

Strategy for achieving the best possible performance

The primary goal of Norges Bank's management of the Petroleum Fund is to outperform the benchmark portfolio defined by the Ministry of Finance. This article presents the main elements of Norges Bank's strategy for surpassing the performance of the benchmark portfolio. The following are vital components of the strategy: spreading the active management over several types of positions, combining external and internal management and specialising the internal management in areas where there is a good possibility of predicting price movements better than the average market participant. Special emphasis is also placed on risk management, portfolio analysis and efficient trading in the market. By spreading active management over a large number of independent decisions, Norges Bank seeks to make effective use of the clearly defined risk limits set out by the Ministry of Finance.

A fundamental principle of modern investment management is distinguishing between strategic or long-term decisions and decisions of a more short-term nature which can continuously be reevaluated in the light of new information. For the Petroleum Fund this distinction has been made through the Ministry of Finance defining a benchmark portfolio from which the manager, ie Norges Bank, may deviate, but only within specified limits which are also stipulated by the delegating authority.

Both performance and risk factors are to a large extent determined by the strategy defined by the Ministry of Finance. Analyses carried out on US pension funds shows that the management strategy determines as much as 90-95 per cent of the return achieved. The most important strategy choices involve the type of assets chosen for investment (such as government bonds, private bonds, listed equities, unlisted equities and real estate), the portion to be invested in each asset class and in which regions of the world to make these investments.

In accordance with the Regulation relating to the Management of the Government Petroleum Fund, Norges Bank shall seek to achieve the highest possible return, given the specified restrictions. This allows management to deviate from the benchmark portfolio when it deems that this will result in a higher return. In Norges Bank, the governor has delegated the operational management of the Petroleum Fund to the executive director of Norges Bank Investment Management. The responsibility for establishing plans for when and how to reach decisions on deviating from the benchmark portfolio is an implicit part of this delegation. This requires the management organisation to develop the skills to obtain and assess information on an ongoing basis, as well as to choose securities other than those of the benchmark portfolio in order to achieve a higher return. This type of activity is often referred to as active management, whereas mirroring the benchmark portfolio is called passive management or indexing. If exactly the same bonds and equities are purchased as those making up the benchmark portfolio, the return will be approximately the same (cf feature article: "Can index performance be achieved through index management?" This article shows that exactly the same performance will not normally be achieved, owing to such factors as transaction costs.)

The distinction between active and passive management is reflected in the division of the Fund into two sub-portfolios with separate follow-up of performance. It is an advantage to have expertise in both areas. The information base in the active management may be useful for the effective implementation of the index strategy, while familiarity with changes in widely used benchmark indices may provide a basis for assuming active positions.

In 1997 and 1998 Norges Bank defined its primary responsibility in the management of the Government Petroleum Fund as the implementation of the strategy set out by the Ministry of Finance in a manner which is secure and efficient, and which inspires confidence. A passive management was built up internally for fixed income investments, while the entire equity portfolio was outsourced to external managers, who were required to follow an index strategy. Active positions were taken only to a small extent, and the scope for manoeuvre of 1.5 percentage points expected tracking error was far from being fully exploited. There is a clear philosophy behind this: We chose to build up expertise before making any substantial deviations from the benchmark portfolio, at the same time placing emphasis on implementing the new management strategy defined by the Ministry of Finance.

To date, the work of developing the active management has largely been concentrated on choosing external managers for different types of active mandates. The three Investment Management departments, Equity Management, Fixed Income Management and Tactical Asset Allocation, have all selected and transferred, or are in the process of transferring, sub-portfolios to external, active managers.

Active management principles

For the fund owner, active management clearly differs from pure indexing in two respects: The performance is different and the risk is different - but different relative to what? As previously mentioned, several surveys indicate that the choice of benchmark portfolio is definitively the most important decision in determining a portfolio's total performance.

The following hypothetical example may illustrate the importance of active management for the total result. Assume that the expected return on the benchmark portfolio is 8 per cent and the risk (measured by standard deviation) is 10 percentage points. The annual return will thus normally (ie in two out of three years on average) remain within the range of -2 per cent and 18 per cent of the Fund as a whole. Assume further that the portfolio is managed by a good active manager. He is limited to a tracking error of 1.5 percentage points, and under these conditions is capable of achieving an expected excess

return of 1 per cent. The expected return on the Fund is now 9 per cent.

