

THE CONCEPT OF INVESTMENT EFFICIENCY AND ITS APPLICATION TO INVESTMENT MANAGEMENT STRUCTURES

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ABSTRACT

Investment efficiency is a function of the risk, return and total cost of an investment management structure, subject to the fiduciary and other constraints within which investors must operate. Institutional investors implement their investment policies through investment management structures. In this paper, the aim is to enhance the investment management structure by broadening the financial objectives, by recognising the effect of behavioural issues and by incorporating governance constraints. We therefore suggest that investment efficiency should be considered as a combination of financial efficiency and non-financial efficiency.

Modern portfolio theory had a revolutionary effect on portfolio construction. In the same way, we believe that investment management structures should be constructed in a more disciplined and quantitative manner. In this paper we outline the quantitative and qualitative methods by which these structures can be developed. The proposed new framework for designing investment management structures seeks to optimise net information ratios while simultaneously recognising the level of regret risk facing fiduciaries, minimising non financially-productive behavioural biases and taking account of the resources available to the fiduciary to monitor these structures.

KEYWORDS

Active return; Active risk; Behavioural finance; Governance; Investment; Investment management structure; Net information ratio

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1. INTRODUCTION

1.1 Overview

1.1.1 Investment efficiency is a function of the risk, return and total cost of investment management, subject to the constraints within which investors must operate. These constraints include financial elements and non-financial elements such as an investor's time available to manage the investment arrangements, accountability as a fiduciary, or legislative requirements. Investment efficiency should therefore be regarded as a combination of financial efficiency and non-financial efficiency.

1.1.2 Investment management structure can best be defined as the framework that establishes how investment assets should be divided amongst different investment approaches and different investment managers. The investment approaches can encompass different expected risk, return and style characteristics. The end result is the construction of a number of layers, each of which comprises distinct types of investment managers, and the desired number of investment managers in each of these layers.

1.1.3 These investment management structures can be as simple as a single in-house investment team or as complex as a large pension fund employing a significant number of

external third parties. This paper is focused on those investors who use external organisations to invest some or all of their assets. Increasingly, these investors view the choice of investment management structure as a key first stage in selecting investment management firms (which we refer to hereafter as 'investment managers').

1.1.4 As advisers to institutions, charities and high net-worth individuals, actuaries and other investment consultants have an increasing challenge to simplify the issues and present efficient investment management structures.

1.1.5 If consultants are to identify appropriate investment management structures, they must ensure that these structures satisfy various criteria. The arrangements must be appropriately diversified, cost-effective and capable of meeting the investors' expectations for performance. The arrangements must also be capable of practical implementation.

1.1.6 In this paper we set out the quantitative and qualitative methods by which these structures can be developed. In the same way that modern portfolio theory had an influence on security selection, we believe that a more disciplined and quantitative approach towards developing investment management structures can have a similarly beneficial effect.

1.2 Proposed Solution

1.2.1 We believe that the existing model of building investment management structures, focusing solely on risk and return, is too simplistic. There are other dimensions that need to be taken into account. For example, we have observed that some funds may be comfortable with their investment management structures despite poor performance and it seems that relationships may have taken precedence over returns.

1.2.2 In this case, and others, behavioural issues are adversely affecting the management of the fund. If investors can exhibit such biases when confronted with investment decisions, then non-financial factors should be recognised in building investment management structures.

1.2.3 We have also observed that some funds have been too ambitious when determining their investment management structures, and have subsequently found them too complex to administer effectively with the resources available.

1.2.4 Other important factors include legislation and the regulatory environment. These can have a direct financial impact on investment arrangements or an indirect, possibly non-financial, impact through changed behaviour.

1.2.5 These issues require a fresh look at investment management structures, incorporating a broader set of objectives that includes both financial and non-financial factors. We can acquire a better understanding of the fiduciaries through developing a model of their preferences and desires, namely their utility function. Once the fiduciaries' utility function is understood, it can be reviewed and challenged to ensure that it has an appropriate balance between the financial and non-financial factors. After agreement on the weights of these priorities, an appropriate fund-specific investment management structure can be developed.

1.2.6 In this paper, the aim is to enhance the investment management structure by broadening the objectives to reflect non-financial factors, and modelling more efficient structures based on these objectives. Enhanced investment efficiency will be achieved primarily through improved financial efficiency but also through the management of non-financial factors.

1.2.7 We suggest financial efficiency should be measured by net information ratio.

1.3 Outline of the Paper

1.3.1 Section 2 sets the background to the paper by considering a generalised governance framework for investment funds and by reviewing the typical investment process currently used to develop investment management arrangements.

1.3.2 In Section 3 we look at the key elements of behavioural finance theory as they relate to investment decision-making. We combine these behavioural issues with financial factors and propose the outline of an investor's utility function in Section 4. We investigate how the utility function could be optimised in Section 5.

1.3.3 Section 6 introduces generic investment manager types and maps the characteristics of these investment manager types to the elements of the utility function. Section 7 takes these manager types and explores the principles used in the manager modelling process.

1.3.4 In Section 8 we pull together the key concepts introduced in the paper using a range of hypothetical structures as an illustration. We discuss the practical consequences of the new concepts, both the benefits and the potential problems for practitioners, in Section 9. Our conclusions are found in Section 10.

2. THE ASSET PLANNING CYCLE

2.1 Fund Governance

2.1.1 The success of an investment management structure is important to a number of different parties. In this section, we consider a generalised framework for investment funds, noting the parties involved and defining common terms. The generalised structure of governance can be represented as follows:

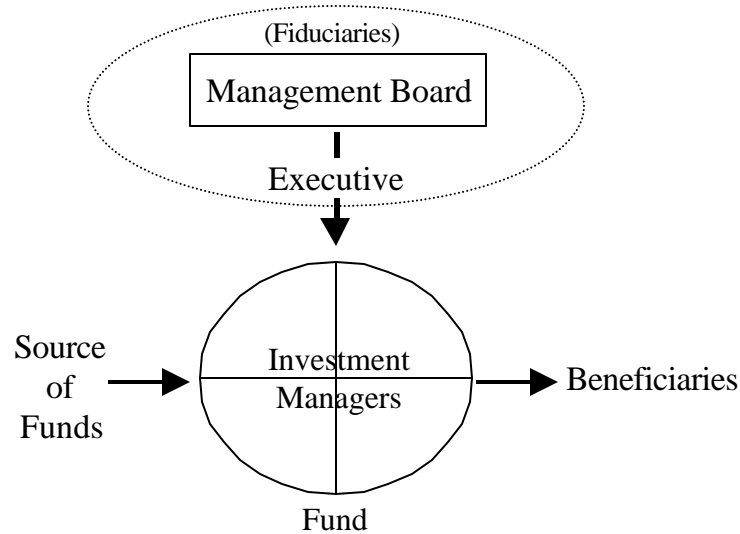


Figure 2.1. Generalised fund governance framework

2.1.2 The focal point of the governance arrangement is the fund. The fund is the pool of assets to be invested.

2.1.3 The parties involved in the arrangement are:

- Fiduciaries. In the case of funds investing for other parties, like trust funds, the group of people responsible for the fund.

- Management group. The group of people considered responsible for the overall investment of the fund. In the case of trust funds, it is either the fiduciaries themselves or agents of the fiduciaries. The group sets the goals of the fund (the fund's mission) and influences the strategy, but typically delegates the day-to-day investment of the assets.
- Executive. The person or group of people who ensures that the strategy of the management group is implemented. The executive is generally involved in the day-to-day running of the fund.
- Source of funds. The provider of the capital for the fund. This party typically delegates the management of the fund to the management group.
- Beneficiaries. The individuals who receive financial benefits from the fund.
- Investment managers. Organisations that actually invest the capital on behalf of the fund. The vast majority of institutional funds employ external investment management firms.

2.1.4 Examining different types of funds against this framework, the following examples can be presented:

Table 2.2. Different governance bodies

Entity	Management Group	Executive	Source of Funds	Beneficiaries
Defined Benefit Pension Fund (Trust)	Trustees	Pensions Manager or Secretary	Employer, potentially the Employees	Pensioners, Members, Employer
Defined Contribution Pension Fund (Trust)	Trustees	Pensions Manager or Secretary	Employees, potentially the Employer	Retirals, Members
Defined Contribution Pension (Personal)	Provider Committee	Individual, Provider	Individual	Individual
Foundation, Endowment, Charity	Management Board	CEO, Investment Director	Benefactor	Grantees
Insurance Company	Investment Committee	CIO or Secretariat	Policyholders	Policyholders
Personal Investor (High Net-worth Individual)	Individual	Family Office, Individual	Individual	Individual, Dependants

2.1.5 We observe the following from looking at different types of arrangements. Only in the case of the personal investor is the same person providing capital, making strategy decisions and receiving financial benefits. These investors have the best opportunity to customise structures to their individual requirements.

2.1.6 For most funds there is a management group (fiduciary) that has to make decisions on behalf of other people. The fiduciary has to answer to other parties - the source of funds and the beneficiaries - who have shared interests in the fund's performance.

2.1.7 Fiduciaries have to operate within the constraints and legal rules of their entity. They are also aware of potential criticism from external sources as to how well they achieve the fund's mission. It has been observed that the level of external monitoring has an impact on the decision-making of fiduciaries. The final investment management structure that the fiduciary chooses for the fund will therefore be influenced by the wishes of the other interested parties.

2.1.8 The steps taken by management groups to develop investment management arrangements are outlined below.

2.2 *Setting the Fund's Mission*

2.2.1 The fund's mission reflects the underlying purpose of the fund and will determine how the fund is managed. The fund's mission is usually determined by the management group and it forms the backdrop for investment planning and, importantly, provides a guide as to whether the fund's emphasis is on return or risk.

2.2.2 This mission will be shaped both by the composition of the management group and by the extent to which it is appropriate to incorporate the interests of the source of funds as opposed to purely those of the beneficiaries. In a defined benefit pension fund, for example, an employer-dominated management group may seek to minimise the cost to the employer or the risk of large unforeseen capital calls in a short period.

2.2.3 In order to be best placed to give advice on investment arrangements, the investment consultant has to understand the fund's mission, the position of the fiduciaries, and the fund's governance structure. In some cases the investment consultant may assist the management group in clarifying the fund's mission.

2.3 *The Cycle*

2.3.1 The asset planning cycle is the process by which investment management arrangements are developed. This is an important process as the fiduciaries are legally responsible for the investment of the fund's assets and their success in this regard will determine how well the fund's mission is accomplished. This section describes the stages in the circular process which are:

- to set objectives;
- to determine the strategic asset allocation;
- to design the investment management structure;
- to populate the structure through the selection of appropriate investment managers; and
- on-going monitoring of the investment arrangements having regard to the objectives.

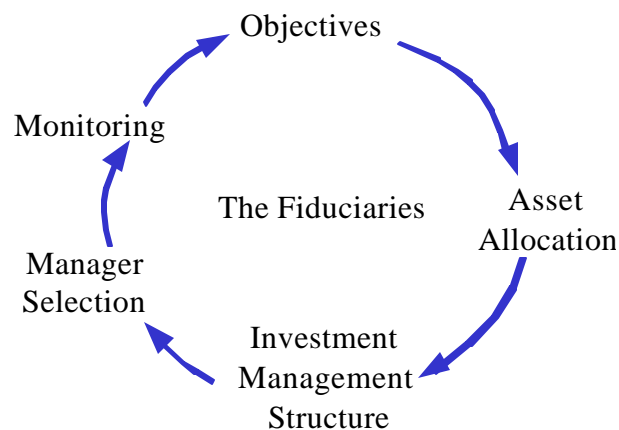


Figure 2.2. Asset planning cycle

2.4 *Set Objectives*

2.4.1 The management group should set objectives that are consistent with the achievement of the fund's mission. The balance of decision-making power within the management group will influence these objectives.

2.4.2 The fund's mission will typically result in an unambiguous primary objective. For example, a foundation is usually required to spend a given proportion of assets to maintain its tax status. The primary objective in this case may then be to maintain the real value of the assets over time. For a pension fund, the primary objective will usually be to meet the liabilities as they fall due.

2.4.3 While important, these primary objectives do not greatly assist the decision-making process, as they tend to be too broad in scope. Secondary objectives are developed to form a stronger link between the day-to-day decision-making and the long-term purpose of the fund.

2.4.4 Typical secondary objectives relate to:

- Solvency measures, where the fund is required by legislation to meet prescribed levels of solvency (the value of assets relative to liabilities). These measures apply particularly to insurance and pension funds.
- Cashflow volatility measures. For example, charitable funds may wish to maintain a stable pattern of expenditure whereas pension funds may aim for a steady contribution level. It is likely that the importance of this type of objective will grow given the trend towards using market values in actuarial valuations and given the likely implications of revised international accounting standards.
- Targeted return measures, expressing a cost-neutral or desirable level of returns to be earned by the fund.

2.4.5 The precise formulation of the objectives will be influenced by both financial and non-financial factors. The financial factors will include such elements as the likelihood of further inflows from the source of funds, the current level of solvency if applicable, the structure of the liability profile and whether the fund is cashflow positive or negative. The non-financial factors include the motivations of the members of the decision-making group, their risk tolerances, their investment experience and the decision-making process itself (whether consensual or autocratic).

2.4.6 In practice, the objectives set largely focus on investment return, and are typically styled as "to maximise return subject to an acceptable level of risk" or "to outperform a stated benchmark by 1% per annum over rolling three-year periods". Risk is typically ill defined.

2.4.7 In Section 4, a more comprehensive framework is discussed. This framework will require the objectives to be broadened and explicitly recognises the non-financial elements.

2.5 Asset Allocation

2.5.1 Deriving a suitable asset allocation taking account of the primary objective and of the underlying liability structure, if applicable, is essential to meet the secondary objectives. The importance of this asset allocation process can be reinforced by legislative requirements. For example, in the United Kingdom the Minimum Funding Requirement of the Pensions Act 1995 provides a starting point for setting the asset allocation. Similar effects have occurred in other countries. For example, until 1997, Japanese pension funds were required to hold at least 50% of their assets in Japanese bonds. Since the cancellation of this legislative requirement, many of these funds have increased their exposure to equities to around 70% of assets.

2.5.2 The strategic asset allocation can be derived either by subjective methods or by more quantitative approaches. Examples of the former would be determining the asset allocation based on professional judgement after considering historical returns alongside expectations for

future outcomes, or deciding to follow a peer group allocation that was deemed suitable for the achievement of the objectives.

2.5.3 Quantitative methods include asset modelling (AM) and asset liability modelling (ALM). Both AM and ALM are risk assessment techniques that involve making projections of the future financial position of the fund. With ALM, both assets and liabilities are projected into the future, allowing insurance and pension funds to assess the risk and return trade-off of various strategic asset mixes in the context of their liabilities. AM allows funds without defined liabilities to trade-off return expectations against absolute volatility or other risk measures.

2.5.4 The core output of these techniques is the bond/equity mix and the geographic split of assets. The process can be further refined to add more details. For example, it can be used to determine allocations to alternative asset classes such as real estate, private equity or hedge funds. The resulting asset mix forms the strategic asset allocation. For the avoidance of doubt, this stage is not concerned with tactical asset allocation or stock selection.

2.5.5 The consequences of an AM or ALM approach are:

- the promotion of fund-specific benchmarks;
- investment policies that more explicitly take account of objectives and liability profiles;
- greater confidence for allocation to new asset classes/structures; and
- investment policies that are more aligned with a fund's risk/reward tolerance.

2.5.6 This process is likely to provide fiduciaries with a better understanding of their fund. This should enhance choices made regarding fund objectives and asset structures.

2.5.7 The long-term strategic asset allocation is generally considered to be the most important decision the fiduciaries can make. Over time, differences in return between different types of assets are usually greater than the differences between investment managers within the same asset class. However, in many countries we observe strong clustering of funds' asset allocations around 'norms'. As a result, the impact of differing returns from the various asset classes is often small, and manager selection can become the greater influence on the bottom line. Funds may therefore have lost out in terms of the beneficial impacts they could have gained from greater emphasis on asset allocation and investment management structures.

2.5.8 In this paper, we assume that an appropriate strategic asset allocation has been set. This is not the focus of the paper. The focus is on adding value to the next stage of the asset planning cycle: developing an investment management structure.

2.6 Investment Management Structure

2.6.1 At this stage in the cycle the fiduciaries will be confronted with a multitude of options such as:

- in-house versus external investment management;
- active versus passive;
- multi-asset (balanced) versus specialist;
- segregated versus pooled;
- style neutral versus style bias;
- the performance target for each mandate; and
- the number of managers for each mandate and overall.

2.6.2 The set of feasible structure options is constrained by the objectives of the fund and by the size of the fund's assets. This set should also take into account the transition costs of moving

from the existing investment management structure and also the future transition costs implied by the expected future turnover of investment managers, although in practice these costs are often not allowed for. Nevertheless, for most funds, even these cost constraints tend not to reduce the set of alternatives to a manageable number of structures.

2.6.3 One consequence of this is that the choice of investment management structure is influenced to a significant degree by non-financial factors. These non-financial factors are essentially the subjective views and prior experiences of the fiduciaries. These issues are explored in Section 3. In practice, we find that poor manager performance is the most common trigger for a change in investment management structure and that little further analysis of the overall structure is undertaken when deciding upon the appropriate response to the manager's underperformance.

2.6.4 As a consequence, structures have tended to be products of a sequence of events, such as poor performance, rather than created by a well thought-out process. For example, only when active management performance has disappointed has passive management been incorporated by funds to any significant extent. Evidence of such 'management by reaction' can be seen in the great diversity between investment structures, despite the high degree of homogeneity present in the asset allocation of funds within each country. Arguably, the risk of future performance disappointment increases where the evolution of the investment arrangements has been so unstructured.

2.6.5 In this paper we address how funds might approach these investment management structure decisions in a more disciplined manner. We seek to apply new concepts and disciplines to build a portfolio of investment managers that is more likely to meet the investment objectives of the management group.

2.7 Manager Selection

2.7.1 At this stage of the asset planning cycle, the managers required to fill the specific mandates identified in the structure will be chosen. Fiduciaries will evaluate investment managers according to factors such as perceived level of skill, the investment team that will manage their assets, past performance figures and expected service.

2.7.2 Behavioural influences are also prevalent at this stage. Performance misconceptions and flawed cognitive perceptions certainly influence the selection of managers. Urwin (1999) outlines seven behavioural issues that fiduciaries face when undertaking manager selection exercises. Common examples are fiduciaries worrying about short-term results rather than the long-term, or seeing patterns in small samples of data where there are none.

2.7.3 As noted, these behavioural issues will be covered in Section 3. The new framework explored in this paper will aim to address and manage these behavioural biases to provide more effective investment arrangements.

2.8 Monitoring

2.8.1 This is the process by which the objectives, strategic asset allocation, structure and managers are reviewed on a systematic basis. This stage evaluates the success in meeting the fund's objectives over time. Issues highlighted by the monitoring process prompt the fiduciaries to revisit the appropriate stage of the asset planning cycle.

2.8.2 It is worth noting that most monitoring effort is currently expended on the investment managers. This provides a check on the managers and allows the fiduciaries to understand why they have done what they have done. Sophisticated manager monitoring will also identify any

changes in an investment manager's style. While this is important, it introduces the danger of 'management by reaction' referred to above. If the structure is also being monitored, it can be seen whether this change in style will have sufficient impact on the overall characteristics of the fund to warrant action by the fiduciaries. Conversely, monitoring of the structure may reveal issues that have developed without any change in style by any of the investment managers.

2.8.3 In a similar manner, the monitoring of the fund's objectives is also important to ensure they remain appropriate in the light of any changes, whether to the source of funds, to the beneficiaries or to the financial position of the fund. Consequently, the periodic monitoring of the strategic asset allocation is also of major importance.

2.8.4 The more complex the investment arrangements are, the more monitoring will be necessary. In practice, the primary source of complexity in the overall investment arrangements is the investment management structure. Therefore, a lack of fiduciary resources available to monitor the arrangements will constrain investment structure opportunities. In designing the new proposed framework, this relationship between structure and monitoring is explicitly recognised.

