,970      | 1,364,332  |
| December  | 582,297                     | 816,723      | 1,399,020  |

Data source: Calculations by Mellon Analytical Solutions Ltd. (c) Copyright 2006 Mellon Analytical Solutions Europe Ltd.

The majority of differences in market values reported between Mellon Analytical Solutions and Norges Bank can be explained by one or a combination of reasons which include:

- Norges Bank discounting income from sell / buy backs and buy / sell backs whilst Citibank is using accrued income accounting methodology.
- Changes in swap prices which occurred after Citibank closed their books.

- Citigroup using their own systems to calculate accrued interest whilst Norges Bank's performance systems use Bloomberg.

Differences in market values reported between Norges Bank and Mellon Analytical Solutions will lead to slight discrepancies in returns reported between Norges Bank and Mellon Analytical Solutions.

Below is a summary of the largest differences reported between Norges Bank and Mellon Analytical Solutions during the year along with an explanation of the differences:

### **September**

In September there was a 125 million NOK difference in market values reported between Mellon Analytical Solutions and Norges bank for the equity segment. This can be explained as follows:

Mitsubishi UFJ Financial Group (sedol 6335171) acquired UFJ Holdings (sedol no 6335223) at month end. We understand that FTSE has used the wrong price on UFJ Holdings (sedol no 6335223) at month end, while JPMorganChase has used the correct price. For the relative performance between the fund and the index to be correct, Norges Bank chose to value the portfolio using the same price as FTSE when measuring performance.

### **November**

In November there was a 111 million NOK difference in market values reported between Mellon Analytical Solutions and Norges bank for the equity segment. This can be explained as follows:

There is an issue in the JPMorgan file regarding the acquisition between Bank Austria (sedol B0M5RF6) and Unicredito (sedol 4232445). Unicredito acquires Bank Austria with a term: for each Bank Austria share, receiving 19,92 new Unicredito shares. In JP Morgan's figure, all physical positions of Bank Austria have been processed according to the term, however, the CFD position had not been processed. This has a NAV impact of 111 million NOK. In light of this, Norges Bank has since amended its official market value.

### **December**

In December there was an 8 million NOK difference in market values reported between Mellon Analytical Solutions and Norges Bank for the equity segment. This can be explained as by the mis-pricing of a contract by JP Morgan.

Differences in market values reported between Norges Bank and Mellon Analytical Solutions will lead to slight discrepancies in returns reported between Norges Bank and Mellon Analytical Solutions.

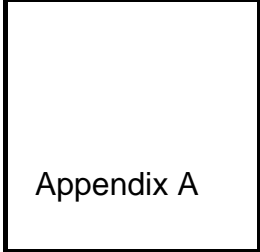
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In addition:

- Past performance cannot be relied upon as a guide to future performance.
- The value of stocks, shares, bonds and other fixed income investments, including unit trusts, can go down as well as up and you may not get back the amount you have invested.
- Investments denominated in a foreign currency will fluctuate with the value of the currency.



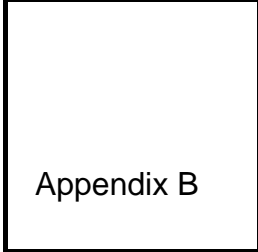
## Appendix A

### Calculation Methodology

Mellon Analytical Solutions employs the “time-weighted” rate of return as the base performance statistic. This return takes into account investment income as well as realised and unrealised capital profits or losses. The use of this statistic minimises distortions due to cash flows into and out of a portfolio which are, in general, outside the control of the investment manager.

Exact calculation of the time-weighted rate of return requires a full valuation of the portfolio whenever a cash flow occurs. As a practical alternative Mellon Analytical Solutions employs an approximation to the time-weighted return, using monthly valuations, monthly/daily transaction details and monthly/daily cash flows. The method used is based on the Regression Method, recommended by the Bank Administration Institute in their definitive report on the topic of performance measurement published in 1968, and which gives an excellent approximation of the time-weighted rate of return.

At the total fund level Mellon Analytical Solutions calculates a day-weighted, money-weighted return using market values at the start and end of the month and net injection details.