The matter of what happens to the risk is slightly more complicated. It is possible to deviate from the benchmark portfolio in ways which both increase and decrease total risk. For the sake of simplicity, let us assume that the active portfolio (the difference between the portfolio the manager holds and the benchmark portfolio) is perfectly correlated with the benchmark portfolio. This brings the total risk to 11.5 percentage points in our example. In other words, the annual return will normally fall within the range of -2.5 and 20.5 per cent.

In our example, most people would agree that active management does not increase the total risk substantially. Increasing the expected return by 1 percentage point is sufficient improvement to justify the risk. However, it is also conceivable that a bad manager would take this risk without achieving an excess return. The normal year will in this case fall within a range of -3.5 and 19.5 per cent, which similarly does not represent a great increase in risk. The excess return will normally not be perfectly correlated with the benchmark portfolio. This will reduce the consequences for the total risk. (See the feature article: "Tracking error as a measure of market risk".)

The example above is based on very specific assumptions. The most important factor is whether an active manager is capable of achieving a consistent excess return. We have based our example on an excess return of 0.67 per cent per percentage point relative risk, ie an information ratio of 0.67. Such a result is a sign of a very good manager.

In academic analyses, financial markets are normally assumed to be efficient. The definition of efficient markets is that "all information" is immediately reflected in prices. It is thus not possible to predict prices, and active management is not profitable. Several empirical studies provide support for this view, by showing that very few active managers succeed in outperforming the benchmark index consistently from year to year. However, in recent years several academic studies have shown signs that it is possible to predict some price trends and to make trading strategies which result in a positive information ratio. There are also theoretical reasons for this being the case, since information is not freely available and adjusting a portfolio involves costs.

There is a trend in international investment management towards an increasing number of investors explicitly choosing between an active and a passive management strategy for portions of their portfolios. The proportion that is indexed is increasing. It is difficult to say whether this represents a general decrease in active management, since the remaining portion may be being managed actively at a higher risk.

The objective of active management is to achieve a higher after-cost return than that on the benchmark portfolio. Measuring excess costs in active management is simple. Active management normally requires a larger organisation - including a number of people to analyse potential investments for soundness. With index strategies, investment decisions largely follow from the composition of the indices at any given time. Transaction costs are also normally lower when an index strategy is followed. It is not sufficient to assess net excess return to determine the profitability of active management. It is also necessary to look at the excess return achieved in relation to the risk applied in the active management.

The example above illustrates the fact that active management on the scale permitted by the Petroleum Fund's guidelines normally only represents a slight change in the Fund's total risk. However, the total risk picture is rather more complex than a single figure can reveal. It is important that the intentions of the client set out in a mandate are taken into account, which means that the manner in which the manager takes on risk is relevant. In the account above, strategic and tactical choices were presented as different areas of expertise. For example, the type of insight on which the decision about the equity portion of a benchmark portfolio is based differs from the type necessary to assess how attractive the equity market is relative to the bond market *right now*.

It would hardly be in line with the intention of the mandate to increase the equity portion on a long-term basis and make use of the leeway in the mandate in this way. Investment Management is no better qualified to make this type of decision than the delegating authority. However, varying the equity portion over time is in keeping with the intention of the mandate.

It can generally be said that active management does not create value for the delegating authority if it could just as well have been done by redefining the benchmark portfolio. It is thus important, in principle, to identify which excess return factors are reasonably stable, and which vary over time. In practice, however, it is very difficult to make such a distinction operational.

An organisation undertaking active management will have broader expertise than organisations engaged exclusively in passive management. Modern management is based on fields of expertise such as economy, financial theory, mathematics, probability theory, informatics and IT knowledge. It is reasonable to believe that an organisation which endeavours to be in the forefront of developments will develop a knowledge base that will benefit all aspects of management. This may include qualified advice to the delegating authority on choice of strategy. We assume that such a cautious, yet ambitious orientation of activities may contribute to generally sounder management. The prerequisite is of course that the knowledge base is also drawn on to improve surveillance and risk control.