2.9 Summary

2.9.1 The asset planning cycle is a multi-stage process that defines the development of an investment policy and a structure for implementing that policy.

2.9.2 In this paper, the aim is to enhance this process by broadening the objectives to reflect non-financial issues, and by modelling more efficient structures based on these objectives.

2.9.3 As stated in Section 2.5.8, we are assuming that the fund's asset allocation and benchmark have been determined. The focus is on the investment management structure stage of the cycle.

3. BEHAVIOURAL ISSUES

3.1 Overview

3.1.1 This section introduces the importance of behavioural finance and reviews the principal findings in the field. In addition, this section challenges and exposes commonly believed performance myths which arise from the behavioural issues discussed.

3.1.2 There are two types of behavioural issues to consider. The first type comprises aversion to regret and aversion to loss and is a consequence of how people make decisions. The second type comprises cognitive illusions that distort rational thinking, such as overconfidence, framing, mental accounting, over-simplification and cognitive dissonance. Like optical illusions, these 'illusions' fool investors and can still persist, even after they have been demonstrated to be irrational choices – as discussed by Thaler (1999).

3.2 Behavioural Finance

3.2.1 The growing field of behavioural finance theory illustrates how behavioural issues affect the management of investments. This body of knowledge reveals that there is more to investing than a simple risk and return trade-off.

3.2.2 A number of studies have constructed examples showing how investors do not always act in a rational manner when confronted with investment decisions. A useful introduction to the subject is published by AIMR (1995).

3.2.3 Rational behaviour is more predictable than irrational behaviour. This is why irrational behaviour is often neglected from models, which instead assume participants act in a rational manner.

3.2.4 These omitted behavioural elements, as Amos Tversky (1995) points out, "indicate that the rational economic model that informs much of financial analysis is incomplete in some essential respects, and the departures are systematic and not random".

3.2.5 It is therefore worthwhile investigating behavioural biases with the intention of strengthening and improving the existing investment management structure model.

3.3 Behavioural Issues in Manager Selection and Structure

3.3.1 The development of investment management arrangements requires a group of people to make decisions. The interaction of any group has great potential for behavioural nuances to emerge.

3.3.2 It is possible that a good investment consultant is aware of these issues, at both a conscious and a subconscious level, when faced with assisting a group to develop an appropriate solution. Nevertheless, the fiduciaries' decision-making process can be enhanced by explicitly recognising the behavioural biases at work. Some of the more common behavioural biases are explored below.

3.4 Regret

3.4.1 Investors are clearly averse to risk to some degree, but they also want to minimise regret. Regret is the feeling of sorrow experienced after making a decision that turns out to be wrong. In manager selection exercises, regret would occur, for example, when a fund management organisation is hired and then performs poorly or indeed when a poorly performing manager is fired and then proceeds to do spectacularly well.

3.4.2 Regret is different from risk. Investors can feel the pain of regret even if the risk has not changed and even when they have not suffered a financial loss. In the manager selection example above where the poorly performing manager is replaced, the likelihood of the fund underperforming its benchmark with the new manager may not have changed. However, the fiduciaries are likely to feel the pain of bad timing if the manager they have just fired goes on to become the new 'star performer'.

3.4.3 Clarke, Krase & Statman (1994) note that one defence against regret is to avoid making choices. We define regret risk as the *fear* of feeling sorrow as a result of making poor judgements. If regret risk is unconstrained, then it can paralyse active decision-making.

3.4.4 We observe management groups that hang on to poor managers for too long. They avoid firing managers even though they know they should replace them. These fiduciaries are postponing decisions to avoid regret risk. In practice, regret risk hampers the effectiveness of the manager de-selection process and can often also bias the selection process.

3.4.5 Another example of regret is peer group behaviour by fiduciaries and investment managers. This is colloquially known as the 'herding instinct'. For fiduciaries, hiring a manager known to behave differently from the peer group carries regret risk, as the performance outcome may be lower than that achieved by the peer group thus opening the fiduciaries up to outside criticism. For managers, the risk of underperforming the peer group carries commercial consequences as well as potential regret. This has implications for investment management structures, as there are greater financial rewards (risk reduction) for picking managers that are

uncorrelated with each other, but regret risk is minimised by employing the same managers as other investors (and who are very similar to each other).

3.4.6 Four examples of fiduciary behaviour arising from regret are:

- Consensus decision-making. Due to their collective accountability the fiduciaries have to reach a group decision, typically on a democratic basis. This means selecting the option with which the majority agree. This may not necessarily be the best option.
- Familiarity. Fear of the unknown can lead to the conventional, familiar options being chosen by fiduciaries. The influence of this factor can be seen in the slow acceptance of new ideas, such as introducing alternative investments into mainstream institutional funds.
- Fiduciary fears. Fiduciaries are required to act prudently and are accountable for investment decisions. A higher degree of risk aversion and loss aversion could be expected from management boards who are highly scrutinised by regulators and stakeholders.
- Peer pressure. This can lead fiduciaries to take the 'safe' option, by doing what everyone else is doing, for example following the peer group asset allocation.

3.5 *Loss Aversion*

3.5.1 Investors have a strong desire to avoid losses. Behavioural finance theorists have found people place about twice as much significance on a loss as they do on a gain (Tversky (1995)). In other words, people are far more unhappy about losing \$100 than they are pleased about gaining \$100. Investors do not have a symmetrical view of returns. They prefer an asymmetric distribution of payoffs, hoping that gains will be more likely than losses and that the chance of very large losses can be avoided. This contrasts with the symmetric view of risk expressed by standard deviation of return, which is traditionally the most prevalent measure of risk.

3.5.2 Loss aversion can affect fiduciaries in a number of ways. If an investment manager has made a short-term loss, then loss-averse fiduciaries will focus on this in their meetings rather than looking at the total fund picture across all their managers.

3.5.3 Another example is that a bad experience with a structure is sorely remembered for a long time. Even if circumstances have changed, strongly loss-averse fiduciaries will avoid even considering such a structure again.

3.6 *Overconfidence*

3.6.1 Several studies have shown that people are generally overconfident about their knowledge and abilities. This overconfidence is observed in many professional fields. These studies are summarised by Barber & Odean (1998) in their literature review.

3.6.2 Overconfidence can lead to biases in two directions. First, people become more optimistic, over-estimating their chances of success, and second, they also overestimate their degree of knowledge (Tversky (1995)). This overconfidence can result in decisions being based on very little information because the person is confident in the outcome.

3.6.3 Barber & Odean (1998) point out that overconfidence is greatest for difficult tasks, for forecasts with low predictability, and for undertakings lacking fast, clear feedback. Successful manager selection is a task that has all three of these elements, and is thus prone to investors becoming overconfident.

3.6.4 For example, overconfidence could lead to higher expectations of returns from managers, which are both unrealistic and unlikely. This could lead to a bias towards managers who have performed well recently, as the fiduciaries are confident the performance will continue. Overconfidence is also often seen in some fiduciaries' belief in their own chances of

success in selecting investment managers. Overconfidence can also distort an investors' view of risk, as their strong optimism in the outcome means the worse case scenario is not given enough significance.

3.7 Framing and Mental Accounting

3.7.1 Framing refers to the importance of context in the way people make decisions. The way the problem is presented to a group may influence the course of action taken. A key aspect of framing is the group's reference point.

3.7.2 The introduction of fund-specific benchmarks is an example of changing the performance reference point from the peer group or market indices to the fund's own criteria. Fiduciaries would benefit from being aware of the extent to which they are influenced by the context when problems are being presented.

3.7.3 Mental accounting refers to the need of individuals and households to record, summarise, analyse and report the results of transactions and financial events. They do so for the same reasons businesses use accounting - to keep track of where their money is going and to keep spending under control. For example, money is typically separated into different accounts: expenditure is divided into budgets (e.g. housing, car), wealth is divided between liquid assets and savings, and income is categorised as regular or windfall. This would not matter if the accounts were perfectly fungible (substitutable) as assumed in economics. Thaler (1999) notes that in the United States of America, where dividends are taxed at a higher rate than capital gains, investors should prefer share repurchases to dividends but actually like dividends, possibly as they provide a simple self-control rule (spend the dividend and leave the principal alone). He also quotes a study that found that capital gains on the stock market have little effect on consumption whereas a cash payout from a merger does increase consumption. Both of these examples show that different mental accounts are treated differently. This is in conflict with the assumption that rational individuals treat money as perfectly fungible.

3.7.4 Clarke, Krase & Statman (1994) point out that behaviourally-driven investors diversify without considering the covariance between assets. They split assets into various pockets such as a cash account for liquidity, bonds for income and equity assets for growth. This goes against Markowitz's principles about the importance of diversification and looking at the portfolio as a whole.

3.7.5 A further example of mental accounting adversely affecting investment decision making is provided by Thaler (1999). He refers to previous work undertaken by himself and Benartzi into the allocation of retirement funds by individuals in the U.S.A. in which they identify what they call the '1/n heuristic'. Where individuals are offered a choice of n funds they tend to spread their money evenly across them. Therefore where one equity and one bond fund are offered, the individual will tend to have 50% in equities, but if a second equity fund is added the proportion in equities rises to two-thirds. In addition, where the employer offers company stock as an option within the retirement fund this appears to be allocated to a separate mental account.

3.7.6 Fiduciaries need to be aware of the issues arising from thinking in mental accounting terms and to ensure that return opportunities and risk budgets are fully optimised. The Thaler study noted above has major implications for the fiduciaries of defined contribution pension plans.

3.8 *Over-simplification*

3.8.1 The human mind tries to find simple rules and patterns to simplify decisions. Behaviourally-driven investors rely on shortcuts based on previous experiences, often seeing patterns in small samples of data where there may be none.

3.8.2 This problem of over-simplification is compounded by "cognitive dissonance", which reinforces and maintains the shortcuts made. Cognitive dissonance is the mental anguish that results from being presented with evidence that our assumptions or beliefs are wrong. This leads to decision-makers rationalising situations to make them consistent with their initial beliefs or even disregarding any new information presented. The more intelligent people can be most prone to cognitive dissonance as they have the ability and aptitude to construct reasonable counter arguments in order to maintain their beliefs.

3.8.3 Investors need to recognise that there are no easy answers. If they believe they know the answers, then they are likely to be over-simplifying, and to be a victim of their own overconfidence.

3.9 *Other Behavioural Biases*

3.9.1 An example of another behavioural bias in the investment arena is the large proportion of domestic assets in most pension fund portfolios. These pension funds, instead of the diversifying their assets according to the global set of opportunities, prefer to invest more in the securities of their home country. This home country bias is seen as motivated not by financial factors (although in some countries regulation does have an influence) but to provide feelings of comfort. It therefore has consequences for adequate international diversification.

3.9.2 Very similar to the home country bias is a familiarity bias, which is particularly relevant for defined contribution funds. Members with less investment experience are more inclined to overweight familiar options. Respondents to a 1995 Gallup survey of defined contribution plan participants viewed their own employer's stock as safer than a diversified stock fund. Fiduciaries will want to ensure that members are sufficiently informed to prevent this type of behavioural bias skewing decisions.

3.9.3 The familiarity bias is not only found amongst members and trustee boards. Coval and Moskowitz (1999) found that U.S. investment managers exhibited a strong preference for locally headquartered firms in their domestic portfolios.

3.9.4 Careful objective consideration of the fund's diversification and awareness of these biases are required when building investment management structures.

3.10 *Performance Myth Pitfalls*

3.10.1 Fiduciaries use performance data to simplify selection decisions and may fall for commonly accepted performance myths that arise from the behavioural issues discussed above. This section explores some characteristics of performance data to make practitioners more aware of this issue.

3.10.2 Myth 1: 'The truth is in the figures'. Performance data contains high levels of statistical noise, which makes it very difficult to distinguish between luck and skill. The 'factor of five' hypothesis states that the noise of one year's performance data is of the order of five times the magnitude of the skill generating that performance. Urwin (1998) observed this when modelling the active skill component (where 'skill' is the capacity to produce outperformance relative to the benchmark) versus active risk. Investors almost invariably expect the skill component in performance figures to be higher than it is likely to be.

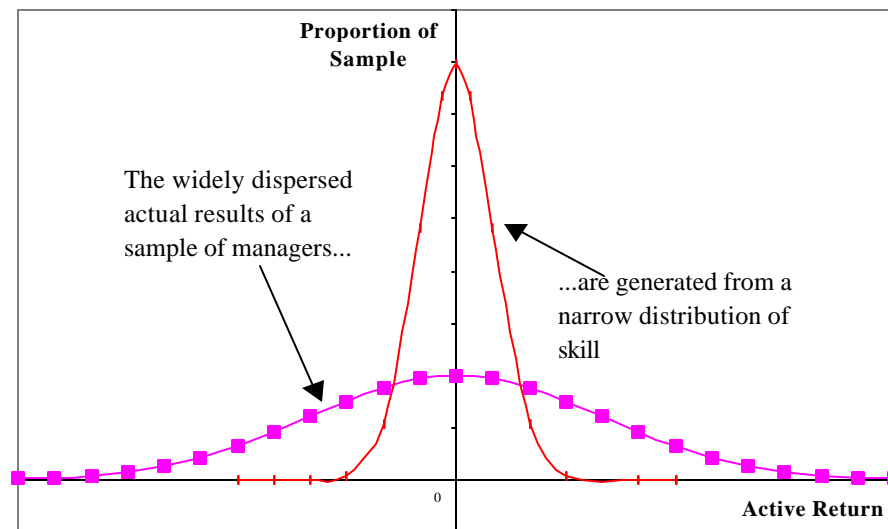


Figure 3.1 Skill and noise distribution

3.10.3 Beckers (1997) echoes this in a study analysing manager performance and skill. It was demonstrated that having above average performance is not a clear indicator of skill. In the simulations, 15% of unskilled managers were still in business after three years and 10% were still attracting business after five years. Likewise, skilled managers can be driven out of the market by bad luck. Fiduciaries should thus understand that there is a large chance element within performance figures and that these figures are not reliable indicators of manager skill.

3.10.4 Myth 2: 'Three-year track records can be used for decision making'. If the system contains so much noise, then the length of time before skill becomes statistically evident is considerable. It is quite normal for a test of manager skill to require fifteen years of data before that skill can be statistically proven. It is also unlikely that the business or its staff (and therefore its level of skill) would have remained constant over such a long period of time. The changes would make it difficult to feel confident about whether the skill observed would still be applicable over the next period.

3.10.5 Myth 3: 'Recent results carry more information'. Great confidence is placed in the recent high performance history of a manager. This is misplaced due to the poor persistency of performance figures, which show that there is no guarantee it will continue.

3.10.6 Luck is very powerful in this context. Given the noise element around the skill distribution, a very good return may have been generated predominantly by chance. Investors that are more prone to behavioural biases will see a good return and tend to extrapolate it into the future. If the observations are independent or have low persistence, then it is more likely that the next period's result will be closer to the mean. This is because most random events lie around the mean and not at the extreme ends of the return distribution. Rational investors will be cognisant of the noise and base future expectations on more realistic values and, particularly, seek to identify the skill element within the noise.

3.10.7 The high noise element in performance data makes it very difficult to prove anything with statistical certainty. What it does however demonstrate is that performance figures are an

unreliable predictor of skill. Good track records are unlikely to persist and cannot be relied upon as a basis for picking skilled managers.

3.11 Summary

3.11.1 Behavioural finance theory illustrates a number of behavioural issues that can affect investment decision-making and there are a number of performance myths espoused by the investment industry that fiduciaries need to treat with care.

3.11.2 On the one hand, the fear of regret and loss aversion increase the concern investors have about 'losing money'. For fiduciaries, their accountability to others can heighten any such concern. This can lead to comfort-seeking decisions such as strong association with peer groups, a reluctance to make changes, a tendency to over-diversify the investment management structure, and an emphasis on large, well-known investment managers.

3.11.3 At the other extreme, overconfidence, over-simplification and extrapolation of past trends can lead to unrealistic expectations and a mis-estimation of risks. This can lead to the adoption of inappropriate structures, where the expectations of future performance are too high, and to 'buy high, sell low' errors in selecting investment managers. In addition, framing and mental accounting encourage inappropriate comparisons and obscure the big picture.

3.11.4 In the construction of better investment management structures, these potential traps and biases need to be carefully considered and skilfully negotiated. This is particularly important when any such biases can be 'justified' on financial grounds, for example failing to make a decision on the grounds of incurring transition costs for an uncertain benefit of a new structure. Clearly this could be a legitimate financial concern which makes the identification and control of the non-financial bias difficult.

4. DESCRIBING THE UTILITY FUNCTION OF FIDUCIARIES

4.1 Overview

4.1.1 In this section, the concept of utility, or satisfaction, is explored. The utility function is a way of describing the decision-maker's preferences among different bundles of goods, in order for the consumer to maximise his or her satisfaction. By applying the concept of the utility function to fiduciaries we can explain why financially sub-optimal structures persist, and we are also better placed to enhance the financial efficiency of future structures.

4.1.2 The financial and non-financial components of the utility function of fiduciaries are developed. The financial elements of active return, active risk, and ongoing costs (which can be combined to form the net information ratio) are described. The effect of diversification is considered. The breakdown of costs between investment management fees, monitoring costs and transition costs is noted.

4.1.3 In addition, we classify the payoffs, or utility, of the behavioural issues identified in Section 3 as belonging to one of two categories. We define the 'SleepWell' payoff as the utility derived from the fiduciaries' level of comfort and the avoidance of the risk of regret. We use the term 'SeemsGood' to describe the utility ascribed to behavioural payoffs that have no financial benefit. The monitoring capability of fiduciaries is outlined as it serves as a constraint in the development of the investment management arrangements.

4.2 Definition of Utility

4.2.1 As used in economics, the term utility may be defined as the amount of satisfaction to be derived from a commodity or service at a particular time. There are two key points to note. First, that the utility of a commodity or service has nothing to do with its usefulness (it may or may not be useful, but must yield satisfaction). Second, that the utility derived from the commodity or service is time dependent. For example, risk control measures have a far higher utility in volatile conditions than when conditions are stable.

4.2.2 Utility theory concerns itself with determining how valuable different outcomes are to a decision-maker. The primary goal of the decision-maker is to maximise their utility or satisfaction. The utility function is a way of describing the decision-maker's preferences among different options and can therefore enable individuals to choose the set of alternatives that maximises their utility.

4.2.3 Utility depends on an individual's subjective estimation of the amount of satisfaction to be obtained from something. As a consequence there is no such thing as intrinsic value because the same commodity or service (at the same point in time) has different utilities for different people. Even for the same individual, the utility of something is not constant but differs at different times and in different circumstances.

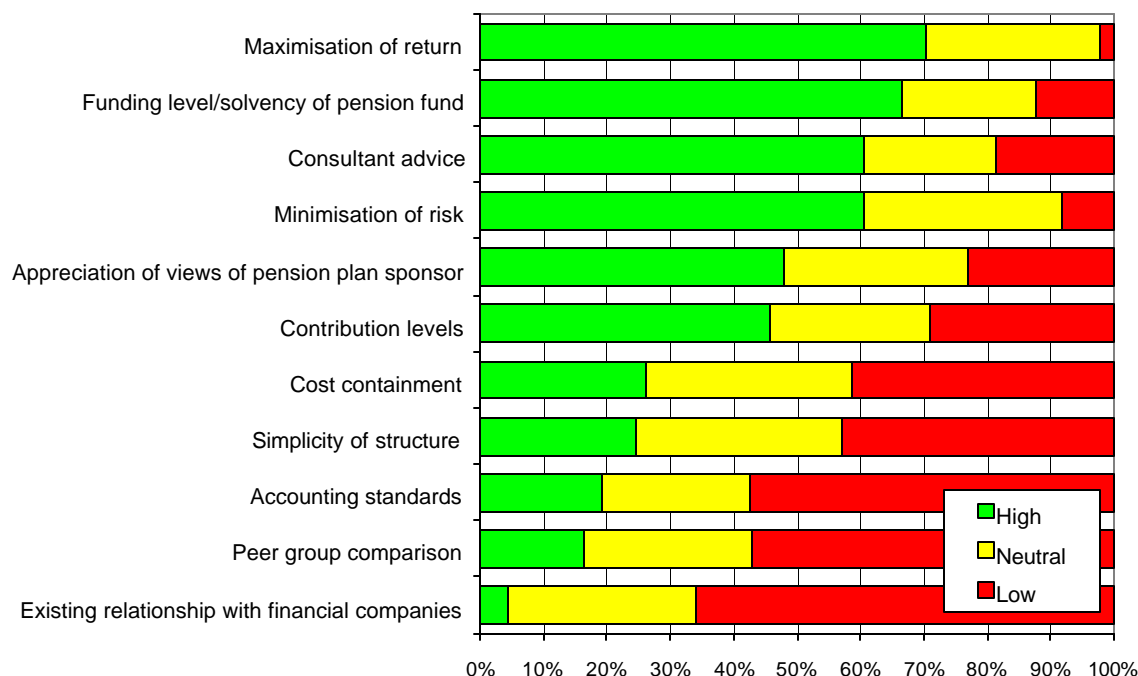
4.2.4 Utility is also subject to the law of diminishing returns. There is diminishing marginal utility associated with increases in the quantity of a commodity or service. The attractiveness of a commodity, service or attribute at any given point in time therefore depends on how much is already possessed. In other words, when considering a change, it is the marginal utility that matters, not the total utility.

