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Investment Beliefs that Matter: New Insights into the Value Drivers of Pension Funds

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July 2010

Acknowledgements

This paper reports on research that is currently in progress. Comments are welcome and appreciated. We gratefully acknowledge the research grant provided by the Rotman International Centre for Pension Management (ICPM) in Toronto, Canada. We would also like to thank Keith Ambachtsheer for initiating this paper, CEM Benchmarking Inc. for providing the pension-fund database, and Ronald Mahieu and Lina Jin for assisting us with the research database. Earlier versions benefited from comments and suggestions from the ICPM research committee.

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Abstract

A direct relationship between the observed investment beliefs held by pension funds and performance measures is tested using an international sample of pension funds. Investment beliefs address strategic choices in the investment philosophy and process that affect the future performance of the fund. Data from over 600 funds between 1992 and 2006 show that the debates in the pension fund industry address the relevant issues: active management, alternatives and new, innovative strategies. The addition of these activities does not necessarily improve the overall performance of a fund, and it may eventually offset the fund's cost and net returns advantage due to its size. We find that the beliefs to which a fund adheres affect its success; the thorough consideration of the relationships between beliefs is equally important.

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1. Introduction

What makes pension funds good investors? Is it their ability to ride out storms in financial markets, their shrewdness in exploiting investment opportunities that other investors cannot emulate, or is it simply their powerful combination of diversification and low investment costs? This question is important, as the stakes are high. Pension funds constitute a major player in the asset management industry worldwide. In 2009, they managed over \$23,290 billion in the 11 largest pension markets worldwide, as compared to \$14,236 ten years earlier (Towers Watson, 2010). They have become increasingly sophisticated investors, investing in a wide range of assets and investment strategies. They are by far the largest drivers behind the rise of private equity and hedge funds. While the global financial markets were favourable for pension trustees and their investors in the 1990s, the funds have been in choppy water since 2001. After steep declines in the global stock markets and a recovery that is still uncertain, surviving in the pension-fund asset-management industry is probably one of the toughest challenges around. With millions of retirees who are at least partly dependent on the investment returns of their pension funds for the retirement outcome of their pension funds, the question of what makes pension funds good investors is highly relevant today.

Recent research suggests that it is simply is not enough to have a good organization, good staff and a well defined and embedded mission. A new line of inquiry concerns whether investment beliefs improve stakeholder governance by reducing possible conflicts of interest, and enhance the organization's ability to adapt and innovate by establishing guidelines for best practices. Each organization must formulate its own investment beliefs: a clear view of how the organization perceives that capital markets work and how the organization can add value and strive for excellence. This is the topic under investigation in this paper. We examine investment beliefs from the world's leading pension funds, providing a broad-based and coherent summary of the views that are currently prevalent in pension-fund asset management. Our research also addresses the equally important question of which investment beliefs are crucial or irrelevant for success in relation to the performance of pension funds. The purpose of our research is to help boards of trustees and pension-fund investment managers to make better investment decisions by developing a defensible set of investment beliefs. Our research aims to generate new insights by combining a practical framework of strategic drivers in the investment process with the rich dataset of the investment choices and performance of pension funds.

Our paper is organized as follows. In Section 2, we frame investment beliefs in the broader setting of pension-fund governance and review recent research. Investment beliefs matter because trustees

should be in control of their investment process, and they should be aware of the choices that they face and the consequences of their decisions.

We then discuss investment beliefs in Section 3. We link investment beliefs to major debates in the investment community; this discussion provides the framework for our empirical investigation. We review the literature and, for practical purposes, narrow the debates to six major topics: long-term investing, diversification, active versus passive management, costs, organization and innovation.

Section 4 discusses the database used for the analysis, outlines the methodology and contains an overview of the empirical results. Pension-fund data were provided by CEM Benchmarking Inc. (CEM), which collects detailed information on pension-fund performance.

We test whether a coherent set of investment beliefs translate into effective financial performance measures. Our analyses focus first on ranking portfolios according to separate investment beliefs. The second set of analyses focuses on the interaction between investment-beliefs variables and performance measures, using a fixed-effects panel data approach. We use the two-step approach to determine the potential impact of each implicit investment belief, thereafter assessing the extent to which the effect is magnified or diluted when other investment beliefs are considered simultaneously.