In its active management plans, Norges Bank seeks to achieve the highest possible excess return within the guidelines defined by the Ministry of Finance, at extra costs and risk commensurate with the expected excess return.

Strategy for achieving excess return

Cost-effective management

Distinguishing between index management and active management is, as previously mentioned, an important aspect of management strategy. The risk limits defined by the Ministry of Finance state that management of the Fund must, by and large, closely follow the benchmark portfolio. A number of effects are achieved by "earmarking" a portion of the portfolio to

follow the benchmark portfolio very closely. Management costs for this portion of the portfolio are kept low since this type of management can be achieved using specific techniques and inexpensively. This also results in a sharper focus on the portion of the portfolio that can be managed actively. A broader overview is obtained, which makes it possible to assess the merits of the different types of management, and to make use of the special strengths of the various managers.

In 1998, Norges Bank chose to start off using only external management for equities and only pure index mandates. It was natural to purchase all management services externally since we possessed no equity management expertise. Selecting index managers and continuous follow-up required less expertise within the organisation than selecting external active equity managers as well would have done. However, preparations for choosing active managers began in the autumn of 1997 already.

An important means of keeping costs low is to allow the active managers, who cost more, to invest only in what they specialise in. In other words, they use their resources mainly to take positions relative to the benchmark index they have been given. In the contracts entered into with active managers, a target area is established for minimum and maximum risk relative to the benchmark indices. A part of the fees of most managers is based on how successful they are in achieving an excess return. This provides them with an incentive to use their own specialist expertise to take active positions. If, alternatively, Investment Management had delegated the entire equity portfolio to external active managers, the total management fee would probably have been considerably higher than that resulting from a division into index and active management.

Another important element of the strategy for keeping management costs down is a keen focus on transaction costs. Transaction costs will, over time, be of considerable importance for the net return, particularly for the Petroleum Fund which enters the market each quarter with large amounts of capital. Each time, the question of which types of transactions result in the lowest overall transaction costs is considered. See feature article "Can index performance be achieved through index management?"

In purchasing external services, Investment Management has attempted to create as much competition as possible between potential suppliers, for example by placing an invitation for tenders on the Internet. The activities of Norges Bank's own management are subject to its internal budget and accounting regulations, and are monitored by the Bank's control system in the same ways as the other departments in Norges Bank.

Highest possible return at lowest possible risk

Active investment management is largely about being able to predict or foresee price trends for various assets. In theory, this can be achieved by having appropriate analyses of what a "fair" price is and comparing it with the prevailing market price. The analyses may be based either on a compilation of many open information sources or on more or less unique insight based on comprehensive research. Either way, the quality of the analytical work must be superior to the market average. Only then is it reasonable to believe that the information in the analysis is not already reflected in the market price. Empirical research indicates that new information is rapidly priced into the market. To the extent that it is possible to attain an information advantage, it will normally be of short duration. Since the intention is to outperform the average manager, the market selected for operations is important. It is not by chance that Investment Management has not yet chosen active equity managers in North America, or that there is proportionately less active management in the UK than in the rest of Europe and in Japan. We consider the North American and British equity markets to be more efficient, ie more competitive for active managers, than the other regions. However, this is not to say that we do not believe in the possibility of achieving an excess return in North America; rather, this choice reflects a natural prioritisation of markets during the establishment phase.

We have previously mentioned that we view active and passive management as different areas of specialisation. We shall also place some limitations on active management. Our strategy is to select certain areas for each of the three management departments and then acquire expertise by specialising in these areas.

In view of the numerous empirical studies showing that there are few active managers consistently achieving sound results over time, there is reason to believe that even a good manager only has limited prediction powers. It is unrealistic to envisage anything approaching complete clairvoyance; as a rule, it is rather a matter of improving the odds from 50-50 to perhaps 52-48. In other words: Even a good manager often makes mistakes. Both probability theory and experience seem to indicate that active management should be spread over a large number of independent positions.

– In principle, a manager's information advantage can be measured as the correlation of his forecasts and the actual outcomes. Such a variable is often referred to as the "information coefficient" or *IC*. A quantitative prediction model can have a measurable *IC* which can, for example, be calculated by simple regression. It is difficult to measure the *IC* of a manager who does not use quantitative models.