4.2.5 In the world of scarce resources and budget constraints, having more of one thing implies having less of another. A choice therefore has to be made, and this implies that each individual has a scale of preferences. Since utility is the strength of the satisfaction that an individual derives from a commodity or service, it follows that it cannot be generically measured. However, it is possible to order these preferences for each individual. The order reflects the current marginal utilities, and the budget can be applied to those areas that have the highest marginal utilities. Perfect equilibrium for each individual at any point in time could be found if each item were infinitely divisible into the smallest units.

4.2.6 In the section below we apply these concepts of utility to the development of an investment management structure by fiduciaries.

4.3 Determinants of Fiduciary Utility

4.3.1 We want to establish a utility function for fiduciaries regarding their chosen investment management arrangements. To derive this we need to evaluate which factors provide them with satisfaction. The specific mix and balance of these factors will naturally change from group to group.



Source: Watson Wyatt Global Asset Study Survey 1999. Data for UK participants only.

Figure 4.1. Factor importance in arriving at fiduciaries' current investment structure

4.3.2 An illustration of dissimilar preferences amongst fiduciaries can be seen above in Figure 4.1. Fiduciaries were asked to rate the factors that they consider when arriving at investment management structures. Solvency and return maximisation were generally highly rated by most fiduciaries, while other factors such as risk, cost containment and simplicity of structures were given differing degrees of importance.

4.3.3 The following subsections review the factors that fiduciaries want from their investment arrangements. They also cover issues that act as constraints to fiduciaries in making their choices.

4.4 Return

4.4.1 Fiduciaries want their investment arrangements to perform 'well'. While the achievement of the fund's mission depends on the absolute level of the investment return we find that fiduciaries pay more attention to relative returns. First, this is due to the strong asset class returns of the last 20 years reducing the need to consider absolute returns. Second, it is attributable to fiduciaries having a long time horizon with respect to absolute returns and exercising short-term management control in respect to relative returns.

4.4.2 Therefore, we make the assumption that shorter-term decision-making is driven by utility derived from relative returns. For individual mandates, the relative return is in comparison to a specified benchmark which could be the return of a market index or the return of a relative defined universe of funds. For the aggregate structure, the comparison benchmark would generally be a composite of market indices in proportions reflecting the strategic asset allocation or a peer group return.

4.4.3 The commonly used (but technically less accurate) measure of return relative to the benchmark is calculated as:

$$\text{Active Return (alpha)} = \text{Fund Return} - \text{Benchmark Return}$$

4.4.4 It is noted that variations of this measure can be calculated. Strictly speaking, a compound variation of the above or the use of log measures would be preferred.

4.4.5 This measure can be considered before (ex ante) or after the event (ex post). Expected active return (i.e. ex ante) is the prospective active return that the fiduciaries expect to be delivered. This measure is the alpha consistent with perceived skill. Actual active return (i.e. ex post) is the observed return after a specific measurement period and includes the effects of both manager skill and noise – the random variations in performance attributable to other exogenous factors.

4.4.6 Holding other factors constant, fiduciaries experience increased utility the higher the actual active returns achieved by their fund. Their utility is diminished to the extent that their expectations for active return are not met.

4.4.7 However, we have noted the lack of evidence of persistency in performance. This places doubt on making appropriate decisions based on past performance data, for example between active and passive management or on the appointment of particular investment managers. Focusing on expected active return shifts the selection perspective from picking the best historical performance to finding the product or investment manager that has the appropriate characteristics and/or skill to meet the fund's risk and return objectives in the future.

4.5 Risk

4.5.1 Fiduciaries do not want these high active returns to come at the expense of placing the fund at excessive levels of risk. Fiduciaries are custodians of their beneficiaries' wealth and are required to act in a prudent manner. They are therefore risk averse, and this requires the incorporation of a measure of risk into the decision-making process.

4.5.2 A comprehensive discussion of risk is outside the scope of this paper. We assume that the risks relating to the performance of the assets relative to the liabilities have been considered when setting the strategic asset allocation (although this assumption is discussed in subsequent sections dealing with absolute return mandates). In this Section, we limit our consideration of risk to that related to the generation of active return relative to the appropriate benchmark.

4.5.3 There are a number of risk measures that can be adopted by fiduciaries. One such measure is active risk, also known as tracking error, which is defined as:

$$\text{Active Risk} = \text{Standard Deviation of Active Return}$$

4.5.4 When considering historic active risk, the number of data points used to derive the standard deviation is typically twenty quarterly returns (five years) or thirty-six monthly returns (three years).

4.5.5 Active risk, like active return, can be estimated in advance. Prospective or predicted tracking error targets can form part of an investment manager's mandate. These can provide a measure of comfort to fiduciaries as they ensure that risk considerations are an intrinsic part of the management process and they enhance the monitoring process. Risk models, such as those

developed by BARRA and Quantec, estimate the tracking error of funds based on the portfolio's composition.

4.5.6 Fiduciary satisfaction will, in general, be greater for lower actual tracking error levels. This will change depending on the fiduciary's level of risk aversion. Fiduciaries tend to have a preference for the actual tracking error to turn out to be less than expected tracking error (they are uncomfortable with risk being greater than expectations), especially when the measure is formalised as a target in the mandate. However, our research indicates that commercially available software for risk prediction tends to underestimate actual tracking error. This has implications for the setting of realistic expectations.

4.5.7 Standard deviation (with an associated implication of normally distributed returns) as a measure of risk can be amply criticised. There is valid concern that active returns are not distributed normally but instead have 'fat tails'. In addition, standard deviation is symmetric in that it assumes investors are equally concerned with gains and losses which does not adequately reflect fiduciaries' loss aversion. Nevertheless, standard deviation has the advantages of being widely recognised and easy to incorporate into a modelling process.

4.5.8 Fiduciary bodies may prefer to work with other measures of risk. Examples of other measures include semi-variance, other downside risk measures or Value at Risk (VaR). This would lead fiduciaries to require other risk targets in their utility function formulation and the proposed modelling process would be adjusted accordingly.

4.6 *Efficiency*

4.6.1 Risk and return measures can be combined to calculate efficiency statistics. These risk-adjusted measures capture the efficiency with which risk is 'converted into' return.

4.6.2 One such efficiency measure is the information ratio (IR):

$$\text{Information Ratio (IR)} = \frac{\text{Active Return}}{\text{Active Risk}}$$

4.6.3 Information ratio is a risk-adjusted measure that considers risk and return relative to the benchmark. The information ratio is similar to the Sharpe ratio with the major difference being that the latter considers the portfolio return relative to the risk-free rate. Consequently, the Sharpe ratio is also affected by the return of the asset class relative to the risk-free rate as well as by the active positions taken. Given that the information ratio is unaffected by the asset class component of return, and that active return and active risk can, within limits, be scaled up or down in commensurate measures by making simple adjustments to active positions, we regard the information ratio as the most reasonable efficiency measure on which to focus.

4.6.4 Once again, this can be calculated ex post using achieved active returns and achieved active risk values, or ex ante using expected active returns and predicted active risk measures. Since fiduciaries achieve most satisfaction from higher active returns and lower active risk, their utility will be enhanced by increases in the information ratio.

4.6.5 The information ratio can be calculated gross or net of costs. This can be expressed in the following relationship, where costs are both the investment management fees and the monitoring costs:

$$\text{Net Information Ratio (Net IR)} = \frac{\text{Active Return} - \text{Costs}}{\text{Active Risk}}$$

4.6.6 Current and future transition costs can also be incorporated in the measure if an appropriate period of assessment is specified.

4.6.7 The information ratio is a useful statistic in ranking the skill of investment managers. A higher information ratio indicates that the manager can add more value per unit of risk. A top quartile manager may have an information ratio of 0.5, adding 50 basis points of active return for every 100 basis of active risk, before expenses. The table below illustrates information ratio values achieved by mutual funds in the U.S.A.

Table 4.1. Typical distribution of empirical information ratio values (before expenses)

Percentile	IR
90	1.0
75	0.5
50	0.0
25	-0.5
10	-1.0

Source: Barra. Kahn (1996) based on mutual funds, for both equity and fixed income funds.

4.6.8 Just as past performance requires careful interpretation, historic information ratios should also be subject to equivalent scrutiny. Given the noise present in active returns, the information ratio achieved over a particular period may over- or understate the underlying level of skill. The task of the consultant will be to apply his or her knowledge of the product or investment manager to identify those with a high level of skill. These are the products or investment managers that are expected to possess and maintain high information ratios.

4.7 Diversification

4.7.1 Another financial dimension to consider is the extent to which the incremental investment manager diversifies overall fund risk. Unless size does not permit, funds usually employ a number of managers. Utility is improved with effective diversification. The diversification effect can be measured as a percentage contribution to the reduction in the fund's overall tracking error.

4.7.2 This is a key financial consideration as the fund is affected by the performance of the managers interacting as a whole group. Interestingly, Clarke, Krase & Statman (1994) observed that the covariance between assets (in our case, between managers) is an element that is often disregarded by less financially-aware investors when making decisions.

4.7.3 There is also a cost element to poor diversification. If the fund is split between two investment managers then the individual portfolio sizes will be smaller. Due to sliding investment management fee scales, which is usual for the industry, the fund is likely to attract

higher average fees. If the two investment managers behave in the same way, then the fund would be better off by placing all the assets with one of them.

4.7.4 To establish an appropriate, investment-efficient structure the covariances between products or investment managers must be taken into account. The interaction between the investment managers selected requires a more rigorous quantitative approach. This will be captured in the manager modelling process outlined in Section 7.

4.8 Costs

4.8.1 Fiduciaries, as custodians of their funds, will want to minimise expenses and other outgoings subject to achieving their other investment objectives. The most visible cost borne by funds is the investment management fee, and fiduciaries will be interested in selecting those investment managers that offer their services at a reasonable price. The degree to which this will affect their decision-making will depend, amongst other things, on the fiduciaries' cost sensitivity.

4.8.2 Investment management fees are explicit costs that are specified in the investment management agreement. The easiest way to incorporate this in modelling the utility function is to consider the expected active return net of management fees.

4.8.3 Fiduciaries should also be aware of other costs that can affect the fund's performance:

- Trading costs. Various studies have explored the components of trading costs. There are various elements to trading costs: commissions, taxes, spreads, market impact, timing costs and opportunity costs. Wagner & Edwards (1993) stress that the focus of investors should not be on commission cost minimisation, but on return optimisation after considering all the costs. Fiduciaries who are very cost sensitive might bring the extent of the investment manager's portfolio turnover into their utility function. However, normal performance measures are calculated after allowing for all these costs.

- Transition costs. These occur when changing investment managers or implementing large changes to investment strategy. Invariably, the new investment manager will want to sell significant parts of the portfolio to match its own strategy. The fund will then incur large scale trading and can suffer greater market impact effects due to rapid trading even when using programme trading techniques. A desire to constrain these costs can limit the pace at which the fund can move to a new structure. These costs should also include the contingent costs of future changes to managers. Usual levels at which fiduciaries turn over their active managers seem to be at around 10% to 15% per annum. These rates imply quite material costs would be introduced and modelled on some probability weighted basis.

- Costs of obtaining advice from consultants and other external advisers. These are much smaller than investment management fees, but could impact on the monitoring of certain structures.

- Costs related to management time. For example, the opportunity costs of the fiduciaries' time sacrificed to work on the fund's investment issues. This type of cost is dealt with in connection with monitoring capacity in Section 4.14 below.

4.8.4 In the modelling process, costs other than investment management fees could be incorporated but more normally would be treated as exogenous variables and form part of the constraints. For example, high transition costs may limit the expected benefits of a new investment structure. Incorporating explicit cost constraints will thus limit the opportunities that are made available when optimising the utility function.

4.8.5 The size of the fund may affect the fiduciaries' cost sensitivity. The widespread industry practice of sliding fee scales means that the size of the fund has a dramatic impact on investment management fees. Although the amount paid out by a fund increases with size, the proportion as a percentage of the assets falls with size. Larger funds can support more complex structures and may receive better attention from investment managers. This allows the fiduciaries of these funds more flexibility when deciding on a manager structure. Similar issues must be dealt with where fees are related to performance, although generally these rates do not change with size.

4.8.6 To summarise, the financial factors that are part of fiduciary utility functions are expected active return, expected active risk, net information ratios, fund costs and the diversification benefit of appointing an investment manager.

4.9 Comfort and Compatibility

4.9.1 In addition to the financial factors discussed above there are also non-financial elements within the fiduciaries' utility function which influence decision-making.

4.9.2 A useful exposition of pension fund trustee decision making is given by Clark (1998a) who notes that trustees make decisions under both "risk *and* uncertainty". The recognition of uncertainty encourages "the formation of ad hoc habits and norms" and at the heart of the decision-making process are the "habits of prudence": loss aversion, regret, preference for certainty and preference for similarity. Clark (1998a) notes that the habits of prudence act as a conservative force but have the virtue of ensuring that any accepted risk beyond that encapsulated by the habits is a deliberate decision.

4.9.3 Within the framework of the utility function, fiduciaries experience a higher non-financial payoff for investment decisions that are made in line with the habits of prudence. However, if we are targeting high active return we must relax the preference for certainty, and in some situations we must relax the preference for similarity. So, while many of the factors identified above are generally useful, some are undesirable as they create barriers that limit investment opportunities unnecessarily. It is therefore important to recognise these factors both to ensure that the investment opportunities are as wide as possible and to ensure that the fiduciaries have an adequate level of comfort. As the fiduciaries have to accept final responsibility for the assets, an inadequate level of comfort on their part would be an undesirable and potentially costly outcome.

4.10 Summarising the Behavioural Issues

4.10.1 We have identified a wide range of behavioural issues that can and do impact on the decisions made by fiduciaries. Having considered each issue we have concluded that they can be classified into two groups based on the benefits as perceived by the decision-maker and the real benefits, if any, that they bring to the decision. The two categories of non-financial factors are:

- 'SleepWell' payoffs: the comfort level of fiduciaries in the structure based on their control of regret risk; and
- 'SeemsGood' payoffs: the behavioural payoffs that have no financial value.

4.10.2 We believe there is a value in constructing these concise terms, as they enable quick and efficient communication of highly complex issues which allow fiduciaries to understand and modify their utility function as desired. SleepWell has value for fiduciaries and is seen as an appropriate element of the utility function by non-fiduciaries. SeemsGood has been chosen to

carry a note of scepticism as to the value of this component of the utility function. It is used to describe the payoffs that are *believed* to be financially valuable but in aggregate tend to reduce financial efficiency. The table below summarises the behavioural issues in each of these categories.

Table 4.2. Categorisation of behavioural issues

SleepWell (regret risk control)	SeemsGood (behavioural biases)
Loss aversion	Loss aversion
Peer pressure	Overconfidence
Familiarity	Framing
Consensus decision-making	Mental accounting
Fiduciary fear	Over-simplification
	Performance myths

4.11 *SleepWell Payoffs*

4.11.1 The SleepWell payoff is defined as the utility that fiduciaries derive from minimising regret risk, where regret risk is the risk of investment outcomes being disappointing, and leading to the fiduciaries' subsequent regret. Fiduciaries' investment decisions are scrutinised and judged by others. There is external validation by the source of funds, beneficiaries, regulators and ultimately the wider public. Fiduciaries not only have to make a good decision, but they have to live with the decision. Heath and Tversky (1991) note that "Psychic payoffs of satisfaction or embarrassment can result from self-evaluation or from an evaluation by others."

4.11.2 Furthermore, if fiduciaries are negligent in their investment decision-making, then they face the risk of legal action being taken against them. Given that investment management results have a high element of noise, there is a risk that a bad outcome arising from chance could appear to be the result of a negligent decision. Not only will the fiduciaries feel regret, but this regret will intensified by the knowledge that other parties are relying on them (and judging them). When faced with the difficulty of making the best choice in a difficult situation fiduciaries act to limit regret. As Clark (1998a) states, "investment decisionmaking is a gamble. But it is hoped it is a structured gamble, framed by habits, rules, and norms that allow trustees scope for both decisionmaking and protection in case things go wrong".

4.11.3 We therefore conclude that not only is SleepWell a significant component of the fiduciary utility function but also that it is a valid and valuable component given the fiduciaries' role.

4.11.4 Arguably the most effective way to manage regret risk is to make the same decision as the external judge would make, or at least to make a decision that the external judge would find to be reasonable even when the subsequent outcome is unfavourable. As this cannot be known in advance it has to be estimated and it is in this context that the concept of brand assumes significant importance.

4.11.5 Marketing textbooks define brand as a promise of consistency in quality and performance. In a low noise to signal environment, such as manufacturing, consistency can be reliably achieved. Brands develop from past performance and in certain environments can legitimately help consumers to make choices. For example, a consumer (with no budget constraint) choosing a car and faced with a choice between a Mercedes and a less well regarded alternative, will use their knowledge of brands to make a choice. The preconceived ideas about the product are likely to match the consumer's experience in practice - essentially you get what

you pay for. Brands can act as a valuable time-saver, or shortcut, when making a decision. In the same way, brands in the investment management industry are both highly visible and are also viewed as providing assistance to fiduciaries in decision-making process.

4.11.6 Given the external evaluation of fiduciaries' decisions, brand can be thought of as an insurance policy. In the event of a bad outcome the fiduciaries will be less open to outside criticism if they have selected a brand name and, since the brands are well known, beneficiaries are also more likely to be sanguine about the bad news. This is particularly relevant for defined contribution pension fund arrangements.

4.11.7 However, brands are not always reliable indicators of performance consistency. The expression "you don't get fired for buying IBM" is a well-known example of false security provided by a brand in relation to the choice of technology platform. Such a decision was taken because it was defensible even if it may not have been the right choice.

4.11.8 Similarly, fiduciaries must try to ensure there is real value in the investment management brands they choose. There is a danger in the investment management industry of relying heavily on brand to make decisions. Well regarded brands have generally grown out of good past performance and, as already noted, there is very little evidence of persistency of performance. In a high noise system the performance promise implied by brand can be hard to deliver in the future. As a consequence, investment managers have worked hard on client servicing so that 'performance' is not just about active return but includes service quality, which can be more directly controlled.

4.11.9 Consequently, investment management brands are significantly different from consumer brands. Fiduciaries should be aware that the existence of a brand does not eliminate investment risk and is seldom a reliable indicator of good future performance. Nevertheless, brand remains an effective tool for minimising regret risk, and provides fiduciaries with a non-financial SleepWell payoff even if the financial benefits of brand as an indicator of good future performance are limited.

4.11.10 The extent to which SleepWell payoffs dominate a group's decisions will depend on the extent to which the fiduciary group is subject to, or requires, outside validation by the source of funds, beneficiaries or regulators. The more utility the management group derives from SleepWell payoffs, the more conventional their investment arrangements will be.