We present our conclusions in Section 5.

2. What makes pension funds good investors?

A relatively large body of literature underscores the important role of governance in determining the performance of pension funds (cf. Impavido, 2002, 2008). The governance of pension funds involves the managerial control of the organizations and how they are regulated, including the accountability of management and how they are supervised (Stewart and Yermo 2008). The sheer size of the pension sector makes the quality of governance a very relevant issue, given that the financial livelihood of millions of retirees worldwide depends on the outcome of these decisions. Fortunately, improving governance also leads to tangible results (Ambachtsheer et al., 1998). The basic goal of pension-fund governance is to minimize the potential agency problems that can arise between the members of a fund and those responsible for its management. Such problems have the potential to jeopardize the security of pension savings and promises. Good governance goes beyond this basic goal and aims to deliver high pension-fund performance while keeping costs low for all stakeholders. Good governance can have many positive side effects, including building trust amongst all stakeholders, reducing the need for prescriptive regulation and facilitating supervision.

In a study of a sample of large pension funds from six different countries in North America, Europe and the Asia-Pacific region, Clark and Urwin (2007) conclude that superior performance is linked to strong governance. Their study identifies several areas in which the analysed funds excelled, including clarity of mission, effective risk management and performance monitoring. The report includes both governance capacity and investment strategy in the risk profile of each fund, and it recommends linking a fund's investment strategy to the governance capability of its board. For example, boards should first decide whether they are capable of monitoring alternative investments effectively before debating whether to include such instruments in their investment strategies.

The absence of effective governance and good decision-making can create substantial opportunity costs (Ambachtsheer, Capelle and Lum 2008). Investment results that were lagging substantially behind those of peers prompted an external review of the Kentucky Retirement Systems in 2008. The \$17 billion Kentucky Retirement System and \$15.6 billion Kentucky Teachers Retirement System both performed significantly worse than did similar plans across the country, according to a report conducted for Kentucky's Governor Steve Beshear. Kentucky Retirement incurred an opportunity cost of \$1.5 billion (8% of assets) for the 10 years ending on 30 June 2008, while Kentucky Teachers incurred \$3.5 billion (22% of assets), based on the adoption of current best practices. Failing governance and a lack of insight

into developments in investment practices and policies were considered the most important factors in these losses (Kentucky Public Pension Working Group 2008).

In its report on an investigation conducted for the Dutch Ministry of Social Affairs in 2008 into the extreme losses incurred by pension funds, failures in investment governance were singled out as a major factor (Frijns et al., 2010). Trustees were not fully aware of, or did not actively question the underlying assumptions behind the investment portfolio or manage its strategies and instruments. Ambachtsheer and Ezra (1994) use the term 'implementation shortfall' to describe this situation.

Studies on governance usually focus on the design of boards. The decision-making abilities, characteristics and effectiveness of trustees have been less well researched. Clark (2006; 2007) surveyed the ability of pension-fund trustees in the UK. In a 2006 paper examining trustee competence, Clark considers the ability of trustees to solve problems relevant to their investment responsibilities. The results show that trustees are more cautious with other people's money than they are with their own. A recent study among Dutch pension trustees reveals similar results; trustees are acutely aware of managing downside risks (Van Dalen et al. 2010). The fact that trustees are not professionals has also led to concerns that trustees may lack the understanding to evaluate the advice they receive from experts. Clark (2007), meanwhile, notes growing tension between representation and expertise in several fields, using UK pension fund governance and the USA mutual fund industries as examples. The evidence suggests that very few trustees have the competence and consistency of judgment to challenge the experts who are responsible for taking complex financial decisions.

