optimised asset allocation

for financial advisers only

The Skandia investment tools enable financial advisers to establish their clients' attitudes to investment risk, and then build a portfolio to match their requirements quickly and efficiently through online functionality. This document aims to provide a brief insight into the theory that underpins the investment tools, by explaining at a high level Modern Portfolio Theory (MPT), the measurement of investment risk and the matching of client risk-tolerance with an appropriate asset allocation.

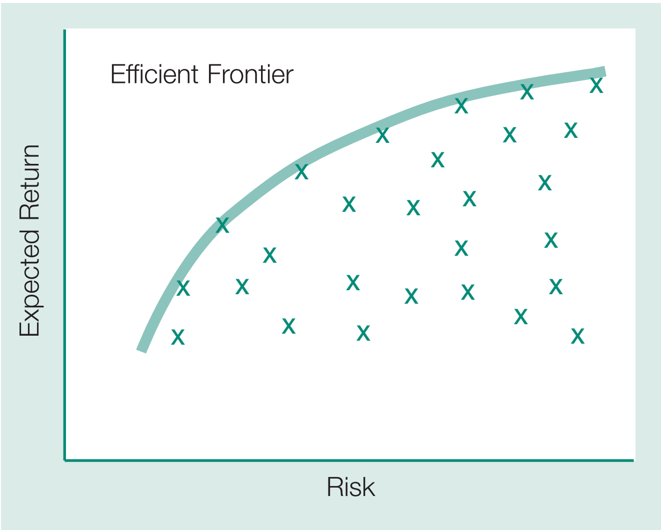
modern portfolio theory – building a portfolio unique to your circumstances.

Our approach to investments is based on MPT.

Professor Harry Markowitz published his doctoral thesis 'Portfolio Selection' in 1952, marking the beginning of what is known as MPT. He demonstrated that for every level of risk it is possible to construct an investment portfolio that, mathematically, delivers the maximum investment return.

A portfolio constructed according to MPT will place the portfolio on an 'Efficient Frontier' where for every level of risk there is a portfolio with the highest expected return and for every level of return there is a portfolio with the lowest anticipated risk.

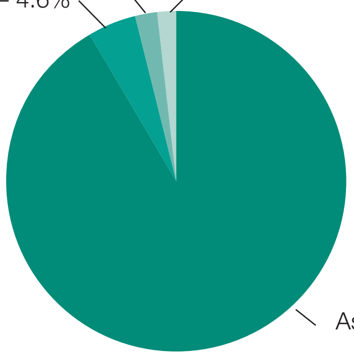
MPT states that portfolios which do not lie on the Efficient Frontier are inefficient (as otherwise you can get higher returns for the same risk). Hence, the asset allocation process should first establish the level of risk to which clients are prepared to expose their investment, and determine a portfolio that lies on the Efficient Frontier.



variation in portfolio returns –
where have they come from?

More recent research by Brinson, Singer and Beebower has shown that by far the most dominant contributor to the variability of total portfolio returns is the asset allocation of that investment portfolio (that is, the proportion held in shares, property, bonds and cash). According to this seminal study on the subject, asset allocation, on average, accounts for 91.5% of the variation of portfolio returns over time (see the pie chart below). Subsequent studies have realised similarly significant results.

The ideal asset allocation differs from investor to investor and is based on the level of risk each investor is prepared to accept. The Skandia portfolio construction tools provide an asset allocation appropriate for an investor's investment risk profile that, according to the theory, should provide maximum returns for that level of risk.



Source: Brinson, Singer, Beebower (1991)

measuring risk

The most common measure of risk in investments (and that adopted within the Skandia investment tools) is the standard deviation of investment returns, ie how much returns may move up and down relative to their long-term average rate of return.

Assets with higher standard deviations may be thought of as more risky because their higher volatility means that there may be more potential for larger downward movements in price.

Historically, shares (equities) have had a higher standard deviation of returns than fixed interest investments (over most time periods), and fixed interest in turn has had higher volatility of returns compared with cash/money market returns.

The table below illustrates current return and volatility assumptions relating to the different asset classes accessible via the Skandia investment tools.

Returns and volatilities as at 17 September 2010

	RPI	Cash/Money Markets	UK Fixed Interest	International Fixed Interest	Property	UK Equity	International Equity
Returns*	3.20%	3.54%	4.74%	3.80%	7.39%	7.63%	8.14%
Volatility		1.62%	5.20%	9.20%	10.42%	19.22%	19.12%

** Gross of tax and charges*

reducing portfolio risk through diversification

A fundamental principle of MPT is that one should consider the risk of the portfolio as a whole, and not individual assets in isolation. While individual assets do have a bearing on the overall level of risk the investor is exposed to, the correlation between the assets in the portfolio has an even greater bearing. In other words, because the price of one asset typically does not move up and down in line with the price of another (eg fixed interest and UK and international equity), there are significant diversification benefits to be gained by including a range of different asset classes in the client's portfolio. Such diversification reduces risk, essentially because you don't have all your eggs in one basket. The table below indicates the correlation assumptions for the different asset classes used within the Skandia investment tools.