4.11.11 SleepWell payoffs relate to both the investment management structure and manager selection. With regards to structure, the fiduciaries will consider the following: Is this structure acceptable? What are other fiduciaries doing? Is this change too radically different from what we already have? With respect to manager selection the issues for fiduciaries include: Do we have managers that people know of and respect? Can this choice of manager be questioned? If this non-brand manager underperforms can we explain it to our beneficiaries?

4.11.12 The use of investment consultants also provides a SleepWell payoff. Fiduciaries tend to feel more comfortable when advisers have been involved in formulating a decision. Regret risk is lessened when responsibility for a decision is shared with another party.

4.11.13 SleepWell payoffs can assist fiduciaries by providing them and the fund's beneficiaries with greater confidence in the resulting arrangements. However, the extent to which SleepWell payoffs drive the investment management decision needs to be managed. As Speidell (1990) warns in following conventional wisdom "comfort and peace of mind are non-financial portfolio returns that come at a high price."

4.11.14 The influence of SleepWell payoffs can be minimised by rational investors who will focus on financial factors and care less about what others think. However, it is unlikely to

fall to zero because of the fiduciary responsibilities underpinning investment management arrangements. Others who focus on brand will still question these rational fiduciaries.

4.11.15 The problems of placing too much emphasis on SleepWell payoffs are:

- Brand bias can result. If this is unchecked, it will result in too small a universe of managers from which to select.
- There is also a risk of apparent, rather than real, diversification if the branded managers are correlated due to peer group effects.

4.11.16 Although the problems of placing too little emphasis on SleepWell payoffs are less acute than those of over-emphasis, the following could result:

- Excessive changes in investment strategy could be experienced by the fund as fiduciaries are changed over generations. If each group was completely flexible and did not conform to any norms, then there is the risk that each new set of fiduciaries would keep adjusting the fund to reflect their specific views. This represents a significant contingent cost to the fund in the future.
- Potential threat of increased regulation, as the regulators would be concerned about the lack of uniformity between arrangements. They may be keen to act on behalf of the fund's beneficiaries. Certain regulators may desire standards of best practice that are easier to monitor.

4.11.17 In summary, SleepWell payoffs are the non-financial payoffs that fiduciaries receive by minimising regret risk in their investment management structures. Fiduciaries, and their beneficiaries, need to feel comfortable with their arrangements. This can lead to selection of recognised managers with established brands and mainstream, less innovative investment management structures. The pursuit of this comfort is important to fiduciaries but is not financially driven. Therefore, the extent of this SleepWell payoff needs to be managed so as not to jeopardise financial efficiency.

4.12 SeemsGood Payoffs

4.12.1 The SeemsGood payoff factor captures the biases of the group beyond the financial and rational non-financial dimensions. SeemsGood payoffs embody preference prejudices and are defined as having no financial value in aggregate, although they do provide the group of decision-makers with a measure of utility. Decisions made by fiduciaries because it 'seems good' are usually driven by this non-financial factor.

4.12.2 The SeemsGood payoffs are built over time through:

- the group's investment understanding;
- the group's prior experience; and
- the group's belief that they have skill in a certain area, for example, in choosing managers of a particular type.

4.12.3 SeemsGood biases therefore differ from group to group and are formed from the complex aggregation of the group's experience with the individual fiduciary's own knowledge and experience.

4.12.4 SeemsGood payoffs have their basis in expected financial benefit, which in aggregate does not materialise (but could through the influence of chance alone). Since SeemsGood payoffs provide no aggregate financial payoff, they are undesirable influences in building investment management structures.

4.12.5 For example, the heuristic premise that the past is a good proxy for the future is not useful in the investment arena. Fiduciaries have a tendency to release an investment manager after a period of poor performance and to replace them with a manager with a strong recent record. However, continued outperformance by the new manager is not a given, and evidence suggests that, on average, underperformance is more likely. (See WM Study (1998) for a factual experience of changing investment managers by UK pension funds.)

4.12.6 This would indicate that fiduciaries who strongly believe in performance histories would generally be disappointed. However past experience can strengthen this belief in past performance. Those fiduciaries who have hired investment managers with strong recent records that have gone on to outperform will have a reinforced belief that past performance is a good guide to the future. Similarly, fiduciaries who have never experienced a period of poor performance in their fund are also more likely to believe this is the case. The SeemsGood factor captures this behavioural bias and can cause return expectations to be unrealistically high. The subsequent lower actual returns represent the financial inefficiency of SeemsGood utility.

4.12.7 In addition, fiduciaries are exposed to various investment trends and circumstances over time. SeemsGood biases can incorporate a fashion element in which the prevailing trends can influence decisions. For example, the use of index-tracking (passive) managers before the mid 1990s was considered in a rational financial framework and had a neutral SeemsGood payoff. In 1999, in countries which had experienced significant poor active performance relative to the index for a number of years, then the SeemsGood payoff of indexation increased. Fiduciaries driven by behavioural factors were likely to reassess allocations to passive management to benefit from this SeemsGood payoff, even though the continued outperformance (before costs) of index funds over the majority of active funds is unlikely.

4.12.8 A further example of SeemsGood payoffs is the fiduciaries' desire for segregated funds over pooled funds. They place a value on the attention and customisation they expect to benefit from under the segregated approach. While there could be some small financial benefit to this, in practice the ability to customise is often under-utilised. So again an expected financial benefit merely provides SeemsGood utility.

4.12.9 SeemsGood payoff factors are complex as they take time for the investment consultant to identify and challenge. Through improving awareness, analysis and time these factors can be minimised. This will cause investment efficiency to meet fiduciaries' expectations with more certainty.

4.13 *Empirical Evidence*

4.13.1 In order to determine the extent to which SleepWell and SeemsGood factors play a part in the decision-making process, we solicited the views of fiduciaries and other investment professionals from around the world.

Table 4.3. Practitioners' views of financial and non-financial factors

Balance of factors (%)	Australia	New Zealand	Japan	UK
Financial = Net information ratio	56%	50%	41%	54%
Comfort = SleepWell	21%	21%	28%	21%
Compatibility = SeemsGood	23%	29%	31%	25%

Source: Watson Wyatt Global Asset Study 1999. Data collected interactively from conference participants

4.13.2 The table above demonstrates the significance of the non-financial factors. They occupy almost half the decision-maker's attention, which reinforces our concern regarding the extent to which non-financial factors affect the design of investment management structures. There are also interesting cultural and market differences between countries. For example, the Japanese funds have less than 50% emphasis on financial factors but rely relatively more on comfort and prior beliefs in their decisions.

4.13.3 A possible explanation for the high weighting of non-financial factors is given by Clark (1998b). He states that "It is likely that there is a much higher degree of certainty with respect to the nature and value of the payoff to trustees than there is knowledge at the time of the decision about the likely consequences of such decisions for the investment performance of the pension fund". The SleepWell and SeemsGood payoffs are more tangible and more immediate than the uncertain financial payoffs which will only become known after the passage of time.

4.14 *Monitoring Capacity*

4.14.1 A critical constraint in the process of developing an investment management structure is the time and resources available to the fiduciaries to undertake effective monitoring. Many fiduciaries are not full-time employees of the fund. Their full-time jobs create commitments that can restrict the time available for managing the investment issues of the fund.

4.14.2 With respect to investment matters alone, fiduciaries have to have sufficient time to do the following:

- Review the fund's investment strategy.
- Decide on manager structure and selection when changes are being implemented.
- Meet prospective investment managers when changes to structure are to be implemented.
- Monitor on a frequent basis the managers' performance and actions with respect to the objectives.
- Ensure compliance with the fund's risk tolerances and mandate.
- Ensure fund cash flows are appropriately invested.

4.14.3 In addition to the time commitment there is also a cost dimension to monitoring. Where the investment manager does not provide external performance measurement services as part of the management fee, the fiduciaries will have to pay for this performance measurement. There is also a need at the total fund level for data collection, synthesis and report generation. The use of an investment consultant to assist with monitoring and interpretation adds to this cost.

4.14.4 While these costs will increase as more complex structures are considered, in practice monitoring costs are generally small (up to 0.03% of assets per annum for most funds) and so do not absorb much attention. The focus of this section is therefore more on fiduciary capacity.

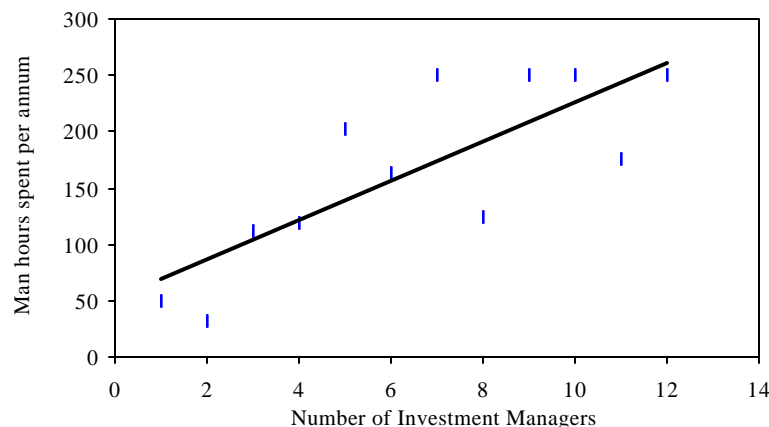
4.14.5 We define capacity as the fiduciary resources available to manage and monitor the fund. Excluding any budget constraint, capacity has two dimensions: time and expertise.

4.14.6 Fiduciary availability of time depends on factors such as how many meetings per year fiduciaries have, for how long they meet, the existence of investment committees or full-time executives, and the extent of delegation to external parties.

4.14.7 This fiduciary capacity will be consumed depending on factors such as:

- Number of investment managers. The greater the number of managers employed by the fund, then the greater the time required to meet the managers and to digest their reports. This is illustrated in Figure 4.2. below.

- Complexity of investment management structure. An increase in the number of disparate investment management approaches will require more time for the fiduciaries to understand the impact of the sub-component on the fund as a whole.
- Types of managers. Some managers may require more attention than others as they have a higher risk profile from a fiduciaries' perspective. For example, very high-risk satellite managers require more monitoring than a passive manager does, as the likelihood of an unfavourable outcome is greater with this type of manager.
- Types of investment products. Some products may require less monitoring time due to the quality of the product's reporting, the existence of guarantees or the simplicity of the product.



Source: Watson Wyatt Global Asset Study Survey 1999. Question: Estimate the total amount of man hours per annum that investment decision makers dedicate to investment issues.

Figure 4.2. Average fiduciary time per annum and number of investment managers

4.14.8 With respect to the chart above, we note that incomplete responses and responses from individuals who answered the survey as man-hours spent by them each year, instead of the whole fiduciary body, have been removed from the data set. The final data set comprises 39 responses.

4.14.9 Although the data can be considered subjective, the chart does reflect a not surprising trend of increasing time demanded from fiduciaries as the number of managers is increased. The chart also suggests that there is a "fixed cost" of time, of around 50 hours per annum, that fiduciaries spend on investment issues no matter how many managers the fund uses.

4.14.10 An observation from looking at the data is that three quarters of the funds spend more than 50 hours on investment issues a year, and more than half spend 100 hours or more. However, as we referred to earlier the cost of the time relative to fund assets is small. Even 150 man-hours of time at a typical overhead charge, results in a cost that is only one tenth of a basis point for the £2 billion average fund size in the survey.

4.14.11 Better management of information can enhance fiduciary resources. Delegating monitoring to other specialists, such as internal investment sub-committees or external consultants, can leverage fiduciaries' time. In addition, comprehensive, integrated reports across all managers compiled in a single common format can help fiduciaries assimilate the pertinent information more rapidly. Simplifying the investment structure can also relieve pressure on

fiduciary resources. However, the impact on financial efficiency must be considered when this is attempted.

4.14.12 The other element of fiduciary capacity is investment expertise. Not only is expertise difficult to define it is also hard to quantify. However, we hope it is clear that expertise can be recognised if not defined, and that it is equally clear that increased expertise leverages the time element of capacity. It is beyond the scope of this paper to consider fiduciary expertise in detail but we note that investment training for fiduciaries is readily available in most countries. Any such training is enhanced by direct experience and so there may be a case for allowing some individuals to spend a disproportionate amount of their time on investment matters.

4.14.13 This latter point goes beyond a simple consideration of capacity and introduces the important concept of the effectiveness with which capacity is applied. Governance is the framework in which all decisions relating to the fund are made. It is the mechanism by which the fiduciaries ensure that the proper arrangements are in place for the management of the fund, and includes such matters as the composition of decision-making groups, the functions delegated, the extent of delegation and accountability issues. Again, a detailed consideration of governance is outside the scope of this paper but we believe it is an area that warrants further study.

4.14.14 In conclusion, investment management structures require the right level of fiduciary capacity to support them. This capacity includes both the time allocated and the expertise of the fiduciaries. The fund's governance arrangements have an impact on the effectiveness of this capacity.

4.15 Specifying the Utility Function

4.15.1 Utility is a function of the financial factors (active return, active risk, costs and diversification benefits) and the non-financial factors (SleepWell and SeemsGood). Alongside the drivers of utility are the constraints of cost and monitoring capacity. Of particular importance when establishing new arrangements or significantly changing an existing structure are the transition costs in moving from the existing position to the new investment management structure.

4.15.2 The utility function can be expressed as:

$$\text{Utility} = \text{Function}(\lambda_1.(\text{Net Information Ratio}), \lambda_2.(\text{Active Risk}), \lambda_3.(\text{SleepWell}), \lambda_4.(\text{SeemsGood}))$$

Where λ_i is the individual propensity to factor i particular to a specific fiduciary group.

4.15.3 Alternatively, one might focus on a simple maximisation of net information ratio subject to constraints on active risk, SleepWell and SeemsGood.

4.15.4 We note that active risk appears twice in the utility function, in the net information ratio and as a separate component. While fiduciaries will derive greater utility from higher net information ratios (greater efficiency), the utility needs to be scaled. In the simple case presented above, the utility from a higher net information ratio needs to be considered in the context of the level of active risk. Higher net information ratios achieved at lower levels of active risk yield more utility than if achieved at very high levels of active risk.

4.15.5 We noted in 4.5.8 above that fiduciaries may wish to consider other measures of risk. In this case the utility function could be modified to replace the active risk component with the alternative risk measure. For given exposures to SleepWell and SeemsGood, utility

maximisation then becomes the maximisation of net information ratio in the context of the alternative risk measure.

4.16 The Consultant's Role

4.16.1 Resolving the fiduciaries' desire for investment efficiency is a more complex problem than may initially be anticipated. This is due to the fact that the fiduciaries' utility function is driven by both financial and non-financial elements.

4.16.2 The consultant has always had the challenge of identifying and managing this blend of financial and non-financial factors in order to assist the fiduciaries in making a decision. Explicitly recognising these factors in a structured way provides a better framework for understanding and analysis by all parties.

4.16.3 In this section we have enhanced the understanding of the fiduciaries' needs by first incorporating a broader set of financial objectives: replacing gross returns by the components of net information ratios, and taking into account a wider set of costs, especially transition costs. In the past, gross returns were the only financial objective, but more recently the focus has been moving towards including tracking error. The use of net information ratios completes this process.

4.16.4 In addition, understanding is improved by explicitly recognising the influence of human behaviour in the group's decision-making process. This is evident in the power of regret that leads to comfort seeking behaviour in investment decision-making, and in the danger of performance myths that can lead to estimation error and misconceptions.

4.16.5 The role of the consultant is to probe the trade-off between these financial and non-financial factors. The consultant's aim is to move the group towards the best and most financially efficient structure for their level of comfort and governance capacity. This is explored in more detail in the next section.

5. OPTIMISING THE UTILITY FUNCTION

5.1 Rationale for the Optimisation Process

5.1.1 Each group of fiduciaries will place different emphases on the factors in the utility function and on the tightness of the cost constraints. Funds should therefore have varying optimal solutions.

5.1.2 The aim is to develop an appropriate investment management structure for each fund by taking into consideration all the factors and constraints driving the fiduciaries' utility function.

5.1.3 This can be done through following a process such as:

- Build fiduciary objectives fund by fund.
- Map and refine the utility function.
- Apply a population of manager choices to this function based on rational consistent assumptions.
- Reach preliminary conclusions on optimal structures that will favour certain manager types based on their contribution to efficiency or other components of utility.
- Where the fiduciary capacity is limiting efficiency and preventing the achievement of the objectives, consider changing the governance structure.

5.2 The Financial - Non-Financial Trade-off

5.2.1 As noted above, decisions relating to investment management structure are driven by financial and non-financial factors. The resolution of the final investment management structure will depend on how the balance of these factors is managed.

5.2.2 Some fiduciaries may claim their only focus is financial, but this is rarely the case. Offering a structure that is 100% invested in hedge funds, say, and then observing their level of discomfort can test this. If 'making money' truly was their only aim, then fiduciaries driven purely by financial factors would not bat an eyelid.

5.2.3 As previously discussed, SleepWell payoffs exist for fiduciaries. This is due to their fiduciary responsibilities and the need for external validation of their decisions. It is the fear of regret that prevents the group from deciding on a structure based on purely financial considerations. The required level of SleepWell will vary between fiduciary groups but is likely to have some weight for fiduciaries with a liability profile.

5.2.4 Ignoring monitoring constraints for the moment, it is useful to illustrate these concepts through the use of a diagram. Consider the graph below that shows the efficient portfolios for different weights of financial and non-financial factors. Each portfolio has the highest *expected* (ex ante) net information ratio for the given non-financial weight.

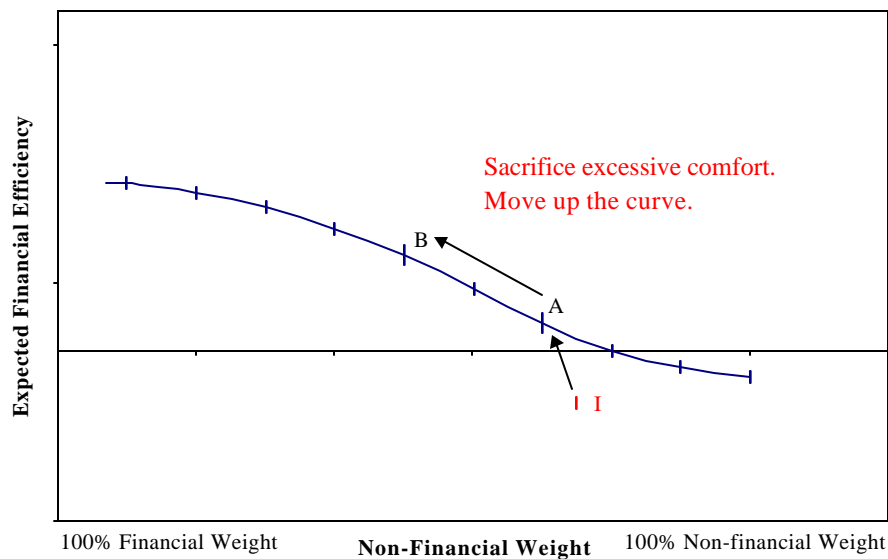


Figure 5.1. Non-financial and financial trade-offs

5.2.5 As decisions regarding investment management structures are based on expected outcomes, we plot expected financial efficiency on the y axis. All points on the line are efficient for that balance of financial and non-financial factors. The graph has an inverse relationship indicating that fiduciaries are willing to give up financial returns to enhance comfort. We note that *achieved* (ex post) financial efficiency for any given non-financial weight could lie above or below this frontier.

5.2.6 Consider portfolios I, A and B in Figure 5.1. Portfolios A and B are efficient given their combination of financial and non-financial factors as they lie on the curve. The further left

on the curve a portfolio lies, the more the portfolio is structured based on financial factors and less on non-financial influences.

5.2.7 Portfolio I is inefficient as it lies below the curve. This would imply a positive weighting to SeemsGood payoffs that prevents an efficient structure being implemented. Addressing these biases would enhance expected financial efficiency and allow the group of fiduciaries to move closer to portfolio A.

5.2.8 Although portfolio A is efficient, the financial position can be improved. This would involve changing the emphasis placed on non-financial factors. For example, the fiduciaries may be placing too much emphasis on brand to minimise regret. Through training, a change in governance arrangements, or even through increased experience, this non-financial weight may be lessened allowing a structure with greater expected financial efficiency to be adopted.