## Appendix B

### Mercer's Role and Control Function

The purpose as set out in the Public Procurement document is for Mercer to verify Norges Bank's internal performance measurements and to strengthen the Ministry's basis for evaluating the competence and actions of Norges Bank. Mercer outsources the role of performance verification to Mellon Analytical Solutions, an independent performance measurer appointed by Mercer.

Mercer has, in conjunction with Mellon Analytical Solutions, performed control and verification functions throughout 2005, in accordance with the terms of the contract awarded by the Ministry.

The objective of this process has been to check Norges Bank's internal performance measurements and to perform wider verification checks, both at portfolio and benchmark level according to instructions received from the Ministry of Finance.

#### **Mellon Analytical Solutions' Role and Control Function:**

##### **Mellon Analytical Solutions' Role**

The function of calculating and verifying Norges Bank's internal performance measurement is carried out by Mellon Analytical Solutions under the guidance of Mercer who retains overall responsibility for the process. Mellon Analytical Solutions calculates performance for the Petroleum Fund based on portfolio data and market values supplied by the custodians JP Morgan Chase and Citibank.

Mellon Analytical Solutions employ the "time weighted" rate of return as the base performance statistic. This return measure is consistent with the one employed by Norges Bank and takes into account investment income, as well as realised and unrealised capital profits or losses. The use of this statistic minimises distortions due to cash flows into and out of a portfolio which are, in general, outside the control of the investment manager.



## **Mellon Analytical Solutions' Control Function**

### *Market value reconciliation check*

Having constructed performance data, Mellon Analytical Solutions will check that the total values for the various segments of the fund agree with those values calculated by Norges Bank. Mellon Analytical Solutions also check that the total value for the fund agrees with Norges Bank's calculated value.

Any significant reconciliation errors here may indicate that there are accounts omitted from the data supplied. If the overall difference is more than a 0.01%, Mellon Analytical Solutions will raise queries with the data providers.

### *Transfers*

When transfers occur at the month end Mellon Analytical Solutions ensure that the transfers into the fund shown in the data agree with those detailed in the letter supplied by Norges Bank.

## **Fund return checks**

In addition to the data checks above, Mellon Analytical Solutions carry out sense checks on individual asset class and total returns.

### *Asset class return check*

Mellon Analytical Solutions carry out sense checks on returns for individual asset classes against the relevant index return. If the asset class return is unexpectedly divergent from the index return then Mellon Analytical Solutions will raise a query with the relevant data provider.

### *Total return check*

After constructing data for individual portions of the fund, Mellon Analytical Solutions produces a consolidated data set for the fund as a whole. Mellon Analytical Solutions check that the total return calculated for each month is no more than one basis point different to the total return quoted by Norges Bank.

## **Benchmark checks**

### *Petroleum Fund Benchmark*

#### *Fixed Income benchmark*

Following provision by Norges Bank of the methodology for calculation, from first principles, of the Fixed Income benchmark weights, Mellon Analytical Solutions set up their own independent verification spreadsheet calculations.

Mellon Analytical Solutions have independently sourced the Lehman Aggregate indices that constitute the fixed income benchmark. These have been sourced directly from the Lehman Live website. Using monthly weights and Lehman indices, Mellon Analytical Solutions will calculate Fixed Income benchmark returns in NOK terms.

On completion of the reconciliation exercise Mellon Analytical Solutions will verify agreement to the Fixed Income benchmark weights and benchmark returns by email notification. If returns and/or weights cannot be agreed then Mellon Analytical Solutions will communicate their findings with commentary.

#### *Equity benchmark*

Following provision by Norges Bank of the methodology for calculation, from first principles, of the Equity benchmark weights, Mellon Analytical Solutions have set up their own independent verification spreadsheet calculations.

Customised regional benchmark index values in US\$ terms up to November 2003 calculated by FTI have also been forwarded by Norges Bank. FTSE took over provision of customised benchmark indices from December 2003 onwards. From December 2003 onwards Mellon Analytical Solutions have received customised benchmark indices directly from FTSE.

On completion of the reconciliation exercise Mellon Analytical Solutions will verify agreement to the Equity benchmark weights and benchmark returns by email notification. If returns and/or weights cannot be agreed then Mellon Analytical Solutions will communicate their findings with commentary.