2.1 Performance differences between pension funds

In addition to the overall process of governance and the effectiveness of the trustee's decision-making process, research is also lacking into the factors on which trustees base their decisions. Questions regarding the place of strategic tenets in investment management are important, as a growing body of research has highlighted the wide disparities in pension fund performance, after correction for risks arising from the asset mixes that are chosen (Impavido, 2002, Clark and Urwin, 2007, Ambachtsheer et al., 2008). A wide range of literature discusses how to analyse the performance of organizations (cf. Verweire and Berghe, 2004). Differences in performance arise due to the main choices in how the delivery of the pension is organized, given the institutional environment. Five types of inefficiencies are identified: allocative, technical, scale, scope and X-inefficiency. Allocative inefficiency arises when a pension fund uses a costly combination of inputs to produce output. Technical inefficiency occurs when a pension fund fails to produce an efficient production frontier. Scale inefficiencies arise when a fund cannot lower average costs by increasing or decreasing its output levels. Scope efficiencies exist when an organization can lower average costs by changing its output mix. X-inefficiency describes the

resulting difference between actual and minimum costs (Leibenstein, 1966), and are an indication of slack in the organization; the fund has more employees and resources than it really needs.

Scale and scope are obviously not the only variables. For example, the Structure-Conduct-Performance (SCP) paradigm states that market performance depends on various elements of market structure, including entry conditions, market concentration and the number and size of firms. Other relevant factors include various forms of company behaviour, including capacity utilization, advertising and collusion. In many Western European countries, however, pension arrangements are compulsory and highly regulated, reducing the impact of entry conditions. In these shielded markets, discussions and research within the pension fund industry have historically focused on efficiencies of scale and scope, seeking to identify the optimal scale with which a pension fund can deliver pension services and add value.

Economies of scale are the best researched source of efficiencies or inefficiencies in the pension-fund industry. Economies of scale allow pension funds to provide the same pension product at a lower cost as its size increases. Scale also implies that, as market participants, larger pension funds have more bargaining power with external managers or counterparties than do smaller funds. It is well documented that larger funds have a significant cost advantage over smaller funds, which generally translates into a performance advantage. Ambachtsheer (2009) analyses the CEM Database and finds a log-linear relationship for the investment-management side: a ten-fold increase in the size of the assets invested by the fund is statistically associated with a drop of 17 basis points in total investment costs, expressed as a percentage of assets under management (Table 1).

	Benefit Administration	Investment
Scale range in CEM database	0.1-2 million members	\$0.1 - \$350 billion
Cost range in CEM database	\$24 - \$550 per member per year	0.05% - 1.31% assets per year
Scale impact Metric	-108, \$ change per 10fold increase	-0.17% %change per 10fold increase

Table 1: cost versus scale in pension funds. Taken from Ambachtsheer (2009)

Scale also introduces opportunities for scope. Larger pension funds can hire and retain staff to execute investment strategies (whether internally or externally) and monitor external investments. The presence of additional skills and resources, combined with the increase in bargaining power could potentially reduce the problem of asymmetrical information between pension fund and external managers. Furthermore, the set of assets invested increases substantially. A larger fund has earlier access to innovations, which further increases the choice of instruments. Alternatively, more complex strategies that might diversify the investment portfolio further are generally beyond the reach of smaller funds, due to higher entry costs, as well as the higher costs of monitoring. At the lower end, the dispersion in costs and performance is quite high. While costs are determining factors for performance, poor

investment choices are likely to be as well: a smaller fund must work with a more limited opportunity set.

In the industrial economics literature, economies of scale generally lead to the question of what is the minimum efficient scale for pension funds. Beyond a certain point, diseconomies may emerge, whereby any further increase in size will offset cost improvements due to an increase in the combination of inefficiencies (Figure 1).

For the Dutch pension fund industry, the results obtained by Bikker and De Dreu (2007) suggest that even ABP, the pension fund for government employees (which is one of the world's largest pension funds, managing over €200 billion), could achieve further economies of scale. Based on information from the worldwide CEM database, however, Ambachtsheer notes that the scale effect is not necessarily log-linear constant across the entire range of pension funds. The scale effect is more pronounced at the lower end of the size range. Larger pension funds that wish to expand further must manage three challenges:

1. There is some evidence that larger funds offset cost advantages by investing in higher-cost asset classes, such as private equity and hedge funds (Ambachtsheer, 2009). The inclusion of higher-cost asset classes raises costs. Pension funds argue that, in this case, the potential increase in net returns should be included in the analysis.
2. There is some evidence that large pension funds create market impact in specific asset classes and strategies, which limits the potential for upward performance. When a large pension fund invests in a specific small-cap strategy, it must balance the minimal size of investment (to make sense from an organizational and investment management perspective) against the negative market impact. Buying into small caps might create unwanted price effects that offset the expected net returns, which was the initial motive behind entering into small caps (Bauer and Frehen, 2008, Bauer et al., 2010).
3. Literature also identifies increasing agency costs; as funds increase in size, so do their organizations in general. The largest pension funds execute strategies internally rather than contracting them out to external managers. The interests and incentives of managers from the pension-fund delivery organization conflict with those of stakeholders with regard to such issues as the optimal size of the pension fund and the allocation of the 'free cash flows' generated by the lower costs due to size. Pension-fund managers have an incentive to expand their pension fund organization beyond its optimal size (cf. Jensen, 1986), especially when the pension-delivery organization is separate from the pension fund. Growth increases the power of managers by increasing the resources that these managers control. It is also associated with increases in the

managers' compensation, as changes in compensation are positively related to the assets under internal management.

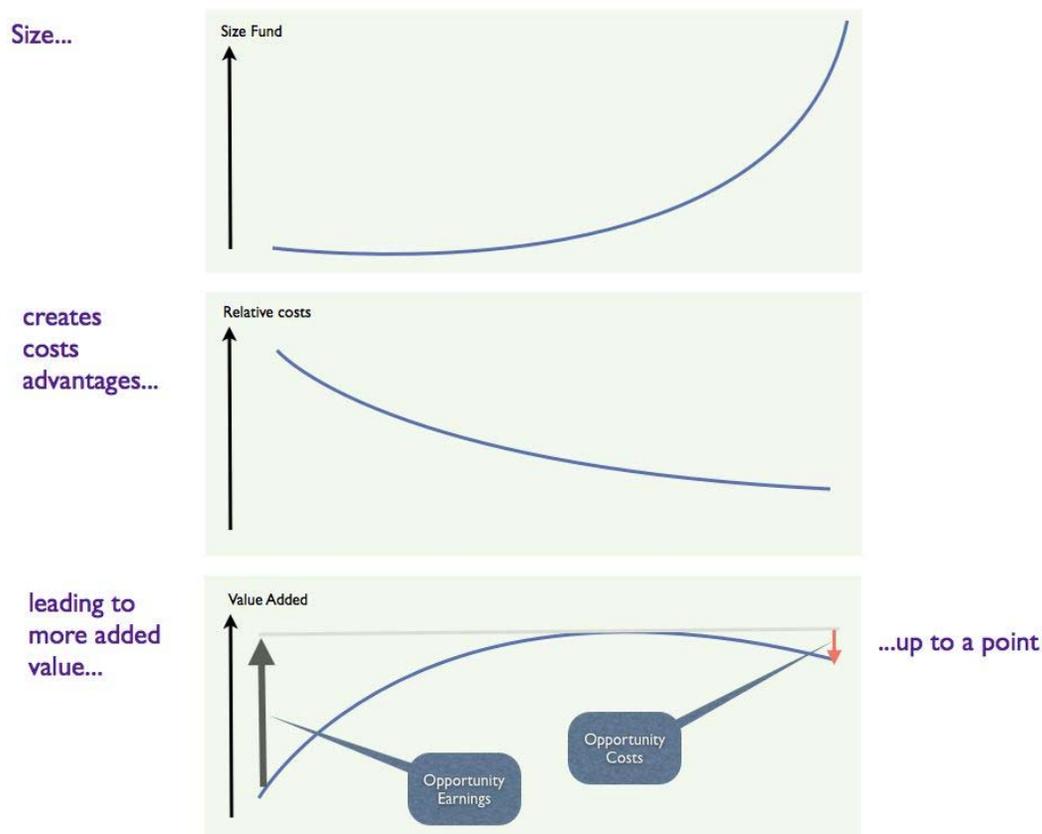


Figure 1: relationship between size, cost advantages and added value

How well these challenges are managed can be expressed as the 'X-efficiency': the resulting difference between actual and minimum costs. Correcting for such factors as size and risk, Clark and Urwin (2007) argue that the gap in performance between the best and worst-performing pension funds typically amounts to 1-2% per year. Adding the compounded interest effect reveals that differences in investment governance have a substantial financial impact over the long term.