5.2.9 Note that the specific shape of the curve above is merely an illustration. The difficulty of quantifying behaviour and the uniqueness of each fiduciary body makes it difficult to speculate on the exact nature and shape of the trade-offs. The curve may not be continuous in practice. As new management types are added to the structure, then a distinct new set of financial opportunities could emerge.

5.2.10 The fund will benefit from increased emphasis on financial efficiency. The role of the consultant in this context can be summarised in the following table.

Table 5.1. Consultant's role in respect of the utility factors

Factor	Financial Payoff?	Fiduciary View	Consultant's Action
<i>Financial</i>			
Active Return	Yes	Seek to improve	Maximise Net Information Ratio (IR).
Active Risk	Yes	Seek a range	Specified by client. Check it is appropriate.
Diversification	Yes	Have enough for prudence	Maximise Net IR. Modelling of active return can improve diversification, lower active risk and increase Net IR.
Management fees & Monitoring costs	Yes	Seek to limit	Maximise Net IR. Just focusing on minimising costs may limit expensive but high active return options.
Transition costs	Yes	Seek to limit	Minimise by using transition strategies and trying to minimise the frequency of future structure and manager changes. This will maximise the fund's long-term net IR.
<i>Non-Financial</i>			
SleepWell	May have	Enough to feel comfortable	Challenge level to ensure it is appropriate. Monitor brand bias. Establish effect on frequency of future structure and manager changes.
SeemsGood	No	Reflect personal and group belief systems	Minimise misjudgements through strengthening fiduciary decision-making.

5.2.11 The aim of the framework that we are developing is to provide investment management structures with enhanced financial efficiency, to attempt to minimise unrealistic behavioural myths and to recognise the regret risk faced by fiduciaries who are managing money on behalf of others. In addition, the financial factors no longer focus solely on return but have been broadened.

5.3 Relationship between SleepWell Payoffs and Transition Costs

5.3.1 Structures containing some SleepWell payoffs may be more efficient in the longer term. These structures are more likely to remain unchanged over time and therefore future transition costs will be minimised.

5.3.2 The structures are more likely to be unchanged as the fiduciaries are more comfortable with their decision. If the performance of the fund is poor then this is more likely to be ascribed to bad luck or noise rather than to a flaw in the structure. On the other hand, if the fiduciaries have never been comfortable with the structure (there is little or no SleepWell payoff), then poor performance can become the catalyst to change the fund.

5.3.3 The financial costs of changing a fund's structure are often not explicit and may be overlooked. The size of these costs, however, can be large in relation to costs such as investment management fees. Minimising the number of transitions also saves on the costs of obtaining advice, such as investment consultancy fees.

5.3.4 The graph below illustrates the effect of transition costs on financial efficiency and builds on the framework developed in Section 5.2 above describing the financial and non-financial trade-off.

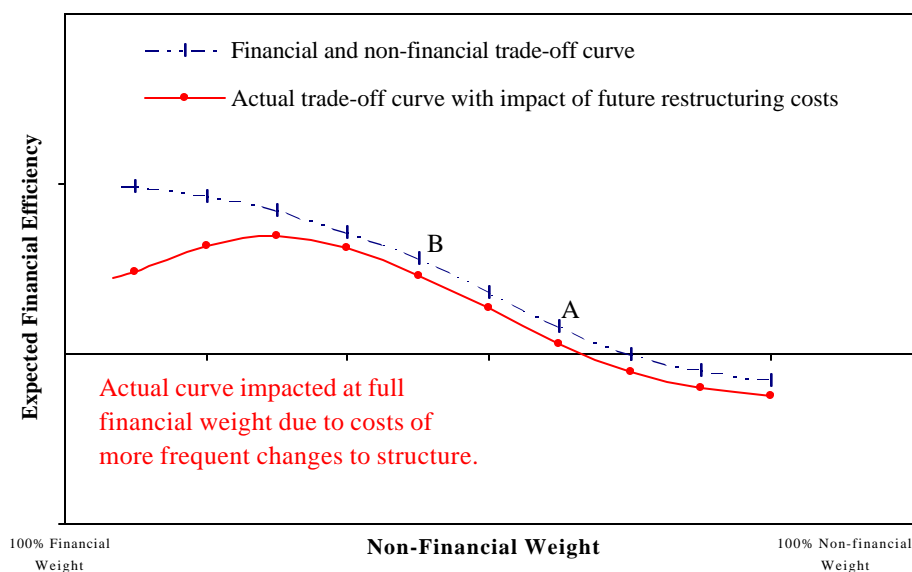


Figure 5.2. Long-term scenario with the impact of restructuring costs

5.3.5 Lowering the non-financial weight will enhance the focus on financial efficiency. However, the low levels of SleepWell payoff may cause the structure to be changed more often and increase transition costs. This will cause a lowering of efficiency for low non-financial weightings. If this hypothesis is correct, then there may be some long-term second-order

financial benefits to SleepWell payoffs. This suggests non-financial factors should be managed but not necessarily eliminated.

5.3.6 There are other non-financial benefits to not changing the fund's investment management structure and managers. Fiduciary time is saved and the continuity allows fiduciaries to become more familiar with their investment structure and with their investment managers' skills and processes. SleepWell payoffs thus have some benefit.

5.4 Developing the Theoretical Optimisation Process

5.4.1 Having incorporated non-financial factors in the framework, we now need to consider ways of modelling such factors. The theoretical process towards optimising could be:

- Establish an algebraic formulation of the utility function and set modelling assumptions.
- Establish expectations for active risk, active return and payoffs for SleepWell and SeemsGood for all investment managers. Optimally this would be specific for each group of fiduciaries as SeemsGood is a fund-specific factor.
- Establish appropriate cross correlations between the factors for the investment managers.
- Optimise to obtain an efficient combination of investment managers that maximises utility and is subject to reasonable transition costs and is within the monitoring capacity of fiduciaries.

5.4.2 Note that this is a difficult and data-intensive process:

- It could be viewed as the equivalent of performing an ALM exercise at the stock (rather than index) level. This would be impractical and the plethora of detail could obscure key results.
- Data would have to be collected for each fund, which would be time consuming.
- It is unlikely that there would be sufficient data available to provide a reasonable estimate of the correlations between the factors at the manager level. Therefore, creating a realistic cross correlation matrix for all factors for so many investment managers would be an arduous task and prone to estimation errors.
- Even if data could be collected at the micro level, it is likely that results would be biased by spurious correlations tied to the data set.
- Fiduciaries may also find such a complex methodology and the resultant solution difficult to understand without spending a great deal of time becoming familiar with the process.

5.4.3 This problem therefore requires simplification to find a better solution.

5.5 Determining a More Appropriate Solution

5.5.1 One such simplification of the solution is to identify groups of relatively homogeneous investment managers. These common groups would have similar financial and non-financial characteristics and form representative investment manager types. This approach would provide a greater amount of data for the estimation of 'average' factor exposures, would simplify the explanation of the process, and would minimise the impact of spurious correlations within a large opportunity set. The parallel with ALM exercises would be that indices are used rather than individual stocks for similar reasons.

5.5.2 Combinations of these investment manager types can be chosen to create a layered structure with each layer comprising investment managers of a single type. The fiduciaries' preferences for the layers can then be investigated. The risk and return interaction of, and between, the layers can be modelled to ensure that an efficient structure is presented.

5.5.3 The investment manager selection within each layer should be controlled to aim for zero correlation between the components. This would maximise diversification benefits without offsetting active returns. This may not always be possible due to investment managers being interrelated as a result of peer group pressures.

5.5.4 We call this construction process 'manager modelling'. This is described further in the next section.

6. INVESTMENT MANAGER TYPES AND MANAGER MODELLING

6.1 *Manager Modelling Concept*

6.1.1 Manager Modelling (MM) is defined as the construction of a fund's investment management structure taking into account the fiduciaries' utility function and capacity. This is generally performed using quantitative techniques to assist in developing the solution.

6.1.2 This approach has parallels with asset liability modelling (ALM). Whereas ALM considers the asset allocation of the fund, MM resolves the choice of investment approaches and manager mandates.

6.1.3 We suggest that MM should generally be a two-stage process:

- First, the split between types of investment manager and the number of managers in each type is modelled. This forms the skeleton of the structure. Consideration of utility, cost, financial objectives, and the governance capacity of the fiduciary body shape the outcome.
- Second, actual investment managers are identified to manage the assets. The managers will be selected so as to deliver the desired characteristics of each layer. Modelling is also required to maximise the diversification between investment managers. The focus is on investment efficiency issues.

6.2 *Selection of Investment Manager Types*

6.2.1 The specification of the investment manager types should be made to produce distinct groups. Each type should share distinct characteristics to make it easy to describe as a homogeneous group. Each type must possess characteristics that are significantly different to those of the other groups to enable a clear choice to be made in decision-making. The focus of this categorisation process is the utility function. We have identified the elements of the utility function as financial factors (net active return and active risk) and non-financial factors (SleepWell and SeemsGood).

6.2.2 We initially define the following three manager types:

- passive;
- active; and
- absolute return.

6.2.3 These types clearly have distinct characteristics and will have different utility payoffs depending on the fiduciaries' preferences.

6.2.4 These types are described in more detail below. In Table 6.1 the direction of the arrow shows how the magnitude of the utility factors and constraints changes across the manager types. For example, utility is enhanced as active risk is reduced, moving from the absolute return to the passive manager type. SeemsGood is unique to a fiduciary group and will therefore depend on the specific case.

Table 6.1. Utility and constraints across manager types

Manager type	Utility factors					Constraints	
	Active Return	Active Risk	Management Fee	SeemsGood	SleepWell	Capacity	Monitoring Costs
Passive	↓	↑				↓	↓
Active							
Absolute Return	↓	↑				↓	↓

6.3 Passive Investment Managers

6.3.1 This manager type comprises index-tracking managers. These are investment managers that manage assets without taking active investment decisions, whose objective is to track closely the performance of a specified index. The focus of this type of manager is on tracking an index and excludes passively managed inactive funds, such as insurance company funds that operate a buy and hold strategy due to tax considerations.

6.3.2 The advantages of this investment manager type are:

- Predictable returns. A passive portfolio produces lower volatility of relative returns and can reduce the active risk of the whole fund to a planned level.
- Low cost. The lower investment management fees charged by passive managers help to control the fund's investment management costs. Low portfolio turnover also reduces the fund's trading costs.
- Asset class rebalancing. A passive portfolio can be a very effective vehicle for facilitating asset allocation changes when the fund's strategy requires a restructuring of portfolios.

6.3.3 The arguments against passive investment management are:

- There is an opportunity cost to adopting passive management. This arises as the upside potential of active management is given up.
- There is a further constraint in that passive investment managers manage only those asset classes where a suitable benchmark index exists. Although the major markets are well covered and there are some indices that can be customised, some smaller, illiquid markets may not be adequately covered.

6.3.4 Our conclusions on how passive management maps against the utility function and capacity constraints are shown in the table below.

Table 6.2. Passive type

Definition	Managers that manage assets without taking active investment decisions in order to track closely the performance of a specified index.
Efficiency	Stability and consistency of relative returns. Reduces active risk at overall level. Could improve active return and lower net costs through stock lending.
Costs	Low ongoing costs. Contributes to lower future transition costs.
SleepWell	Results of passive management are predictable which provides comfort.
Monitoring	Low management decision time. Process easily explained.
Additional Risks	Index benchmark may be inappropriately designed.

6.4 *Active Investment Managers*

6.4.1 Active managers apply various types of judgement to the selection of portfolios with the objective of outperforming a benchmark.

6.4.2 This is how the majority of assets have been invested to date. As a result of transition costs and the inertia provided by non-financial factors, the fund's existing structure will be a key influence in determining the allocation to, and composition of, this layer.

6.4.3 This investment manager type can be divided into two different sub-components:

- multi-asset (balanced) mandates; and
- specialist mandates.

6.4.4 The advantages of this manager type are:

- The active returns from successful managers are potentially large and in excess of the fees paid.
- Active management hedges against the risk that the index becomes an easy target to beat and so acts to limit peer group risk.

6.4.5 The arguments against active investment management are:

- Successful selection of active investment managers candidates is difficult.
- Making changes to the line-up of active investment managers is also very difficult; it is hard to time the changes appropriately.

6.4.6 Urwin (1998) attributes many instances of disappointing active returns to problems of diseconomies of scale (see Section 6.7 below). He also describes the problems of timing manager changes.

6.4.7 We conclude that, assuming skilful investment managers can be chosen, there is a strong case for the inclusion of active investment managers. The difficulty lies in achieving the active returns on a reliable basis, to justify the higher fees paid relative to indexation. The contributions to the utility factors and capacity constraints are as follows:

Table 6.3. Active type

Definition	Managers that take active positions with the objective of outperforming over the long term.
Efficiency	Variable - dependent on level of active return and level of active risk.
Costs	Moderate to high.
SleepWell	Variable - dependent on the familiarity of the approach and the strength of the brand.
Monitoring	Average to high.
Additional Risks	Realistic setting of expectations. Avoid focus on short-term performance leading to costly turnover. Diversification between managers in the layer is required.

6.5 *Absolute Return Type*

6.5.1 Absolute return investment managers follow investment strategies that are long term in nature with no explicit benchmarks. Their atypical nature makes them hard to classify. Although the term 'absolute return' is used, it is recognised that in certain economic conditions these investment managers can generate negative returns in the short term. This investment type contains numerous vehicles but the principal types are private equity and hedge funds. Real estate might also be included here as it shares similar characteristics in terms of being illiquid and having uninvestable benchmarks.

6.5.2 This type generally contains less liquid investment vehicles, which leads to investments being held for longer time periods. This illiquidity can exist even though in some cases the investment manager may use underlying instruments that are very liquid in nature, such as listed derivative instruments.

6.5.3 The lack of predictability of market risk (beta) distinguishes the absolute return type from the other investment manager types. The performance from absolute return investment managers cannot be directly compared against equity or bond benchmarks. The performance that emerges will be a combination of alpha and beta positions.

6.5.4 This type of investment manager focuses much more on wealth creation and the preservation of capital through unconstrained investment strategies. It is argued that the lack of constraints on such managers' mandates should produce higher performance and/or greater diversification than mandates constrained to particular benchmarks.

6.5.5 The arguments for the use of the absolute return type are:

- Performance can potentially be considerable.
- The performance of these investment managers is generally out of synchronisation with other mainstream alternatives giving high levels of diversification.

6.5.6 The arguments against are:

- The selection of such investment managers will be riskier.
- The performance of such investment managers will be more vulnerable to measurement issues, making interpretation of results more difficult.
- This area can have problems of poor liquidity and poor transparency.
- Absolute return managers make significant demands on fiduciary capacity.

6.5.7 Our conclusions are that the use of absolute return investment managers can increase the performance expectations of the fund, but that measurement and risk management issues severely restrict the amounts that could be appropriately assigned to this manager type. Absolute return investments offer potential diversification benefits to the fund. The contributions to the utility factors and capacity constraints are as in Table 6.4.

Table 6.4. Absolute return type

Definition	Numerous strategies: private equity, real estate, and hedge funds.
Efficiency	Variable - expectation of large, positive alpha but tracking error can be high. Alpha and beta can vary substantially.
Costs	Very high management fees with a performance element
SleepWell	Very high discomfort level. Unfamiliar. Bad press. Large tracking errors.
Monitoring	High as many managers required for diversification and specialist natures. Long time scale.
Additional Risks	Volatility management - layer must be well diversified amongst a number of strategies. Fund-of-funds structures may be of benefit.

6.6 *Alternative Groupings of Investment Manager Types*

6.6.1 As described in Section 5.5 the goal of putting investment managers into distinct categories is to create reasonably homogeneous groups of managers whose financial and non-financial factors are well correlated in order to facilitate the estimation of average values for each type. We believe that the division into three manager types (passive, active and absolute return) is the most obvious taxonomy to adopt. In our view however, one further sub-division of

investment manager type is desirable. This is the division of active managers into two sub-groups, active core and satellite, which we characterise below.

6.6.2 Active core investment managers typically:

- have *no* internally imposed limit to the volume of assets under management and are often very large;
- have strong brand attributes as a result of their size;
- operate portfolios with wide diversification and low active risk; and
- would not be expected to achieve particularly high information ratios, due to limitations of their size.

6.6.3 Satellite investment managers typically:

- *do* have internally imposed limits to the volume of assets they can manage and are therefore generally quite small;
- have weak brand attributes as a result of their small size;
- operate more concentrated portfolio positions with high active risk; and
- depending on relative skill, can achieve high information ratios, this not being limited by volume of assets.

6.6.4 We discuss the potential impact of size on information ratios in Section 6.7. While the above characterisation refers to types of investment manager, the characterisation by type of mandate may be almost as important. We raise the question of how to characterise a large organisation that operates a particular mandate which is strictly limited in asset size and has a high active risk profile. The key to the categorisation of this mandate is the degree to which the asset size limit preserves the integrity of the information ratio. If the mandate shares certain portfolio positions with other larger portfolios managed by the same organisation then the asset size limit is likely to prove ineffective; if the portfolio is wholly independent of other portfolios managed by the same organisation then the integrity of the information ratio is more able to be preserved.

6.6.5 In the light of the above, the tables below show how the characteristics of the active core and satellite types map against the utility function.

Table 6.5. Active core type

Definition	Specialist or multi-asset managers operating at moderate risk levels but providing high levels of comfort.
Efficiency	Moderate efficiency with low expected information ratios.
Costs	Moderate fee, but large sized portfolios can result in significant trading costs.
SleepWell	High level of fiduciary comfort.
Monitoring	Average. Benefit of low number of managers.
Additional Risks	Realistic setting of expectations. Avoid focus on short-term performance leading to costly turnover. Potentially difficult to identify uncorrelated managers

Table 6.6. Satellite type

Definition	High performance, specialist managers. Selection may require substantial relaxation of the brand criterion in favour of financially based criteria.
Efficiency	Quite efficient with high expected information ratios.
Costs	Higher fee is a negative factor. Smaller sized portfolios - potentially better trading costs as deals are in smaller block sizes.
SleepWell	Higher risk profile and unknown managers will cause fiduciary discomfort.
Monitoring	High requirements for both expertise and resources. Many managers required for diversification and specialist nature of investments.
Additional Risks	Diversified line-up of managers required to control the substantial short-term volatility that can be expected from the likely candidates.

6.6.6 Central to these issues are the potential diseconomies of scale of active management. In the following sections we review the repercussions of this premise and develop a related concept - the 'Skill cycle' - which has important implications for successful investment management structures.

6.7 *Potential Diseconomies of Scale from Increased Assets under Management*

6.7.1 Investment management organisations desire an asset base of sufficient size to finance their fixed costs and to support a sufficiently sized investment team. Initially economies of scale exist in which increasing the volume of assets under management enhances the profitability and efficient running of the organisation. However, beyond a certain level of assets under management, continued and particularly rapid growth of assets can create potential pitfalls for active investment managers. This concept has been explored by a number of authors, such as Perold & Salomon (1991), Urwin (1994) and Indro *et al.* (1999).

6.7.2 This "diminishing returns to scale in active investment management" associated with the growth in assets under management, as described by Indro *et al.* (1999), can arise for different reasons. Some of the sources proposed are the increased stresses that the large pool of assets places on the skill of the investment teams, the increased trading and opportunity costs from dealing in larger transaction blocks, and the difficulties in successfully implementing stock ideas over a larger, less flexible asset base.

6.7.3 Increased asset sizes can also have an effect on the investment management organisation's people. A larger pool of assets will require more staff to be hired to handle the increased workload. However, co-ordination problems and the risk of dilution of skill intensify as the number of portfolio managers grows. A diseconomy is more likely to develop in highly skilled teams that already have a certain critical mass as they add further people. Urwin (1994) outlines the types of problems that emerge as the investment team grows:

- New additions to the team may be less skilful than existing team members.
- New members may not follow the same processes or philosophy as the existing team.
- Increases in the size of the team can create a more bureaucratic and less responsive process.