– Assume that a manager has a subjective expectation for the return on an asset. This expectation is arrived at against the background of information in the form of a "signal" - which, for example, might be a new earnings estimate for a company. This type of expectation is called a conditional expectation. The difference between the conditional expectation and the market's average expectation is called α . In other words, α is the expected differential return relative to the expected return upon which the valuation of the asset at current price is based. Under certain conditions it may be shown that:

$$\alpha = \text{volatility} \cdot \text{IC} \cdot \text{score}$$

Here, *volatility* is the standard deviation of the return on the asset, and *score* is the reading of the signal (eg earnings estimate) less the average signal divided by the standard deviation of the signal.

In other words, the more "unusual" the signal reading, the more the score differs from zero. In more general terms, it can be said that the above equation shows that the excess return a manager succeeds in generating over time will depend on his taking risk (*volatility*), and finding relevant (*IC*) information which the market has not taken into consideration (*IC* and *score*).

– The information ratio, or *IR*, is a concept widely used to relate a manager's excess return to the risk he has taken relative to the benchmark. Thus

$$IR = \frac{\text{excess return}}{\text{tracking error}}$$

Tracking error is the standard deviation of the difference between the return on the manager's portfolio and the return on the benchmark portfolio. An average *IR* comes to just under 0 after transaction costs, ie no net excess return is achieved. An *IR* of 1 is an unusually good result.

– It can be shown that there is a relationship between the number of signals (ie sources behind the investment perspective), *IC* for each signal and *IR*. Under certain conditions the following applies:

$$IR = \sqrt{BR} \cdot IC$$

Here *BR* is the "breadth" or number of (independent) investment signals. An intuitive interpretation is that a number of investment signals help to produce a more accurate estimate for This is particularly so when *IC* is low, as is typically the case.

Those readers who are particularly interested can read more about these concepts in the book "Active Portfolio Management" by Richard C. Grinold and Ronald N. Kahn, Irwin Professional Publishing 1995.

It is against this background that we have chosen to develop active management in several independent areas. For example, our Tactical Asset Allocation unit is going in for both quantitative modelling and macro-based investments. Fixed Income Management has special teams for assessing differences in the pricing of almost identical cash flows and for taking open positions. In Equity Management, the focus is on the selection of individual equities, with special teams to cover selected sectors in which conditions may be expected to be most conducive to achieving excess return. Building up expertise in only one area would be akin to putting all one's eggs in one basket.

The areas singled out for focus resemble to a certain extent the activities of the external managers. A common feature of the equity managers selected up to the present is that, in general, their investment strategy is to analyse and choose from among individual companies with the aid of a range of valuation models, and without any restrictions on country or sector positions. This means that their results (excess or deficit return) will normally show less covariation with more general market trends than if the strategy had placed most of its emphasis on analyses at a macro-level. On the allocation side, the emphasis has been on a spread in the approaches used by the external managers in order to achieve a low correlation among the external managers.

It is not only the number of decisions which is of importance, but also how wide price trend variations are among the securities from which selection has taken place. There were very large differences in the performances of comparable companies in the autumn of 1999. There was a broad spread between the price trends of companies that performed well and those that fell behind, particularly in the technology and IT sectors. Under such conditions, the potential for excess return is greater for managers who select individual equities than in periods of substantial covariation in the return on individual equities. This suggests that the degree of risk taking may vary over time as the potential for excess returns changes. In other words, it is also important to predict risk and not just prices and returns.

In summary, in setting out to achieve excess return, a fundamental choice has been made in preferring to take many small positions against the benchmark index rather than a few large positions. Our strategy is that spreading our active management over many different types of positions (diversification of risk-taking) can result in a more robust excess return relative to general fluctuations in the market. Unless one is particularly skilled at forecasting market trends, a conscious strategy of spreading risk in position taking results in the best trade-off between excess return and risk.