Correlation matrix as at 17 September 2010 – five-year nominal returns

	Cash/Money Markets	UK Fixed Interest	International Fixed Interest	Property	UK Equity	International Equity
Cash/Money markets	1.00	-0.40	0.00	-0.05	0.06	0.01
UK fixed interest	-0.40	1.00	0.19	0.24	0.29	0.25
International fixed interest	0.00	0.19	1.00	0.06	0.08	0.53
Property	-0.05	0.24	0.06	1.00	0.49	0.50
UK equity	0.06	0.29	0.08	0.49	1.00	0.69
International equity	0.01	0.25	0.53	0.50	0.69	1.00

The Skandia investment tools aim to optimise the asset allocation so as to achieve the highest expected level of returns for a given level of risk. Risk is once again measured as the standard deviation of returns, and the client's risk score is calibrated to be consistent with it. Even for a relatively low risk score, it is possible to achieve the same level of portfolio risk with a small exposure to more volatile asset classes (eg international equity). This is because a relatively small allocation to, say, international equity does not necessarily increase the risk of the whole portfolio, due to the benefits of such diversification. However, a small allocation to international equity may (according to the model) give the potential for higher returns. As an analogy, in isolation yeast doesn't taste very nice but it is an integral ingredient to the bread-making process.

Most of the benefits of diversification are at major asset class level, ie cash/money markets, UK fixed interest, international fixed interest, property, UK equity and international equity. The Skandia investment tools perform the mathematical optimisation at this level.

Asset classes

- Cash/Money markets
- UK fixed interest
- International fixed interest
- Property
- UK equity
- International equity (includes North America, Europe, Emerging Markets, Far East, Japan, Global Specialist)

There is further diversification benefit within International Equity. The split within International Equity (ie between North America, Europe, Japan, Far East, Emerging Markets and Global Specialist) is determined by leading actuarial consultancy Towers Watson & Co (Towers Watson) and depends primarily on the size of the respective financial markets and their economies.

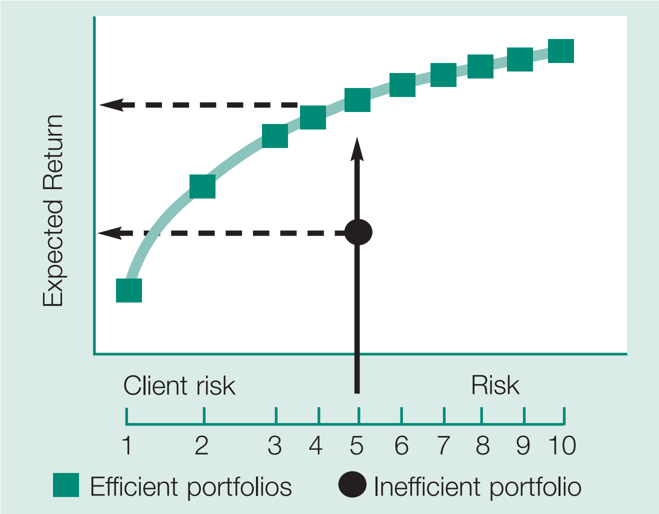
matching portfolio risk and client risk tolerance

The Skandia investment tools include the Risk Profiler (developed in conjunction with Towers Watson), which aims to complement the financial adviser's fact-find by quantifying the level of risk that the investor is willing and able to accept for a particular investment. The client is asked a series of questions about his/her views on assuming investment risk, and his/her financial position. A risk score is then determined based on the answers to the questions, ranging from 1 to 10, with 1 being the most risk-averse and 10 being the most risk-seeking. Remember that risk is defined as portfolio volatility. This risk is then mapped to a corresponding level of portfolio risk on the Efficient Frontier, as measured by standard deviation of returns. The Skandia Asset Allocator works out a portfolio with the highest mathematically expected return for that given level of risk based on the major asset classes.

'Optimal' or 'Efficient' portfolios are theoretical concepts and are achieved when a portfolio is established where a maximum mathematical return for a given level of risk has been established.

In order to determine these Efficient portfolios, it is necessary to analyse every combination of assets and plot the expected risk-return outcome for each combination. The Optimal or Efficient portfolios are defined as those that maximise the expected return for the desired level of risk.

Having established the expected outcomes for all the combinations of assets, a line can be drawn to join up each of the Optimal portfolios at each risk level; this line is the Efficient Frontier.



The key point is that the portfolio as a whole is matched to a level of risk that is based on the score the client obtained in the Risk Profiler. The risk levels are mapped with an expected portfolio volatility level as indicated in the risk mapping table below.