6.7.4 Increased asset size leads to trading pressures, problems with liquidity and higher transaction costs. Larger asset sizes will require relatively larger blocks of securities to be traded or smaller blocks to be traded more frequently. Increased transaction sizes suffer relatively higher market impact costs, timing costs (changes in price before a trade is executed), and opportunity costs (performance foregone because a trade cannot be made). Bid-offer spreads also increase dramatically with block size.

6.7.5 The increase in transaction costs is consequently not linear but ever rising with asset size. This is a diseconomy of scale as the increasing costs will consume relatively more of the value generated by the trades. It may even cause some transactions, that could be implemented across a smaller asset base, to be no longer viable as the size of assets increases. The investment manager will be wary of investing in less liquid stocks as the size of assets increases significantly. The number of days trading time to get into and out of a share holding increases as the assets under management increase. The liquidity concerns can further limit investment opportunities. These trading issues impact on the investment manager's ability to add value to an active portfolio.

6.7.6 Increased asset sizes also have an impact when viewed in terms of wealth creation. To exercise their skill active managers have to act on information and transact with less skilled counterparties. This is made more difficult as the size of assets increases. Successful large funds become targets of attention and this further curtails the manager's ability to trade freely without signalling his intentions. The amount of wealth generated through a good active decision will have a diminishing impact on performance when spread over a larger asset base.

6.7.7 Other issues surrounding increases in assets under management are:

- Trading strategies must be altered as asset size increases.
- The influx of new business creates administrative stress.
- With increasing size the manager is more likely to deviate from the investment objectives. It is considered that as traditional opportunities are exhausted, the manager is pressured to boost returns by adopting new strategies and investing in different assets.
- Investment opportunities can be reduced as the size of assets increases. A proposed holding in a small company in the house portfolio could result in too much stock in that company being purchased by the entire investment management organisation. Risk controls would then limit the holding.
- Strong flows of new money into an investment manager can increase the cash holdings and change the asset allocation from the desired position. Such cashflows can also put upward pressure on the prices of stocks held in the model portfolio.

6.7.8 Investment management firms are not equally affected by rapid growth in new business. Firm-specific factors such as existing infrastructures, market capitalisation bias, people dynamics and trading systems will influence the ability of the organisations to manage this growth. Indro *et al.* (1999) claim that the impact of asset size on performance differs according to investment style. It is likely that the optimal size of assets to be managed will differ amongst investment management organisations.

6.7.9 Nevertheless, for all organisations there are risks that a rapid growth in assets, which leads to a large asset base, can result in dilution of investment management skill. This could emerge through investment team inefficiencies or increased difficulties in trading.

6.8 The Skill Cycle

6.8.1 The success of the investment manager selection process relies on the ability to choose investment managers with persistent skill. Investment managers with good performance track records are often considered by investors to have skill. In fact, as Urwin (1998) notes, this is rather more likely to be a result of luck. These investment managers attract assets and their asset base grows. As discussed above this can lead to capacity strains and diseconomies of scale for the investment management organisation. We have termed a description of this process in action the 'skill cycle'.

6.8.2 The skill cycle is a concept exploring the changes that take place over time to an investment manager's skill and performance as a result of client growth, growth in assets under management and the subsequent effect of the diseconomies of scale in asset management. Although the focus of this paper is on investment management structures the concept of the skill cycle has a bearing on the construction of manager layers.

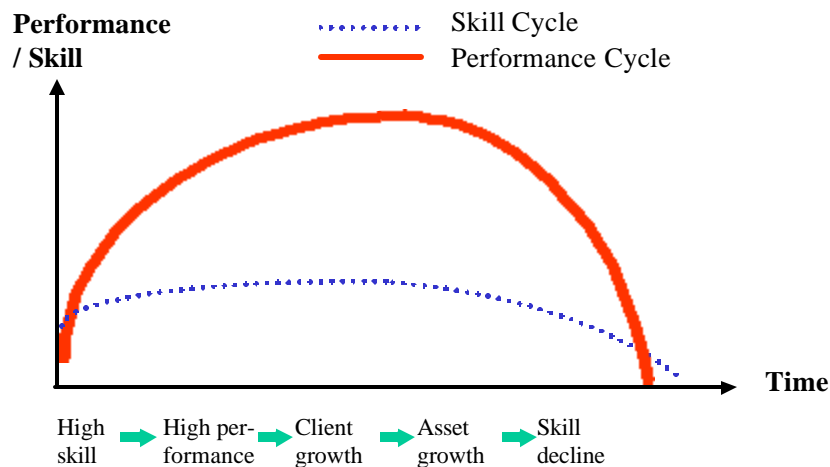


Figure 6.1. The skill cycle

6.8.3 In Figure 6.1 above, the skill cycle line tracks the level of skill currently within an investment management organisation. In this model, we assume that a starting level of investment management skill exists and is persistent. The performance cycle line tracks the rise and fall in the relative performance of the investment management organisation.

6.8.4 High skill should lead to the emergence of high performance. Thus the performance cycle rises when skill is high. Initially the cycles move in the same direction as client and asset growth continue to generate performance through improved resources and process efficiencies. However, eventually the larger asset base requires an increase in capacity. There is an increase in the number of clients to service, strain is placed on the investment team, recruitment is needed, and there is an impact of increased transaction costs and wealth dilution effects.

6.8.5 The skill of the investment manager is eroded and begins to tail off due to the effect of some or all of these diseconomies of scale. As these diseconomies intensify there is some decline in the skill cycle. Performance can still continue at this point as the continued flow of new business (based on the strong historic performance) maintains demand for the shares favoured by the organisation and supports the prices in the portfolios. The performance cycle will lag the skill cycle but will eventually fall as skill is sufficiently diluted. Consequently, there

is a danger of appointing a manager whose performance implies a higher level of skill than actually exists in reality.

6.8.6 Of course, this does not have to be the case for all organisations. Indeed in some situations funds do derive some net economy of scale advantages. Investment management organisations can successfully ride the skill cycle but in our view, this is a challenge where the odds are weighted against success.

6.8.7 Investment management organisations that seek to grow their asset base to maximise profitability will risk doing this at the expense of the value they can add to their clients' portfolios. Perold & Salomon (1991) reflect that the danger of ad valorem fee scales is that the interests of the investment management organisation and their clients are not aligned. The investment management organisation seeks to win more clients at the potential expense of less attention being given to their existing client base. Perold & Salomon (1991) call for performance-based fees to reward investment management firms for adding more value. This would prevent the drive, under ad valorem fee arrangements, primarily to increase profits by increasing assets under management.

6.8.8 Fiduciaries should be wary of diseconomies of scale and enquire about the growth aspirations of their investment managers. They must ensure their managers have plans in place to manage capacity. This is particularly relevant for traditional active managers. Furthermore, groups of fiduciaries with strong SleepWell payoffs often base investment manager selection decisions on brand names. This can perpetuate the situation. Favoured investment managers win a lot of business quickly, but fail to ride the skill cycle and then experience difficulty in managing the accumulated funds. The only winner is the broking community, which extracts value out of the system as these managers are rotated.

6.8.9 The existence of the skill cycle and its particularly significant impact on the core active investment manager type means that fiduciaries should consider using different types of managers when building investment management structures. The passive layer suffers fewer capacity problems as passive managers generally enjoy positive economies of scale. Their buy and hold investment style minimises the size and number of trades made. This means they do not have the same difficulties with increasing transaction costs as the size of assets increases. Passive investment managers with more assets under management can fully replicate the index they are tracking, which offers the benefit of lower tracking errors to investors.

6.8.10 The satellite and absolute return types are noteworthy as they generally have specific plans to limit capacity. These managers charge higher fees but keep their asset bases small in order to maintain the level of value they can add to portfolios. There is also widespread use of performance-based fees or profit-sharing arrangements. This provides good reasons for fiduciaries of large funds who have sufficient governance capacity to consider the merits of selecting a number of satellite managers.

6.9 Implications of the Skill Cycle

6.9.1 Our observation is that the skill cycle is evident in a large number of past instances of unsuccessful investment management structures and manager choices. Essentially many funds continue to repeat the mistakes of hiring and then firing managers at inappropriate moments in the investment manager's cycle of skill and performance, and incur substantial transaction costs in making such changes.

6.9.2 For example, it is common for fiduciaries to appoint managers based on SleepWell factors such as brand (which is often present in large investment managers who are prone to skill

cycle decline), and SeemsGood factors, such as past performance (where performance has been measured over a timeframe where in reality luck outweighs skill). When performance disappoints, either through skill decline or because the manager never had the skill level their performance record suggested, they are fired, and most likely replaced with another manager based on the same non-financial factors. In this situation the change in manager maintains the SleepWell and SeemsGood payoffs, leaves the financial payoffs unchanged, but incurs significant turnover costs - in fact this approach is likely to set up a similar rotation in another few years.

6.9.3 By definition satellite managers apply controls to their asset base which help to mitigate the effects of the skill cycle, and allow them to maintain higher information ratios than active core managers. In addition, as satellite managers have low SleepWell and SeemsGood factors fiduciaries are only likely to employ them based on financial factors and their selections are therefore less likely to become 'buy high, sell low' errors. This suggests strong reasons to differentiate between these two active manager types in terms of their financial factors.

6.9.4 In addition, in brand consideration, satellite and active core managers are quite distinct. As satellite investment managers are much less attractive for this non-financial reason, this suggests opportunities for consultants to be more proactive in endorsing these managers to fiduciaries and in alleviating the burdens of monitoring.

6.9.5 The distinct financial and non-financial characteristics of active core and satellite investment managers argue for separate categorisation. We recognise that the distinction may be blurred at times, and is certainly harder to define than the other groupings. Nevertheless, we find that the case for the separation suggested in Section 6.6 above is strong.

6.10 Modelling Across the Types

6.10.1 Practitioners will want to know how these layers of different investment manager types will be implemented in practice. Within each layer the fit with the required mandates needs to be investigated. For example, fiduciaries will want to test decisions of choosing one manager per asset class against having multiple managers per asset class. To a certain extent this depends on the mandate being fulfilled and the size of the fund's assets.

6.10.2 Relationships between the layers can be exploited in the modelling process. The fiduciaries may have a defined active risk target for the fund as a whole. Adopting an allocation to the passive layer, with low active risk, allows the use of a higher risk satellite layer and enables the active risk target to be met. Part of the modelling process is to investigate how the composition of a layer affects the correlation with the other layers.

6.10.3 The interactions between these layers need to be explored and quantified. This can be done through the modelling process that is discussed in the next section.

7. MANAGER MODELLING PRINCIPLES

7.1 Overview

7.1.1 This section looks at the principles that influence the manager modelling process. These principles cover issues such as diversification, the optimal number of managers, the effect of fees, and the need to be aware of a structure's sensitivity to assumptions.

7.2 *Stochastic Modelling*

7.2.1 The crucial concept that we are promoting is that funds should try to quantify the financial factors defined in investment efficiency.

7.2.2 We have already discussed how investment management results are influenced by noise. It would be unrealistic to present a static, deterministic set of results to fiduciaries. Fiduciaries need to be aware of the uncertainty inherent in any projections associated with investment management performance. It is therefore better to present stochastic projections of future outcomes for the investment management structure.

7.2.3 Stochastic variation around the central assumptions for active return (alpha) can be modelled to show volatility in active returns. We would recommend looking at results over periods of five years or more depending on the investment structure. Links to the fund's current ALM assumptions and processes can also be investigated.

7.2.4 The stochastic output would provide distributions of returns that would allow the fiduciaries to investigate the performance characteristics of their investment structure. For example, the range between the 5th percentile and 95th percentile results can provide a clear measure of the uncertainty of future results that may be expected. The 95th percentile case and lower quartile results give an explicit measure of the downside risk.

7.2.5 The usual criticisms can be levelled against stochastic modelling. It is a victim of its own assumptions, and these assumptions may be manipulated by the modeller or may be based on doubtful historic assumptions. Manager correlations are unstable over time and any historic relationships discovered may be spurious in nature. The model may be designed to fit the intended answer and not reflect the true risks going forward. These problems are recognised by the authors and the limitations of any model should be discussed carefully with the fiduciaries. These issues arise from dealing with both risk and uncertainty. While risk can be modelled directly, the uncertainty inherent in any investment situation cannot. However, stochastic modelling should not be unduly criticised for the problem of uncertainty which would be a problem whatever method or approach was used.

7.2.6 Qualitative judgements and intuition about managers predominantly drive current practice. Although the manager modelling process may have problems of subjectivity and model risk, it brings more rigour to the process than the current situation. Seeking to turn judgements about managers and manager types into a more quantitative framework clarifies viewpoints between fiduciaries and investment consultants. It provides a platform for debate and results can test and increase the understanding of the investment management structure.

7.2.7 Over time, more sophisticated models will be developed and model parameters will be tested and refined. This will strengthen the case for and benefits of manager modelling.

7.3 *Assumption of Best in Class Investment Managers*

7.3.1 The managers put forward for the Manager Modelling (MM) process will be put through a filtering process to produce a reasonable subset for the selection process. Investment consultants often undertake this process on behalf of the fiduciaries through their research and analysis. They will attempt to screen out investment managers that they feel lack the appropriate discipline, insight and quality processes and instead choose the managers that they believe will add value consistently through investment skill.

7.3.2 The assumptions in the MM process should not be based on what can be expected from the broad universe of investment managers. The focus will be on some short-listed or 'best in class' group of investment managers that are expected to provide better than average skill.

Assumptions will be based on the median performance of this smaller selected group, which is expected to have higher and more persistent skill over time. Implementing a strategy that meets these criteria over time will be difficult and this should be recognised in the modelling process.

7.3.3 Consider a graphical explanation of this in Figure 7.1 below, which illustrates the expected active risk and active return of active core managers. The whole universe of managers will provide a wide range of expected active returns, both positive and negative, for a broad range of active risk levels. The 'best in class' investment managers are expected to provide good positive returns due to superior expected investment skill. The assumptions for these managers will anticipate some expected alpha. The extent to which this is borne out in practice will depend on the success of the selection process in identifying skill. It is reasonable to describe an alternative group of managers chosen by this process in which the accuracy of skill assessment is imperfect. We refer to this practical imperfection as 'slippage'.

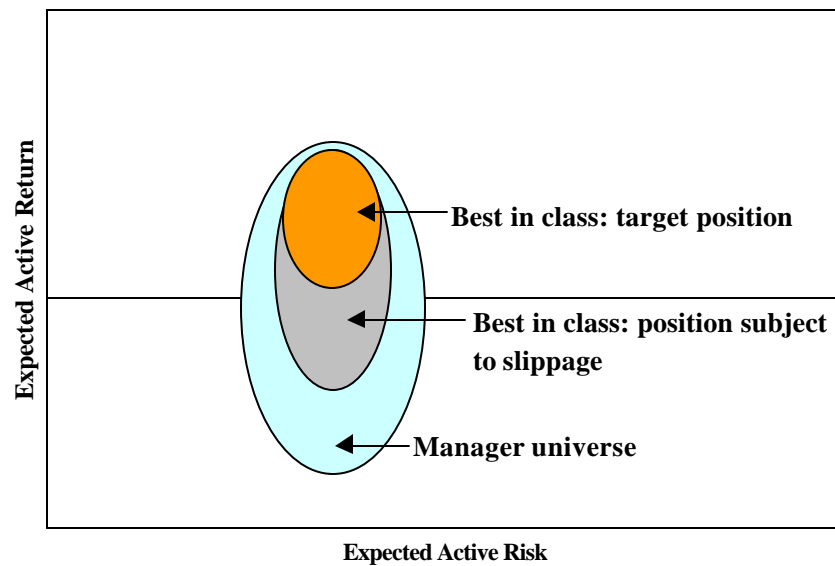


Figure 7.1. Investment manager universe and best in class managers

7.4 Tracking Error in a Portfolio

7.4.1 The active risk, or tracking error, of a portfolio is not in the main a linear combination of the standard deviations of the individual assets in the portfolio.

7.4.2 From basic statistics we know that when variances are added together for random variables A and B:

$$\text{Variance (A + B)} = \text{Variance (A)} + \text{Variance (B)} + 2 \times \text{Covariance (AB)}$$

7.4.3 Likewise in the case of a two-asset portfolio where w_i is the weight of the portfolio in asset i, the variance σ_p^2 is the risk of the portfolio returns, σ_i^2 is the portfolio risk of asset i and ρ_{ij} is the correlation between two assets i and j:

$$\begin{aligned}\sigma_p^2 &= w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \sigma_1 \sigma_2 \rho_{12} \\ \sigma_p &= \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \sigma_1 \sigma_2 \rho_{12}} \\ \sigma_p &= \sqrt{(w_1 \sigma_1 + w_2 \sigma_2)^2 + 2w_1 w_2 \sigma_1 \sigma_2 (\rho_{12} - 1)} \\ \sigma_p &\leq w_1 \sigma_1 + w_2 \sigma_2\end{aligned}$$

7.4.4 Note that only in the case of assets being perfectly correlated with one another would equality occur. In other cases, combining assets will lower overall portfolio risk. This is the essence of diversification in which creating a portfolio of diverse assets provides a less risky outcome than holding the individual assets. The extent to which this will happen will depend on the correlation between assets (ρ_{ij}). This non-linear nature underlines the need for quantitative manager modelling.

7.5 Effect of Diversification of Manager Risk within a Layer

7.5.1 We have discussed manager modelling and how it aims to develop quantitatively investment management structures for funds. One of the reasons why structures need to be developed with more sophistication than at present is to ensure that diversification benefits are maximised. Each investment manager must add value, not only on a stand-alone basis, but also at the total fund level.

7.5.2 The following example shows how the active risk of a group of risky assets is diminished with good diversification.

7.5.3 The table below illustrates the hypothetical situation of a fund with five satellite investment managers. For illustrative purposes we have assumed that they all have the same characteristics, although in reality this would not necessarily be the case. Each manager has a target active return of 3% or more and the average active risk is 6%, giving a gross information ratio of 0.5 for each investment manager.

Table 7.1. Diversification of manager risk within layer

Manager	Active return (%)	Active risk (%)	Information ratio
A	3	6	0.5
B	3	6	0.5
C	3	6	0.5
D	3	6	0.5
E	3	6	0.5
Total	3	2.7	1.1

7.5.4 The most interesting figures appear in the bottom line. Assuming that the outperformance of each manager is uncorrelated with the others we arrive at a tracking error of 2.7% and a gross information ratio of 1.1. The risk of the satellite layer is therefore comparable with that of a mainstream active core manager, but we have far higher performance expectations and a very significant information ratio.

7.5.5 The first step towards achieving such diversification is to choose managers wisely to ensure they are both skilled and disparate. In addition, observing manager interaction through extensive manager modelling can provide structures that are less risky when viewed at the fund or layer level. This has important implications for choosing a group of satellite or absolute return managers.

7.5.6 In theory the best diversification is achieved by employing managers that are perfectly negatively correlated. However, this can only occur if the managers take precisely opposing decisions for their entire portfolios. Indeed managers whose portfolios have *significantly* negative correlations must contain significant portions which are mirror images. To justify both managers having the same expected outperformance it is necessary to believe that this is generated by those portions of the managers' portfolios which are either identical or completely unrelated. When the overall correlation is very negative those identical or unrelated portions must be very small. It is difficult to justify the generation of significant outperformance from a small part of each portfolio.

7.5.7 In implementation it would seem appropriate to avoid managers with very large negative correlations, as it is difficult to justify them both having excellent alphas, and to focus on managers with low correlations.

7.6 Optimal Number of Managers

7.6.1 A core part of the manager structure process is the decision as to how many managers the fiduciaries should hire. The following factors will drive this decision:

- Availability of skilled managers. Fiduciaries must choose managers whose skills justify the investment management fees paid. The number of managers that can be identified as skilled will limit the number of managers selected. Furthermore, the higher the number chosen the more the information ratio is likely to diminish as the selection criteria are relaxed.
- Manager specific risk. All managers carry the risk that they will not deliver what was required by the fund's objectives. Some manager layers have more predictable outcomes than others. Layers employing managers with high tracking errors will need to include more managers to reduce the layer's overall tracking error to an appropriate level.
- Correlation between managers. As we have observed in the active risk formulation, the portfolio risk will be decreased the more the managers perform differently to each other. Highly correlated manager types will require a relatively larger number of managers to be combined in order to lower risk. For certain manager types it becomes increasingly difficult to find uncorrelated managers as the number of managers increases.
- Management fee costs and structure. The splitting of assets across many managers may drive the fee into more expensive fee bands. This will lower the net information ratio and make the investment structure less efficient. Modelling can take these effects into account.
- Size of assets. This is partially captured in the fee element but also may limit the options available. Small funds may not be able to diversify across many managers due to the existence of minimum portfolio sizes.
- Governance. As already observed in the utility function, fiduciary organisation structures and capacity create a limit on the complexity of structures. This will generally create an upper limit on the number of managers.