#### *Overall Petroleum Fund benchmark*

Following provision by Norges Bank of the methodology for calculation, from first principles, of the overall benchmark weights, Mellon Analytical Solutions have set up their own independent verification spreadsheet calculations.

Using monthly weights and Fixed Income and Equity benchmark returns calculated above Mellon Analytical Solutions will calculate overall benchmark returns.

On completion of the reconciliation exercise Mellon Analytical Solutions will verify agreement to the overall benchmark weights and benchmark returns by email notification. If returns and/or weights cannot be agreed then Mellon Analytical Solutions will communicate their findings with commentary.

#### ***Environmental Fund Benchmark (prior to 1 December 2004)***

From December 2003 onwards Mellon Analytical Solutions have received customised benchmark indices directly from FTSE. Benchmark returns are calculated by dividing out customised total return indices in NOK.

As of end November 2004 the Environmental Fund was merged with the Petroleum Fund and hence since 1 December 2004 this control function ceased to exist.

***Combined Total Fund Benchmark***

Prior to 1 December 2004, Mellon Analytical Solutions calculate the Combined Fund total return benchmark on a monthly basis by weighting the Petroleum Fund and Environmental Fund total benchmark returns by their respective start market values. Since then the Total Fund benchmark is the same as the overall Petroleum Fund benchmark.



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### **The Norwegian Petroleum Fund – Mellon Analytical Solutions role during 2005**

#### Our role in 2005

During 2005, Mellon Analytical Solutions “MAS” have provided independent performance measurement in respect of the Norwegian Petroleum Fund

To perform this task MAS collect data on a monthly basis from three data sources namely: JP Morgan Chase, Citigroup and Norges Bank “the data suppliers”.

MAS undertake a number of reconciliation checks on the data, at asset class level and where available at security level, ensuring that data reconciles from the previous month, and at the total level. Any questions that arise from these checks will be raised with the data suppliers and where appropriate the client.

Reconciled data is run through our internal performance system to calculate returns. At the asset class level MAS employs the “time-weighted” rate of return as the base performance statistic. This return takes into account investment income as well as realised and unrealised capital profits or losses. At the total fund level MAS calculate a day-weighted, money weighted return using market values at the start and end of the month and net injection details. Monthly total fund returns calculated by MAS were no more than one basis point different from these calculated by Norges Bank during 2005.

MAS also carry out a number of independent checks on Norges Bank’s benchmark return calculations. We independently source FTSE-AW indices and Lehman customised indices in order to carry out a check on the Equity and Fixed Income benchmark returns. We then apply

relative Fixed Income and Equity weights within the Petroleum Fund to calculate the overall benchmark. Following provision by Norges Bank of the methodology for calculation of the Fixed Income, Equity and Overall benchmark weights we have now set up our own independent spreadsheet checks to verify these weights. MAS also independently calculate the fund and benchmark returns in the currency basket.

#### Performance discrepancies in 2005

Different valuation methodologies between Norges Bank and Citigroup in respect of money market instruments may give rise to differences in market value between MAS and Norges Bank reporting. These in turn may lead to small differences in return between MAS and Norges Bank. These are usually no more than 0.01% to two decimal places

The different methodologies in the calculation of currency rates between MAS and Norges Bank may give rise to differences in currency returns. Essentially this problem stems from the fact that Norges Bank is using a different base currency in their calculations from MAS. The small differences are usually no more than 0.01% to two decimal places.

Yours sincerely

Charles Ward



Appendix C

## Style Research Portfolio Analysis Definitions

### Value Criteria

#### Book to Price

The ratio of the company's Book Value (the sum of Shareholders' Equity plus accumulated Retained Earnings from the P & L Account) to its Share Price.

This Factor has been one of the most successful measures of the intrinsic Value of company shares.

#### Dividend Yield

The annual Dividend Paid per Share divided by the Share Price.

This Factor measures the Value of company shares according to the stream of dividend income resulting from share ownership.

#### Earnings Yield

Annual Earnings per Share divided by the Share Price.

This Factor measures the worth of a company's shares according to the company's ability to support each share with after tax earnings.

#### Cash Flow Yield

Annual Cash Flow per Share divided by the Share Price.