The management process

The management of the Petroleum Fund is carried out, as mentioned, in three departments within Investment Management. In the broadest terms, the Tactical Asset Allocation Department is responsible for achieving excess return by taking positions across all asset classes, sectors and countries included in the benchmark portfolio of the Petroleum Fund. The department's positions are limited, for the present, in that only future and forward contracts are used in management. Equity Management chooses investments primarily on the basis of comparative corporate analyses within defined sectors. Selecting individual equities may, over time, result in exposure to other sectors. Whether exposure to a sector is desirable must be assessed against the background of valuation and an understanding of the earnings potential of the various sectors. To date, all indexing has been undertaken by external managers. The Fixed Income Management Department invests within a broad universe of fixed income and foreign exchange instruments. Indexing of the fixed income portfolio takes place internally. The departments generally operate independently of each other within limits for how much active risk each of them may take. The risk limits are defined by the Executive Director of Investment Management, according to an assessment based on the potential for excess return viewed in relation to the use of risk.

The three departments exchange perspectives and analyses through an organised meeting structure, but no consensual view is established on the assumptions upon which investments should be based. The possibility of a single analysis having a substantial influence on the results is thus avoided.

Each department is responsible for both its own and external management. External active management will be initiated in the Tactical Asset Allocation Department during the first six months of 2000. External active management began in Equity Management towards the end of 1998, and slightly earlier in Fixed Income Management. There has been a moderate degree of internal active management in all three departments.

Achieving an excess return through the selection and monitoring of external managers is a demanding task. Past success is often not a good indicator of whether a manager will continue to succeed in the future. Very substantial resources are invested in the selection process and in the attempts to identify factors of importance for future results (see the article on "Equity investments and choice of external equity managers" on Norges Bank's Internet pages). Substantial emphasis is also placed on continuous monitoring, with daily transfers of information on transactions and prices to database and analytical systems.

Selecting and maintaining a portfolio with active managers is in itself an investment decision in line with taking an active position in a security. The aim is to select managers with the best potential for achieving an excess return, and it is important to terminate the contracts of managers whose product is not up to expectations. Skill in such processes entails being capable of terminating a contract if changes in the organisation or management style detract from expectations that the manager will be able to achieve an excess return in the future.

Details of plans for internal active management

The Tactical Asset Allocation Department

If sectors are disregarded, Tactical Asset Allocation has a universe of 54 assets: 21 equity markets, 18 bond markets and 15 currencies. These are the asset classes in the Petroleum Fund's benchmark portfolio. There are liquid futures markets for most of these assets. Futures contracts are extremely cost-effective as instruments for taking positions.

The basis for the internal management is a core of internally developed, quantitative decision-making and valuation models. There is a very large amount of publicly available and quantifiable information on aggregate markets, providing a foundation for the use of models which organise and correlate relevant information when assets are allocated. The ability to forecast thus lies more in processing information better than the average participant than in possessing special information on the individual market. The model result is routinely compared with a more discretionary assessment of the markets.

Tenders have been invited for external active mandates, and the selection process is in the final phase. Common to all finalists is a purely quantitative, model-generated investment process. However, there are quite a wide variety of models, leading to low correlation among managers.

The Equity Management Department

The investment universe consists of approximately 20 000 listed equities. The benchmark index that the equity portfolio is managed against consists of about 2000 equities.

It is a great challenge to select individual equities from an investment universe as broad as that of the Petroleum Fund. For this reason, limits on the active management universe have been set by focusing on particular areas. Equity Management presently covers the financial, IT and service sectors. These sectors have been chosen on the basis of both quantitative features (such as low covariation between the returns on individual equities within the sector) and a qualitative assessment which has to do with the structural changes the sectors undergo, and the possibility of taking advantage of these to achieve excess returns.

Generally, the basis for active investment in particular equities will be a thorough knowledge of the financial situation, strategic orientation, etc. of the individual company. This type of thorough knowledge of individual equities must be brought into a broader analysis of alternative investments. Valuation models are the most important quantitative tool in this analysis. Great emphasis is placed on establishing effective IT solutions in order to access the abundant information available on companies. However, the valuation of uncertain future cash flows, which are characteristic of equities, represents major methodological challenges. The most important function of the valuation models is to reveal what future earnings expectations are implied by the market prices. It is thus only in combination with a fundamental understanding of the various forces - structural (such as changed regulations and demographic trends), economic (such as growth, interest rates, inflation and exchange rates) and competitive (such as new participants, products, channels) which influence a company that the comparative analysis can be translated into active positions that can yield an excess return.