7.6.2 There is an optimal number of managers for financial efficiency which will be a function of the particular circumstances of each fund. This optimal number will be reached

when the marginal utility of improved diversification of another manager is less than the marginal disutility associated with higher fees and the lower relative skill that this new manager introduces.

7.6.3 These principles can be modelled in the MM process to create efficient structures. Simple examples of the conclusions that arise from manager modelling are given below.

7.7 Managers and Tracking Error

7.7.1 As discussed in the section above, increasing the number of managers decreases the specific risk of the single manager.

7.7.2 In Figure 7.2. below, the tracking error of a 100% multi-asset (balanced) investment management structure is illustrated for a different number of managers. (The assumptions regarding expected tracking errors and active returns of different layers are merely for illustrative purposes) Adding more managers decreases overall risk, but the benefits of this diversification diminish in size as more managers are added. Beyond a certain point the effectiveness of adding more managers becomes worth less relative to the increasing complexity of the structure and the likely dilution of the information ratio.

7.7.3 For lower active risk managers, such as passive managers, the active risk is so low (in the context of the fund's total active risk) that diversification has less impact. In this case it may be worth using only a single manager for this layer.

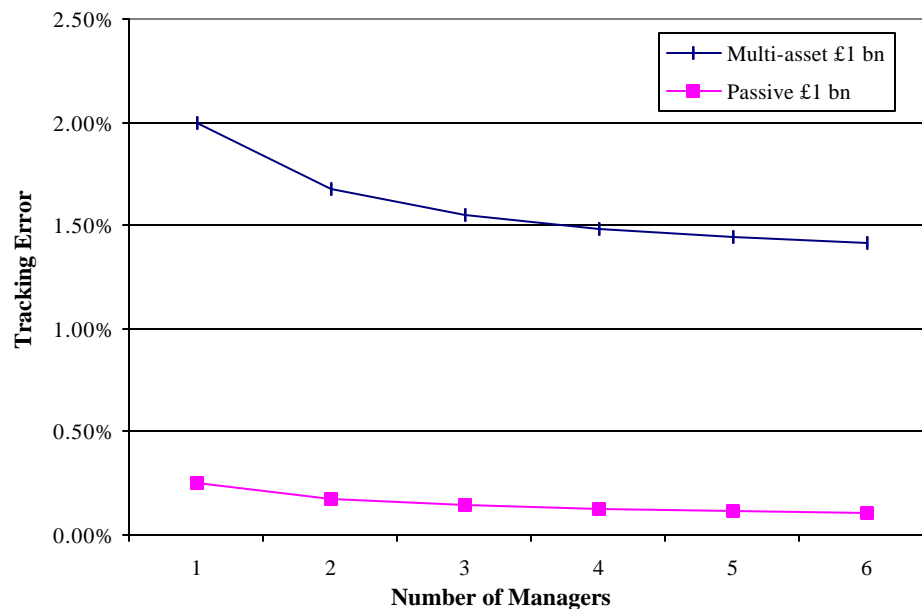


Figure 7.2. Tracking error and number of managers

7.7.4 Manager types with high tracking errors require the use of more managers to achieve diversification. Illustrative tracking errors for groups of active core, satellite and hedge fund managers are shown below in Figure 7.3. In this example, to achieve less than 2% tracking error would require three active core managers, nine satellite managers and significantly more than ten hedge funds.

7.7.5 Risk models can help provide further information on the risks that investment managers are taking on an individual and, in particular, on a combined basis. The extent of diversification against the benchmark can also be explored.

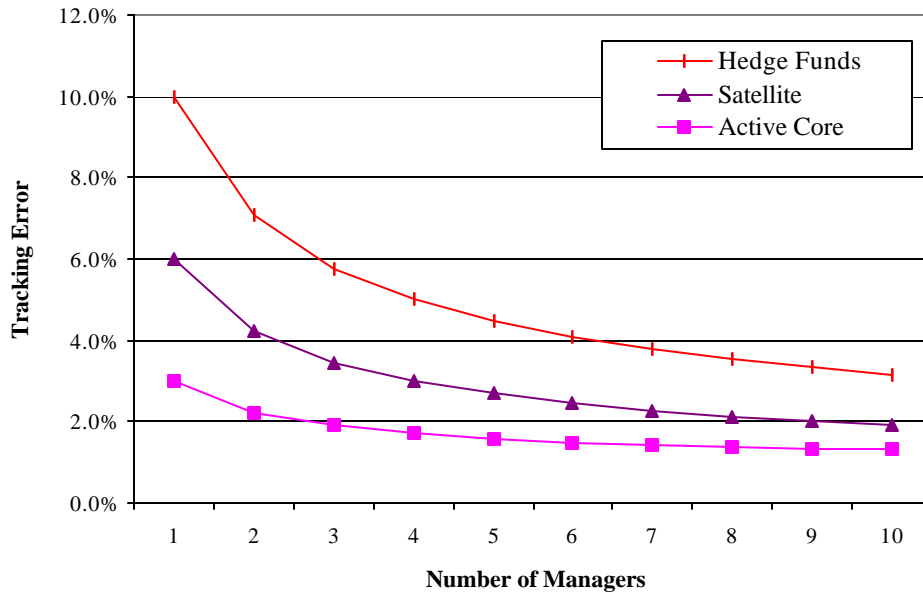


Figure 7.3. Tracking error for different types of managers

7.7.6 As seen in the tracking error formula described earlier, the extent to which the tracking error of groups of managers decays is linked to the correlation of the returns between the managers. This is illustrated in the figure below.

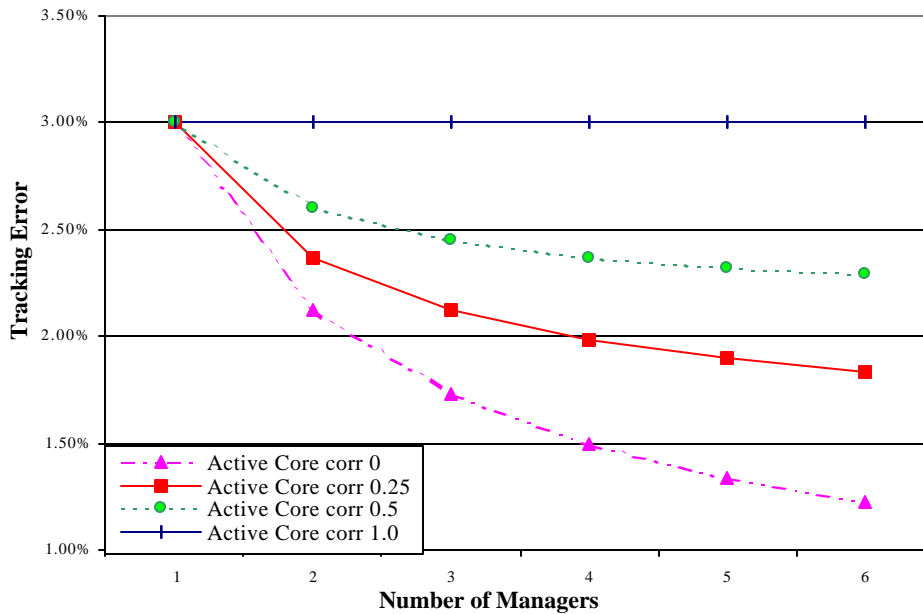


Figure 7.4. Tracking error and manager correlations

7.7.7 If managers are perfectly correlated (correlation of 1), then adding them together does not reduce risk. The horizontal line at 3% indicates this in Figure 7.4 above. In practice this may be the case for index fund managers, although it is unlikely for active managers who are pursuing their own, often independent, strategies.

7.7.8 As discussed in 7.5.6 we believe it is unrealistic to assume significantly negative correlations for investment managers that have significantly positive information ratios. We believe that a reasonable assumption for the correlation between manager returns would be zero. The manager modelling process will try to find combinations of managers that meet the financial criteria but share low correlations. This will maximise the net information ratio of the layer by lowering the tracking error in the denominator.

7.7.9 The success of diversification will depend on the manager layer. Traditional active core managers will typically have more commonality in their approach than satellite managers. Active core managers follow similar benchmarks for segments of their client markets. Business risk considerations and controls will also cause these active core portfolios to hold dead-weight allocations to stay close to the benchmark even if this is not style consistent. These factors will inevitably lead to some correlation amongst these managers. Absolute return managers follow a host of different strategies and have different skill sets. A mix of very lowly correlated managers will be easier to establish within the absolute return layer.

7.8 Information Ratios and the Effect of Investment Management Fees

7.8.1 Investment management fees have a considerable impact on the active returns the investment managers are trying to generate with their skill. Investment managers should be able to provide returns in excess of their fees in order for the fund to benefit. In constructing the utility function, we stress that the net information ratio should be used to take into account the relevant costs of the investment management structures.

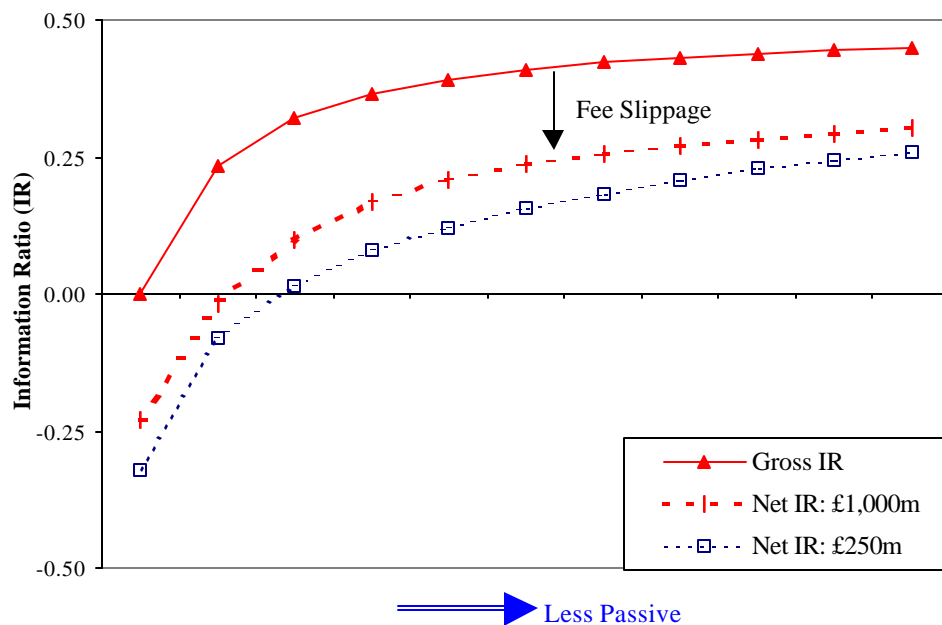


Figure 7.5. Information ratio gross and net of management fees

7.8.2 In the figure above, the information ratio (IR) of an investment structure comprising passive and active core managers is presented both before and after fees. To reflect the difference that the size of the fund has on costs, the net IR position is shown for a £1,000 million fund and a smaller £250 million fund. The structures on the left start with 100% passively managed and as we move to the right progressively more of the fund is switched into the active core layer.

7.8.3 The gross information ratios are the same before costs for each fund as their structures are identical at each point on the curve. On a net basis, the investment management fee slippage is greater for the smaller fund due to sliding fee scales. This means that on average fees are higher for the smaller fund. This creates a higher hurdle that smaller funds must reach in order to break even.

7.9 Slippage in Alpha

7.9.1 Investment management fees are not the only area of slippage in active returns. There is also the risk of investment managers performing below expectations. Further, slippage could result from inappropriate governance e.g. 'buy high, sell low' errors as explained earlier. This could lead to the active returns assumed in the modelling process not being delivered in reality. Hopefully the structure will be well diversified by manager and this poor performance will be partially offset by good performance by other managers, although slippage through poor governance can apply at the fund level. We call this slippage in expected active returns 'alpha slippage'. Urwin (1998) explains the reasons why the expected alpha has been overestimated in the past. Note that this alpha slippage is not simply the result of random fluctuations, but rather a result of mis-estimation of the long-term mean return from the structure.

7.9.2 In designing investment management structures quantitatively it is important to undertake sensitivity testing and to be aware of alpha slippage. This should lead to more robust structures being chosen.

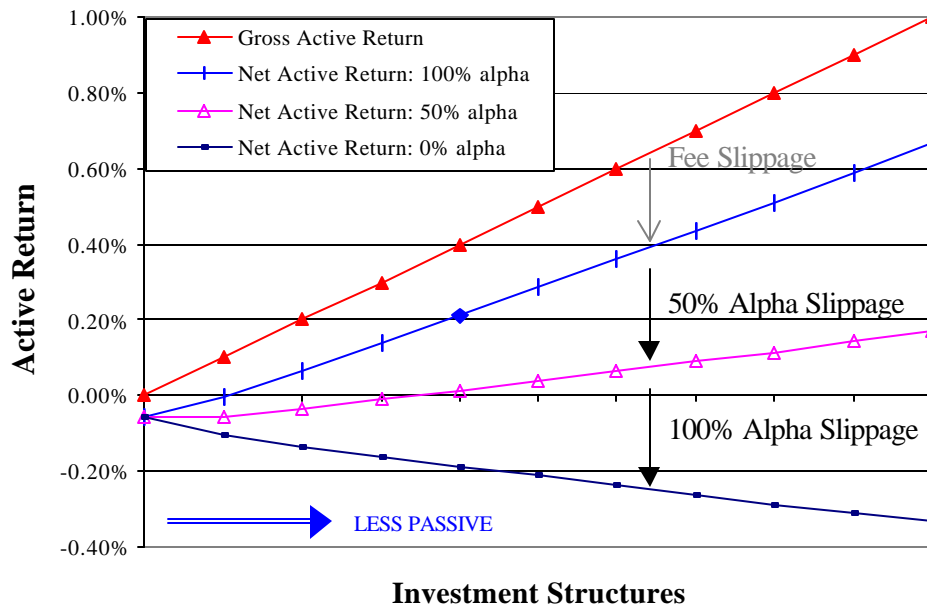


Figure 7.6. Alpha slippage and the effect on active returns

7.9.3 In the Figure 7.6 the active returns, gross and net of investment management fees, are shown for a £1,000m fund invested in structures with different allocations to the passive and active core layers. Once again, as in the figure above, the percentage of the structure invested passively decreases as you move right along the curves.

7.9.4 The widening between the uppermost gross active return line and the first net active return line (100% alpha) shows the increase in fees that occurs as the proportion managed actively rises. The investor generally knows about the potential of this fee slippage in advance.

7.9.5 Whether the structure will perform as expected is, however, not known in advance. Investors need to consider this factor when developing investment management structures. To demonstrate alpha slippage, the active returns from a modelled structure can be recalculated assuming that the expected returns were not delivered as anticipated. In Figure 7.6, the two lowest lines indicate the sensitivity of the performance to the alphas assumed in the modelling. In one case the modelled alpha is half of what is expected and in the lowest line the alpha has fallen to zero. (Note that this is not the worse case position as the actual alpha could be negative). Stochastic risk analysis can be added to this sensitivity analysis.

7.9.6 In Figure 7.6, the most active structures can perform well but can also underperform by relatively large margins. Although the passive layer provides no expected active return, some allocation to the passive layer can cushion the investment management structure from alpha slippage. The consistency of the passive management layer can provide stability to the fund's returns.

7.9.7 Alpha slippage can cause a reasonable structure to no longer provide positive benefits to the fund. Fiduciaries need to be aware of structures that have high risk of alpha slippage. These structures in particular need to avoid implementation difficulties. They require rapid and effective decision-making by fiduciaries and proficient monitoring of the investment management arrangements. Fiduciaries who are unable to deliver in this regard should consider structures with lower risks of alpha slippage.

7.10 Summary of Manager Modelling

7.10.1 This section considered a number of manager modelling (MM) principles. These principles are best explored in a quantitative manner with the client. Some of the points made were:

- Active risk, or tracking error, of a portfolio is not in the main a linear combination of the standard deviations of the individual assets in the portfolio. The non-linear nature underlines the need for quantitative manager modelling.
- The extent to which combining assets will lower portfolio risk depends on the correlation between the assets. The extent to which the tracking error of groups of managers decays is linked to the correlation of the returns between managers.
- When grouped in a portfolio uncorrelated, high-performing, risky managers can result in a high return, low risk layer. The risk of the satellite layer is therefore comparable with a mainstream active core manager, but with far higher performance expectations.
- The decision as to how many managers the fiduciaries should hire can be modelled in the MM process.
- A key constraint on the number of managers used will be the availability of skilled managers.
- The optimal number of managers depends on the specific risk of managers, the correlation between the managers, the level of management fees, the structure of those fees, and the size of the fund's assets.

- Fiduciaries' organisation and capacity create a limit on the complexity of structures. This will generally create an upper limit on the number of managers.
- Manager types with high tracking errors require the use of more managers to achieve diversification.
- Investment managers should be able to provide returns in excess of their fees in order for the fund to benefit.
- Investment management fees are not the only area of slippage in active returns. There is also the risk of investment managers performing below expectations.
- Alpha slippage is the extent to which actual active returns do not measure up to what was expected.
- When designing investment management structures in a quantitative manner it is important to undertake sensitivity testing and to be aware of alpha slippage.

7.10.2 The Manager Modelling process, with the aid of quantitative techniques, can blend the complex relationships between expectations for active returns and active risks, diversification benefits, fee structures, and capacity constraints.

8. EFFICIENCY, STRUCTURE AND GOVERNANCE

8.1 *Overview*

8.1.1 In this paper we have introduced the concept that investment efficiency is a combination of financial efficiency and non-financial efficiency. Financial efficiency concerns the maximisation of the net information ratio. Non-financial efficiency recognises the constraints under which investors, and most particularly fiduciaries, operate. It is concerned with the provision of appropriate SleepWell payoffs and the minimisation of SeemsGood payoffs.

8.1.2 The paper has reviewed behavioural biases that affect decision-making and performance myths that skew decisions about investment matters. We introduced the concept of the fiduciary utility function, which explains how fiduciaries can operate financially sub-optimal investment arrangements and yet derive high levels of satisfaction.

8.1.3 We introduced the concept of manager modelling and demonstrated how this quantitative approach is essential in designing efficient investment management structures given the complex interrelationships between the components.

8.1.4 This section seeks to draw together all these important themes into a cohesive whole.

8.2 *Governance in Practice*

8.2.1 Fund governance was reviewed in Section 2. The main parties involved in the governance arrangements are the management group, which is responsible for strategy and policy, and the executive who implements the strategy. We have concentrated on those management groups that have fiduciary responsibilities.

8.2.2 In this paper we have noted that these fiduciaries are generally constrained in the amount of time they are able to devote to the management of the fund. In addition, the effectiveness of the time devoted to the fund is highly variable. This depends on the size of the management group, the differing levels of investment expertise of the fiduciaries, the degree of delegation of investment matters to sub-groups, the decision-making process and the effectiveness of the executive in implementing the group's decisions.

8.2.3 We find that, in general, fiduciary groups for pension funds are comprised of individuals with limited prior investment experience and who are appointed for terms that often last only a matter of a few years. This produces cycles in which fiduciaries may reach levels of sophistication in their tenure but they do not stay in place long enough to apply their acquired skills effectively. Decision-making within such groups tends to be consensual in nature with each individual needing to become comfortable with any proposed change before the decision can be taken.