This Factor is related to the earnings yield but also includes other items, specifically: depreciation, amortisations, and provisions for deferred liabilities. It is intended to capture the cash availability of the company as a multiple of the share price, and offers a Value criteria based on the stream of accessible cash earnings.

#### Sales to Price

Net Sales per Share divided by the Share Price.

This Factor measures the worth of a company's shares according to the annual sales volume supporting the company business. The item is considered by many analysts to be less susceptible to manipulation than other valuation criteria; it is, however, a less comprehensive measure of a company's range of activities.

## **GROWTH CRITERIA**

### **Return on Equity**

Net Income before Preferred Dividends divided by the Book Value of Shareholders' Common Equity.

Return on Equity measures the profitability of the operations of the company as a proportion of the total amount of equity in the company. Since Return on Equity multiplied by the reinvestment rate (the proportion of earnings not paid as dividends but reinvested in the company) gives the warranted growth rate of a company, Return on Equity is a very usual measure of a company's growth potential.

### **Earnings Growth**

The average annual growth rate of Earnings over a trailing three years.

Earnings Growth is, perhaps, the clearest of the Growth criteria. However, it is subject to the distortions of reporting conventions and manipulation and, particularly in some markets, only known after a considerable lag.

### **Income to Sales**

The "net margin", annual Net Income divided by annual Net Sales.

This measure attempts to assess the company's potential for profitable, sustained expansion or growth.

### **Sales Growth**

The average annual growth rate of Net Sales per Share over a trailing three years.

Although growth in sales per share might be only a narrow measure of a company's business growth, and may be subject to a number of distortions, it is less subject to differences in reporting conventions or manipulation than many other Balance Sheet or Profit and Loss items.

### **Earnings Growth**

**IBES 12Mth Growth** – The IBES consensus forecast growth over the next 12 months. This is calculated on a pro-rata basis from the forecasts for each company's next 2 annual reporting periods.

**IBES 1 Yr Revisions** – The IBES balance of earnings forecast revisions for the next annual reporting period. This is calculated as the difference between the last 3 months upwards revisions minus the last 3 months downward revisions expressed as a percentage of the total number of estimates over the last 3 months.

## Size & Risk Criteria

### Market Cap

The market capitalisation of a stock.

The Market Cap statistic of the portfolio is the weighted (by holding value) average size of the securities held. The Market Cap statistic of the benchmark (or total market) is the weighted (by holding value) average size of the securities within the benchmark (or total market).

### Market Beta

The “slope coefficient”, ( $\beta$ ), from the simple regression:

Security Monthly Return =  $\alpha$  +  $\beta$  \* Market Monthly Return + Random Error

The regression is carried out over rolling 36 month periods; where sufficient information is not available,  $\beta=1$  is assumed.

## Performance Record Criteria

### Historic Relative

The Historic Relative Return is calculated using a 6 month **Return** “memory” of monthly relative returns. The past period returns are weighted using to a “decay ratio” of 2/3, per month.

This weighted historic relative return factor measures the degree of simple price performance trend following. It is useful in recognising the trading character of specific markets and in noticing occasional changing patterns through the market cycle.

The international equity analysis shows short-term and medium term momentum factors.

## Other Criteria

### Debt to Equity

Total Debt as a percentage of total Common Equity.

The Debt to Equity ratio measures leverage, or gearing, a particular feature of share price risk - the higher the ratio the more changes in a company’s fortune might be reflected in changes in the payment of dividends. The influence of this



criterion is, however, especially subject to a number of particular specific considerations (e.g. sector differences, interest rate sensitivity). Consequently it is considered separately from the other “risk” criteria.

**Foreign Sales /**

International Sales as a percentage of Net Sales

**Total Sales**

Although information is occasionally rather sparse, where the data are available, and reliable, this is frequently an important investment criterion. It is undoubtedly linked to movements in the exchange rate and company size, and has different interpretations in different industrial sectors.