Risk mapping as at 17 September 2010

Risk Level	1	2	3	4	5	6	7	8	9	10
Volatility	2.00%	4.50%	7.00%	8.64%	10.29%	11.93%	13.57%	15.21%	16.86%	18.50%

For risk-averse clients, the Skandia Asset Allocator does not produce portfolios with large exposure to the more volatile asset classes. There is a maximum of 2% exposure to international equity at Risk Level 1 and a maximum of 14% exposure to international equity at Risk Level 2 across all products available through Skandia. (Risk Levels 1 and 2 are both unavailable for ISA investment due to their high cash/money markets content.) By Risk Level 3 the maximum international equity exposure is 24% (although for these portfolios there are also significant allocations to cash/money markets to balance the portfolio risk). The risk-averse investor does not therefore have excessive exposure to what might be considered risky asset classes when viewed in the context of the whole portfolio. For example, the aim of having exposure to the international equity sectors is to provide diversification benefits (ie increasing the portfolio's expected return) whilst not exposing the client to risks that are not in line with his/her risk score.

Financial advisers have the flexibility to exclude asset classes that are not desired (eg to satisfy client preference). For example, the financial adviser may apply a constraint of a maximum of 20% for cash, or a minimum 10% to property, to finesse a portfolio to a client's requirements. The optimisation process in the Skandia Asset Allocator will then produce an asset allocation taking into account both these constraints and the client's risk score. However, it should be noted that the optimisation process can only produce an asset allocation appropriate to the client's risk score. For example, it would not generate an asset allocation for a Risk Level 1 client where a constraint of a minimum of 40% equities has been applied. This is because each risk level covers a range of volatilities and whilst the suggested asset allocation for an unconstrained portfolio would be in the centre of that range, it can only suggest variations that fall within the identified risk band.

Each Risk Level covers a range of volatility. The portfolio the system suggests is in the centre of that range. There are however very many more variations of asset allocation, whose associated volatility would fall within that risk band. The system 'seeks out' a portfolio that best reflects the constraint criteria.

The financial model underlying the investment tools, the economic assumptions behind the model, and asset allocations produced by the model in the Skandia Asset Allocator have been verified by Towers Watson (authorised and regulated by the Financial Services Authority). For further details on the asset allocations for growth and yield investors, please see the Standard Asset Allocations document.

fund selection

Once a client's portfolio is determined at asset class level, a financial adviser can then select funds to represent each asset class by using the Skandia fund selection tool. The selection tool provides many different parameters by which funds may be assessed including past performance, alpha, beta and volatility. Some of these measures are relative to a benchmark. Selecting individual funds that are significantly different to the asset class benchmarks assumed by the fund selection tools can lead to more or less risk than projected. Once the fund selection is complete and the portfolio is saved, the portfolio is automatically 'beta tested' to determine if the fund selection has increased or decreased the overall risk of the portfolio. Beta is a relative measure of the sensitivity of an investment's return to changes in the benchmark's return and based on past performance. A portfolio beta greater than 1 might increase the risk of the portfolio, ie potential higher volatility, and a beta less than 1 might decrease the risk of the portfolio, potentially leading to lower expected investment returns. Should the portfolio's beta be too high or low the financial adviser will be warned and can then address the fund selection where appropriate. Financial advisers can of course choose to proceed with their chosen funds should they deem it appropriate. For more information on beta and other performance measures, please see the glossary below.

glossary

Alpha –

If you are measuring two investments (normally a fund against an index), the alpha represents the theoretical return of the first investment when the second investment has a zero return, ie it represents the over- or under-performance of a fund in relation to its benchmark. The result is expressed on an annualised basis.

Beta –

Beta is a quantitative measure of the volatility of a fund or portfolio, relative to the overall market. A beta above 1 shows that a fund is more volatile than the overall market, while a beta below 1 represents a fund which is less volatile.

Cash –

Cash, generally coin and note currency of a country, in circulation and deposited in cheque accounts and other deposits that are available on short notice.

Equities –

Another name for shares held in a company.

Fixed Interest –

Referring to income which remains constant and does not fluctuate, such as income derived from bonds, annuities etc. Any debt security which has a fixed flow of income is known as a fixed interest security.

Money Market –

The market for trade in short-term securities such as Bills of Exchange, Promissory Notes and Government and Semi-Government bonds. Participants in the money market include banks and other financial institutions, life offices, stockbrokers, pension funds and Government authorities.

Property –

In the finance industry, the term refers to real estate including land and buildings that can be bought, sold or leased.

Volatility –

Volatility frequently refers to the Standard Deviation of the change in value of a financial instrument with a specific time horizon. It is used to quantify the risk of the instrument over that time period. Volatility is typically expressed in annualised terms, and it may either be an absolute number (£5) or a fraction of the initial value (5%).

Yield –

A measure of the income received from an investment compared to the price paid for the investment. Normally expressed as a percentage.

PDF5621/210-2012/September 2010