Equity Management has chosen to focus on sectors rather than countries in its internal management. Empirical evidence shows that the return on individual equities is increasingly related to sector-specific factors rather than to country-specific factors. The growing globalisation of the economy will probably boost this trend. An understanding of a sector's dynamics is thus a form of expertise which can be utilised across national borders and regions. In this way, it will be possible to achieve high quality global coverage with less resources than the alternative involving a geographical breakdown.

The external active management, in contrast to the internal management, has been built up using regional mandates. This primarily reflects the fact that most managers are still organised in this way. The external managers selected are primarily characterised by the quality and breadth of their fundamental analysis of individual companies, and for their advanced skills in constructing and implementing portfolios. Performance-based fees are among the incentives for managers to achieve a high return. The number of external managers is relatively low, ensuring that the aggregate positions taken by the managers do not counteract each other to the extent that the active risk in the total portfolio is diluted.

It can be difficult to distinguish clearly between active and passive management. One element of Equity Management's indexing strategy is active trading in equities which are on the way in or out of indices in order to take advantage of the type

of "incorrect pricing" which may arise as a result of imbalances in supply and demand. This type of active indexing can be viewed as compensation for the weaknesses attached to managing the Petroleum Fund's portfolio close to the benchmark indices.

The Fixed Income Management Department

All index management of the bond portfolio is carried out internally and defined as a separate profit centre. However, this strategy also uses techniques for weighing up the deviations in return against transaction costs (see the feature article "Can index performance be achieved through index management?") and active strategies for taking advantage of the fluctuations in bond prices created when the movements of some securities deviate from those of very close substitutes (security-specific risk). These strategies can be regarded as actively chosen deviations of the actual portfolio from the benchmark portfolio.

Active management is carried out both by internal and external managers. It is of vital importance that the expected information advantage (in other words, the ability to generate excess return) and the degree of covariation between the individual active decisions is maintained and analysed. Both of these factors are prioritised when external managers are selected.

In internal active management of the fixed interest portfolio, active decisions are grouped according to position type and grounds. This is done primarily in order to develop specialist expertise in connection with management of the different types of positions. Grouped active decisions are assigned to separate profit centres.

One group of active decisions is entitled "relative value" decisions. The approach here is that a choice is made between instruments which initially have approximately the same cash flows and risk characteristics. The objective is to take advantage of differences in prices for these instruments which may arise through participants' different preferences for risk and liquidity, variation in these preferences over time, and different degrees of price stickiness in response to changes in supply and demand.

Another group of decisions is more characteristic of traditional fixed income management. Here there are no explicit requirements that instruments bear a similarity to one another. However, the reasoning behind an active selection may be based on the same type of expectation that prices revert to a normal level ("mean reverting" processes) as was the case for relative value strategies. A key point is that this type of management is subject to the same requirements concerning performance, spread and risk as management of the rest of the portfolio. Factors relating to developments in risk level and tolerance are expected to influence market trends in addition to more traditional macro-oriented factors. Risk levels and tolerance are also influenced by more micro-oriented effects such as the relationship between supply and demand, wealth effects, correlations, etc.

Common features of internal management

Important elements of the strategy for outperforming the benchmark portfolio are:

- Internal management focuses on areas where it is possible and financially justifiable to build up and develop expertise. External management allows for increased breadth of management style, but it is necessary for Investment Management's own organisation to have the expertise to select and monitor all forms of external management services purchased.
- Assuming a focus on management in possession of expertise, attempts are made to achieve the largest possible spread in the active positions taken.
- Reasonably safe possibilities for achieving an excess return are used first, such as lending and repo trades and techniques for improving the index return.
- Considerable emphasis is placed on ongoing monitoring of portfolios and on risk management. Analyses to find the optimal combination of different active positions in the individual portfolios are performed constantly.
- In taking positions, efforts are made to create a skewed outcome set by maintaining positions that are performing well, and unwinding positions not achieving the desired results in accordance with stipulated rules for decision-making.
- Great emphasis is placed on implementing the active decisions effectively in the markets in order to avoid trading costs which consume a substantial portion of the potential excess return.



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