**Risk Terms**

Currency risk (the extent to which currency exposure differs from the benchmark)

Market risk (the extent to which the portfolio’s exposure to different equity markets differs from the benchmark)

Sector risk (the extent to which the portfolio’s exposure to different industries differs from the benchmark)

Style risk (the extent to which the portfolio’s style biases (see graph on previous page) introduce risk relative to the benchmark)

Equity risk (risk arising from stock-specific factors)

However, the different segments of risk are not independent. For example, sector risk can itself introduce currency risk if the sector has a bias to companies with non-domestic currency exposure.

**Coverage**

The term “coverage” is a measure of the portfolio’s exposure to the indices it is benchmarked against i.e. if a benchmark index had only 2 stocks, both of equal weighting, each stock would have a market capitalisation of 50%. If a portfolio worth 100 NOK held 50 NOK in each stock its coverage would be 100%. If the portfolio invested all the 100 NOK in just one stock its coverage would be 50% as it is only exposed to the movements of the 50% of the benchmark index. Further, if the portfolio was invested 60 NOK in one stock and 40 NOK in the other the coverage would still be 50% in the first stock, but 40% in the other making a total of 90% coverage.

## Multi-Market Risk Attribution

The return of stock  $j$  may be written in terms of its currency, market, industry, style and specific returns (dropping subscript  $t$  for convenience)

$$r_j = R_{C(j)}^\phi + R_{M(j)} + R'_{I(j)} + R'_{S(j)} + r'_j$$

Where company  $j$  belongs to market  $M(j)$ , industry  $I(j)$  and style  $S(j)$ . The Portfolio base currency is  $\phi$  and the currency of market  $M(j)$  is  $C(j)$ . Industries are according to the 10 economic sectors as defined by FTSE International. Styles are defined within each economic sector according to Large Value, Large Growth, Small Value, Small Growth. Size is the primary sort, where Large is the top 80% by capitalization and Small the bottom 20%. Value is taken to be the top half, by capitalization, of each size category, sorted by a measure which is 60% normalized Book Value per Share to Share Price and 40% normalized Dividend Yield, and rebalanced every 6 months; Growth is simplified as the other half within each size category.

The month  $t$  currency return is defined as:

$$R_{C(j)}^\phi = \frac{er_{C(j),t}^\phi - er_{C(j),t-1}^\phi}{er_{C(j),t-1}^\phi}$$

Where the exchange rate of currency  $\phi$  to currency  $C(j)$ , at the end of month  $t$ , is  $er_{C(j),t}^\phi$

In matrix notation the Equity returns are:

$$\mathbf{r} = \mathbf{R}_C^{\Phi} + \mathbf{R}_M + \mathbf{R}'_I + \mathbf{R}'_S + \mathbf{r}'$$

The covariance matrix is then:

$$\begin{aligned} Cov(\mathbf{r}) &= Cov(\mathbf{R}_C^{\Phi} + \mathbf{R}_M + \mathbf{R}'_I + \mathbf{R}'_S + \mathbf{r}') \\ &= Cov(\mathbf{R}_C^{\Phi}) + Cov(\mathbf{R}_C^{\Phi}, \mathbf{R}_M) + Cov(\mathbf{R}_C^{\Phi}, \mathbf{R}'_I) + Cov(\mathbf{R}_C^{\Phi}, \mathbf{R}'_S) + Cov(\mathbf{R}_C^{\Phi}, \mathbf{r}') \\ &\quad + Cov(\mathbf{R}_M, \mathbf{R}_C^{\Phi}) + Cov(\mathbf{R}_M) + Cov(\mathbf{R}_M, \mathbf{R}'_I) + Cov(\mathbf{R}_M, \mathbf{R}'_S) + Cov(\mathbf{R}_M, \mathbf{r}') \\ &\quad + Cov(\mathbf{R}'_I, \mathbf{R}_C^{\Phi}) + Cov(\mathbf{R}'_I, \mathbf{R}_M) + Cov(\mathbf{R}'_I) + Cov(\mathbf{R}'_I, \mathbf{R}'_S) + Cov(\mathbf{R}'_I, \mathbf{r}') \\ &\quad + Cov(\mathbf{R}'_S, \mathbf{R}_C^{\Phi}) + Cov(\mathbf{R}'_S, \mathbf{R}_M) + Cov(\mathbf{R}'_S, \mathbf{R}'_I) + Cov(\mathbf{R}'_S) + Cov(\mathbf{R}'_S, \mathbf{r}') \\ &\quad + Cov(\mathbf{r}', \mathbf{R}_C^{\Phi}) + Cov(\mathbf{r}', \mathbf{R}_M) + Cov(\mathbf{r}', \mathbf{R}'_I) + Cov(\mathbf{r}', \mathbf{R}'_S) + Cov(\mathbf{r}') \end{aligned}$$