8.2.4 While such decision-making is clearly appropriate in many instances, it is less productive when dealing with investment matters as the inherent complexity can be beyond the experience of many of the individuals. As a consequence, decision-making tends to be slow, performance myths are more difficult to dispel, excessive comfort can be sought and, in some cases, a consensus position cannot be reached which can lead to inaction.

8.2.5 We believe that certain investment options are likely to be precluded by such governance arrangements, for example the use of satellite and absolute return manager types. In these cases, the investment managers typically lack brand recognition thereby exacerbating regret risk. In addition, the understanding of the investment process or likely portfolio will be beyond the investment expertise of most fiduciaries.

8.2.6 The governance arrangements can be improved by delegating the responsibility for such investment matters to a small group which does have the appropriate expertise. This will allow faster decision-making, which we believe to be important for the selection and de-selection of more volatile investment products and less stable investment organisations.

8.3 *Efficiency, Structure and Governance*

8.3.1 In Figure 8.1 we show four different types of governance structure. We would expect only funds that include the executive layer to be proficient, and successful, in implementing structures with satellite and absolute return managers. While an investment committee can concentrate investment experience and expertise, it still requires consensus to be reached and if this committee is too large logistical problems of forming a quorum will be hard to overcome. A fund executive, however, avoids these latter problems.

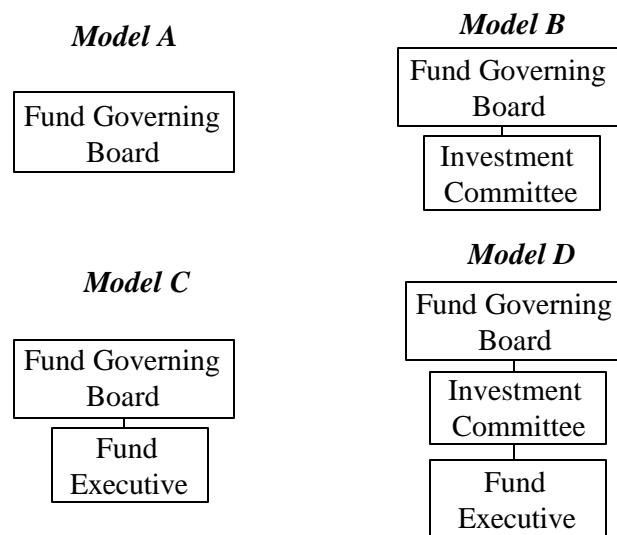


Figure 8.1. Governance models

8.3.2 Figure 8.2 demonstrates the relationships between investment efficiency, investment management structure and fund governance. Investment efficiency is plotted against diversification and a series of efficient frontiers is derived. Each efficient frontier represents a different level of effectiveness and capacity of the governance structure. Models A and B in Figure 8.1 above are likely to be limited to the lower two frontiers, while Models C and D could implement structures on the highest frontier. It is not only the governance structure that restricts funds to the lower frontiers but also their expertise and time constraints. It should be noted that these curves will be unique to each management group as investment efficiency is a function of non-financial, as well as financial factors which vary between management groups.

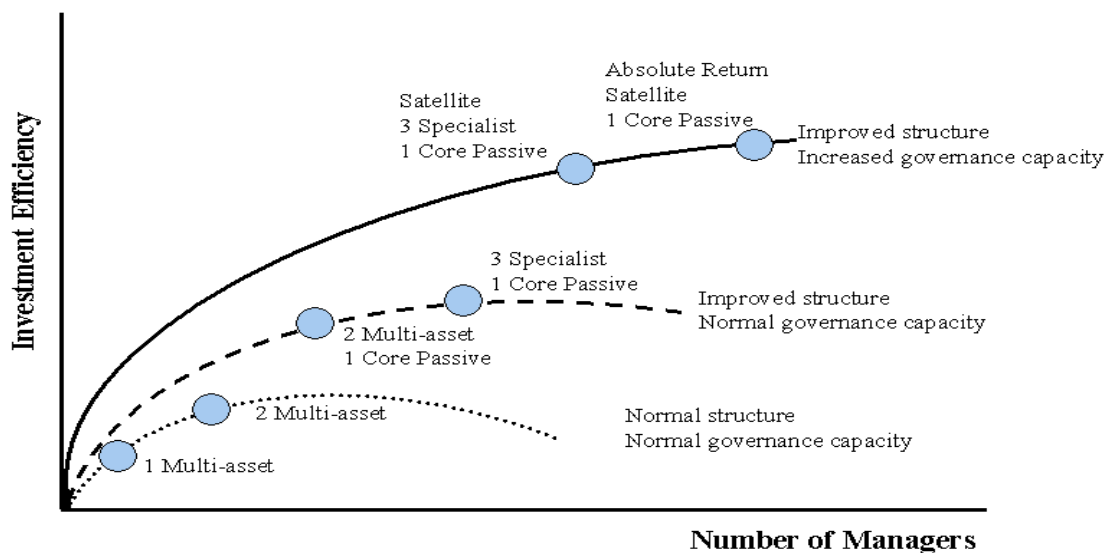


Figure 8.2. Efficiency, structure and governance

8.3.3 Initially, the efficient frontier slopes upwards as investment efficiency is improved with increasing diversification. The improvements in investment efficiency relate to enhanced financial efficiency and/or increased non-financial efficiency.

8.3.4 For example, in the figure we can trace the progression of an hypothetical fund. In moving from one multi-asset manager to two with equally weighted risk contributions, the financial efficiency is usually improved: the outperformance expectation will be unchanged but the average fees paid are likely to rise in most circumstances, so net performance is slightly lower. However, there is an expected diversification benefit from employing two managers rather than one and therefore active risk is reduced. Provided that this latter effect is sufficiently large, we will see an improved net information ratio – improved financial efficiency. In addition, two managers will provide enhanced non-financial efficiency through a higher SleepWell payoff.

8.3.5 This process of improving investment efficiency through the addition of further multi-asset managers can continue for a short while. However, each incremental addition has a larger negative impact on financial efficiency: the increases in average fee rate offset more and more of

the active return while each incremental manager also brings less diversification benefit. Financial efficiency begins to fall. Non-financial efficiency could still be increasing at this point through a higher SleepWell payoff. However, the complexity of the structure and pressure on fiduciary time will reduce the non-financial payoff and this could also become negative. As a consequence, there comes a point where investment efficiency starts to fall with increasing diversification.

8.3.6 To combat this effect, our hypothetical fund can step up to a higher efficient frontier. In the figure above we move from two multi-asset managers to a structure employing two manager types by adding a passive manager. In terms of financial efficiency, we reduce the expected outperformance of the fund by diluting the impact of the two active managers. We also reduce the average fee level. There may be some small upward pressure on fees from the smaller active portfolios but in the majority of cases we would expect this effect to be more than offset by the introduction of the substantially cheaper passive manager. Finally, we see two effects on the active risk of the fund. The first and most obvious is the dampening of volatility through the addition of the passive manager's very low tracking error. The second, and smaller, effect is the diversification benefit of having two layers to the structure, as it is reasonable to assume that the active returns of the two layers (noise or experienced tracking for the passive layer) are uncorrelated. In aggregate, therefore, while we see a reduced net outperformance expectation we also expect a significantly reduced active risk. Financial efficiency is generally enhanced. In addition non-financial efficiency would be improved through the simple effect of adding a third manager and probably also as a result of the passive manager providing an enhanced SleepWell payoff derived from the diversification benefit between the two basic manager types. In addition, demands placed on the fiduciaries do not increase significantly either in terms of time or expertise. As a result, the governance arrangements can remain unchanged.

8.3.7 In moving along this higher efficient frontier, our hypothetical fund replaces the two multi-asset managers with three specialist managers – perhaps domestic equities, global equities and bonds. While outperformance expectations are increased, specialist fee levels are typically higher than multi-asset fees, and so any net outperformance improvement must come from higher skill managers and higher gross information ratios. It is likely that there will be some benefit to active risk from having three managers rather than two, and so this extra diversification may bring some gains in financial efficiency. Given that the three specialist managers have strong brands, there should also be some incremental improvement in non-financial efficiency. While investment efficiency would generally be enhanced for this level of diversification, further manager additions would see the same downturn in investment efficiency as for the lowest efficient frontier. We see the above arguments as demonstrating why the popular structure of core-active does work in practice, although in our view the greater benefits seem to be most evident in non-financial payoffs.

8.3.8 Consequently, to further enhance investment efficiency, our fund must step up to a higher efficient frontier. In the figure, this is achieved by the addition of the satellite layer. As they are less constrained by the diseconomies of scale of active management, we can expect higher net information ratios from the satellite managers than from the active core managers. This causes a significant increase in financial efficiency. However, as these managers are likely to adversely impact the non-financial efficiency through poor SleepWell payoff, we do not believe our hypothetical fund can incorporate the satellite layer without changes to the current governance structure. Improvements in the governance arrangements along the lines suggested

in the section above will allow the fiduciary group to reweight its utility function to give more emphasis to financial as opposed to non-financial factors.

8.3.9 The next step for the hypothetical fund to take in improving its investment efficiency is to refine its utility function further to reduce the non-financial factors to an absolute minimum. Specifically, we mean the reduction of the SleepWell factors to the minimum level appropriate for fiduciaries and the elimination altogether of the SeemsGood factors. This allows the removal of all brand-driven choices of investment managers from the structure and the introduction of the absolute return layer to provide high levels of active return and further diversification benefits.

8.4 *Summary*

8.4.1 In this section we have drawn together the elements of financial efficiency and non-financial efficiency and qualitatively shown the benefits of manager modelling. We have also shown that governance arrangements can act as a constraint on investment efficiency and that the achievement of high levels of investment efficiency requires a reweighting of the utility function away from non-financial towards financial factors.

9. PRACTICAL CONSEQUENCES OF INCORPORATING NON-FINANCIAL FACTORS

9.1 *Overview*

9.1.1 This section looks at the value that can be added by recognising non-financial factors when developing investment management structures.

9.1.2 We assert that non-financial factors are always present when making decisions on investment management structures, and that failure to incorporate them directly in the decision-making framework is likely to result in poorer decisions. Even the most advanced investment management structures we have observed have this limitation. The benefits of incorporating non-financial factors in the decision-making process are set out below.

9.2 *Behavioural Preferences Brought Out into the Open*

9.2.1 The main advantage of bringing non-financial factors into the model is that a framework is created to address and discuss them.

9.2.2 Once recognised by fiduciaries, biases and mis-estimation errors can be addressed explicitly. It is easier for the consultant to steer the group away from a SeemsGood bias if the fiduciaries know about cognitive errors.

9.2.3 SleepWell payoffs can also be better managed. Fiduciaries are able to specify their required level of comfort in advance. The acceptance of the strategy will be improved if their comfort requirements are met. Management groups can also better appreciate the financial cost of their non-financial requirements.

9.3 *Transition Costs Minimised*

9.3.1 One financial advantage of taking into account the level of regret risk that the fiduciaries can accept when developing an investment structure is that this can help to limit the frequency and size of future transitions. The following problems are more likely to be avoided:

- Fiduciaries will not adopt complex structures with which they are uncomfortable.
- Fiduciaries are less likely to change the structure at the first sign of performance problems.
- When changes need to be made to the structure fiduciaries are less likely to wait until performance problems arise to make such changes.

9.4 Constraints on Fiduciaries Recognised Explicitly

9.4.1 Fiduciaries operate within various constraints, which often include pressing time constraints. The advantage of the proposed framework is that it matches structures with the governance capacity of the fiduciaries.

9.4.2 For example, consider a group of fiduciaries that can only meet once a year and have just one hour to discuss investment issues. This group's limited time can only do justice to a very simple investment management structure. If this structure is felt to be inappropriate, then the fiduciaries have to solve the resource and capacity constraints, perhaps by delegating the investment function to another group with more time resources.

9.4.3 As discussed, the focus on governance means that fiduciaries will be advised not to select structures that are too complex for them to manage effectively. This should help to improve the governance of the investment function amongst fiduciary bodies and to avoid unnecessary costs.

9.5 Recognition that Fund-Specific Solutions are important

9.5.1 A framework that is based on satisfying fiduciary utility has to look at the particular needs of the fund. This will avoid 'one-size fits all' approaches to structuring investment management arrangements.

9.5.2 Given their fund's size, their level of comfort and the governance structure some fiduciaries will set up simpler structures. Such structures will concentrate on passive and active core manager types. The increased governance capacity of other funds will support solutions with allocations to satellite and absolute return manager types. The key feature is that the structure will be financially efficient subject to the governance constraints of the management group.

9.6 Improved Fiduciary Expertise and Understanding

9.6.1 For most funds, the influence of non-financial factors on fiduciaries' decisions is highly significant. The introduction of non-financial factors into the framework for manager structure decisions helps the fiduciaries to be more aware of the hidden drivers at work in their decision-making and to make appropriate adjustments.

9.6.2 In particular, the new framework helps to reduce the focus of fiduciaries on historical performance alone. This framework introduces the net information ratio, which is a more comprehensive way of assessing a manager's risk-adjusted performance after allowing for all costs.

9.6.3 The framework allows fiduciaries to work with realistic expectations of manager performance.

9.7 Enhanced Quality of the Selection Process

9.7.1 A paper published by The WM Company (1998) analysing the results of manager transitions in the UK found that less than half of the pension funds that decided to change their investment manager were better off after the change. The new managers appointed had strong relative performance before the change but by the second year following the change they fell short of both the deposed manager and the WM universe. This underperformance was before taking account of the costs of restructuring the fund.

9.7.2 Urwin (1999) listed seven 'deadly sins' of manager selection decisions. These sins are a combination of behavioural biases and performance myths, which, if avoided by fiduciaries, should enhance their fund's structuring and selection process. These seven sins assert that fiduciaries typically:

- prefer to avoid regret risk over financial risk;
- worry about short-term results rather than long-term results;
- rely on shortcut myths based on previous experiences;
- see patterns in small samples of data where there are none;
- fail to recognise the force of mean reversion;
- are unduly over-confident and over-optimistic, and
- falsely weight data in decisions, such as over-weighting recent data in complex decisions and over-weighting personal data.

9.7.3 The WM results are less surprising considering the significant prevalence of these biases in most manager selection processes.

9.7.4 The proposed framework facilitates more effective selection decision-making by setting realistic performance expectations, controlling the extent to which fiduciaries are influenced by brand and improving the fiduciaries' awareness of other biases.

9.8 Practical Issues

9.8.1 Many ideas look good in theory but prove difficult to implement in practice. There are a number of practical issues that have the potential to hinder the attempts of fiduciaries to adopt and benefit from the new framework.

9.8.2 First, there is a comfort payoff in maintaining the status quo. Fiduciaries may resist the new arrangements and stay with what they know. Fiduciaries with high behavioural payoffs would benefit the most from this new framework. Patience and education in this area are required.

9.8.3 Second, even with the new framework in place the risk of disappointment in performance is present. Will fiduciaries want to return to the structure they had? This would be undesirable as it would result in the fund suffering two sets of large transition costs.

9.8.4 One further issue is that the investment management structure choices have to be consistent with the asset allocation decision. In practice, compromises between the strategic asset allocation and the manager structure may need to be made due to the lack of availability of skilled managers and appropriate investment vehicles. To a certain extent this can be solved by using the passive layer as a 'completion fund'; although extreme asset allocations in this layer may be unacceptable to some fiduciaries.

9.8.5 Good monitoring is essential, as the structure will be more interdependent than previously. A manager who changes style unexpectedly and does not do what is expected could affect the intended outcome for the fund as a whole. Well designed and frequent reporting that monitors the managers against their mandate can help to identify manager deviations.

9.9 Summary

9.9.1 In conclusion, we believe that the new framework that incorporates financial and non-financial factors is more effective at developing investment management structures. The wider focus allows more fund-specific information to flow into the investment management process.

The result is a more stable, better understood, comfort-providing structure that the fiduciaries are more likely to be able to manage with their level of resources.

10. CONCLUSION

10.1 Summary

10.1.1 This paper has focused on developing efficient investment management structures for fiduciaries whose funds are managed by external investment managers. We have introduced three main concepts:

- the definition of investment efficiency, which comprises both financial and non-financial efficiency;
- the proposal that structures should be developed in a more quantitative manner through a process of manager modelling, and
- the importance of the governance capacity of fiduciaries and the ability to support the resulting structure.

10.1.2 To find better ways of analysing investment efficiency, the factors contained in the fiduciary utility function were analysed. Five financial factors were identified: active return, active risk, diversification benefits, ongoing costs and transition costs. Ongoing costs include not only investment management fees but also other costs incurred by the fund such as monitoring costs. Transition costs are a critical, but often overlooked, component to consider when designing investment management structures. The longer-term benefits of the new structure must outweigh these costs. The net information ratio is a measure that can capture these five financial factors.

10.1.3 Non-financial payoffs stem from established behavioural finance findings and performance myths. Fiduciaries ascribe 'value' to these non-financial factors. We have categorised these payoffs into two classes - 'SleepWell' and 'SeemsGood' - which collectively become the third dimension of investment efficiency after active return (alpha) and active risk (sigma). For colloquial reference, we suggest that these non-financial factors could be termed 'theta' factors.

10.1.4 SleepWell payoffs arise from the fiduciaries' need for comfort and from the fact that they are subject to external validation. Reliance on these payoffs when developing an investment management structure can lead to brand-driven choices and commonality in structures. This can have some long-term financial benefits if the stability of the structure reduces future transition costs.

10.1.5 SeemsGood payoffs have no financial benefits but arise from behavioural biases. The extent to which decisions are driven by SeemsGood payoffs (at the expense of financial factors) can lead to the formation of unrealistic expectations. Controlling SeemsGood payoffs will cause investment efficiency to meet fiduciaries' expectations with more certainty.

10.1.6 A utility function framework results in the realisation that there is no single structure that will produce optimal satisfaction for fiduciaries. Fund-specific solutions are needed. The role of the investment consultant is to assist the fiduciaries in managing the balance between the financial and non-financial factors, and to explain the consequences of placing too much reliance on non-financial payoffs.

10.1.7 The fiduciaries' capacity to monitor and manage the arrangements is a significant constraint when developing investment management structures. This can place real limitations on the successful implementation of certain structures. Fiduciaries may need to adopt new ways of governing if they require more complex investment management structures.

10.1.8 We believe that investment management structures should be developed in a more quantitative manner. Manager modelling (MM) is the process by which an investment management structure can be constructed, taking into account the fiduciaries' utility function and capacity.

10.1.9 We have identified four investment manager types that can be used for the manager modelling process. These manager types are: passive, active core, satellite and absolute return. Investment management structures will be comprised of some, but not necessarily all, of these layers. Once the structure has been designed it can be populated through manager selection.

10.1.10 Changes to an existing investment management structure can also be analysed by using the manager modelling process. The effect of changing an investment manager on the expected active return, active risk or diversification of the structure can be assessed. Transition costs and the impact of fees and fee structures can also be analysed.

10.1.11 The intention of this paper was to provide a more comprehensive framework for fiduciaries and their advisers to develop more efficient investment management structures. We believe that management of non-financial factors, attention to governance constraints and more rigorous quantitative modelling can assist fiduciaries and their advisers in this task.

10.2 *Where to next?*

10.2.1 The focus of this paper has been on investment management structure. The principles of investment efficiency and non-financial factors can be extended down to the manager selection level. We anticipate that the concept of utility and recognition of behavioural elements will also be extended to the asset allocation stage.

10.2.2 The skill cycle describes the increasing diseconomies of scale for active investment managers as assets under management increase. This has important consequences for manager selection and de-selection. The relationship between economies and diseconomies of scale, asset size thresholds, and strategies that investment managers can use to prolong the skill cycle are issues for future analysis.

10.2.3 The authors are aware that this work is conceptually driven. Examples of a practical application of how to maximise the financial efficiency of funds can be found in the Watson Wyatt Structured Alpha Monograph (1999).

10.2.4 Further analysis is required and planned by the authors into the area of investment efficiency.

10.3 *Final Observations*

10.3.1 Both financial and non-financial factors need to be considered when developing investment management structures.

10.3.2 Structures can be improved by adopting a more rigorous quantitative approach to their development.

10.3.3 We view effective fund governance by fiduciaries as an increasingly important issue to ensure successful management of their assets.

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