The covariance between  $r_i$  and  $r_j$  is:

$$\begin{aligned} Cov(r_i, r_j) &= Cov(R_{C(i)}^{\Phi}, R_{C(j)}^{\Phi}) + Cov(R_{C(i)}^{\Phi}, R_{M(j)}) + Cov(R_{C(i)}^{\Phi}, R'_{I(j)}) + Cov(R_{C(i)}^{\Phi}, R'_{S(j)}) + Cov(R_{C(i)}^{\Phi}, r'_j) \\ &\quad + Cov(R_{M(i)}, R_{C(j)}^{\Phi}) + Cov(R_{M(i)}, R_{M(j)}) + Cov(R_{M(i)}, R'_{I(j)}) + Cov(R_{M(i)}, R'_{S(j)}) + Cov(R_{M(i)}, r'_j) \\ &\quad + Cov(R'_{I(i)}, R_{C(j)}^{\Phi}) + Cov(R'_{I(i)}, R_{M(j)}) + Cov(R'_{I(i)}, R'_{I(j)}) + Cov(R'_{I(i)}, R'_{S(j)}) + Cov(R'_{I(i)}, r'_j) \\ &\quad + Cov(R'_{S(i)}, R_{C(j)}^{\Phi}) + Cov(R'_{S(i)}, R_{M(j)}) + Cov(R'_{S(i)}, R'_{I(j)}) + Cov(R'_{S(i)}, R'_{S(j)}) + Cov(R'_{S(i)}, r'_j) \\ &\quad + Cov(r'_i, R_{C(j)}^{\Phi}) + Cov(r'_i, R_{M(j)}) + Cov(r'_i, R'_{I(j)}) + Cov(r'_i, R'_{S(j)}) + Cov(r'_i, r'_j) \end{aligned}$$

The component parts of the covariance matrix are:

Pure Currency term:  $Cov(R_{C(i)}^{\Phi}, R_{C(j)}^{\Phi})$

Market cross terms:  $Cov(R_{C(i)}^{\Phi}, R_{M(j)}) + Cov(R_{M(i)}, R_{C(j)}^{\Phi})$

Pure Market term:  $Cov(R_{M(i)}, R_{M(j)})$

Industry cross terms:

$$Cov(R_{C(i)}^{\Phi}, R'_{I(j)}) + Cov(R_{M(i)}, R'_{I(j)}) + Cov(R'_{I(i)}, R_{C(j)}^{\Phi}) + Cov(R'_{I(i)}, R_{M(j)})$$

Pure Industry term:  $Cov(R'_{I(i)}, R'_{I(j)})$

Style cross terms:

$$\begin{aligned} &Cov(R_{C(i)}^{\Phi}, R'_{S(j)}) + Cov(R_{M(i)}, R'_{S(j)}) + Cov(R'_{I(i)}, R'_{S(j)}) + Cov(R'_{S(i)}, R_{C(j)}^{\Phi}) \\ &+ Cov(R'_{S(i)}, R_{M(j)}) + Cov(R'_{S(i)}, R'_{I(j)}) \end{aligned}$$

Pure Style term:  $Cov(R'_{S(i)}, R'_{S(j)})$

Equity cross terms:

$$\begin{aligned} &Cov(R_{C(i)}^{\Phi}, r'_j) + Cov(R_{M(i)}, r'_j) + Cov(R'_{I(i)}, r'_j) + Cov(R'_{S(i)}, r'_j) + Cov(r'_i, R_{C(j)}^{\Phi}) \\ &+ Cov(r'_i, R_{M(j)}) + Cov(r'_i, R'_{I(j)}) + Cov(r'_i, R'_{S(j)}) \end{aligned}$$

Pure Equity term:  $Cov(r'_i, r'_j)$

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