From the perspective of pension-fund governance, it makes sense to explore which strategic investment choices have been made and why. We refer to these strategic options as investment beliefs: assumptions regarding how to view the financial markets and regarding what works best for the organization. Companies in the non-financial services sector have long been accustomed to formulating their strategic choices (realized or not) and assessing their impact, whether in terms of organizational

design or capital investment choices (Mintzberg, Quinn and Ghoshal 1995; Moore 1992). This remains an unexplored area for investment management in the pension-fund industry, despite the attention called to it by Ambachtsheer (2007) and Minahan (2006). As principals, pension funds formulate investment beliefs as an effective tool for decision making, mitigating potential information-related problems stemming from a principal-agent relationship between trustees and investors (cf. Clark and Urwin, 2007; Laboul and Yermo, 2006). Formulating effective investment beliefs benefits both small and large pension funds.

- 💡 Pension funds at the lower end of the size scale have a higher margin of error in their strategic choices. Their cost base is higher, and their ability to divest or choose managers more effectively is more limited than it is for larger funds. A pension fund must make clear choices or risk overstretching its resources, thereby creating monitoring risks.
- 💡 Large pension funds have fewer concerns about costs, but more concerns about the incentives of the pension-fund delivery organization. Size can generate incentives that may diverge from the pension fund's objectives. Investment beliefs help to manage these potential conflicts. Size also requires a clear vision on where to add value if the size of the fund leads to a market impact.

3. Investment beliefs – a framework for investing

The theory and practice of investing have developed dramatically over the past five decades; nonetheless, there is still no objective framework for considering capital markets and applying these insights for investment purposes (Lo 2005). Investment management is not a hard science like physics or chemistry; it is primarily a social science. A truly scientific theory is based on equations derived from proven laws of nature which specify how we get from point A to point B in the future (Sherden 1998). Models are based on such characteristics as mass, gravity, velocity, which can be clearly defined and precisely measured; well-specified models therefore allow for precise predictions (Gray 1997). Scientific theories and forecasts about economies and financial markets are impossible for the same reason: there are no proven natural laws underlying behaviour in social systems. Economists therefore opt for the second-best approach, constructing relative measures (for example, utility, preferences or risk tolerances) to emulate hard science (Beinhocker 2006). Although analysts may make predictions based on theories, such theories are not laws of nature; they have limited applicability, and they are difficult to establish objectively. Risk tolerance varies immensely from one individual to the next, or before and after a financial crisis.

The second difference that sets investment management and economics apart from other sciences is that, in contrast to physics or similar disciplines, it is practically impossible to test hypotheses through controlled experiments in economics and investments (Gray 1997). Few economists are keen to create a recession for the sake of research, simply to ascertain which policy measures are more effective. Economists are creative in circumventing this restriction, by gathering as much information as possible, looking for common denominators (when equities go up, *on average*, bonds do not increase in value by as much) and trying to recognize patterns. The statement, ‘The economy is experiencing the sharpest drop in production since the great Depression’ is a typical example of a pattern-recognition remark. Other economists focus on the actor, who sets processes in motion – hence the surge in behavioural finance. While general theories are almost impossible to construct, modelling structural regularities (or irregularities) in human behaviour is a promising avenue to explore, given that human behaviour has a tendency to follow long-term patterns. Nonetheless, the bottom line remains the same: it is not possible to draw general conclusions from experiments conducted in a sheltered environment. At best, these theories result in forecasts that are not much better than naïve guesses (Sherden 1998). For this reason, many debates never reach firm conclusions and continue to vex investors and trustees. Proponents of

active management have just as much ammunition in the form of anecdotal evidence or research to prove their case to sympathizers of passive management, as the other way around.

The previous discussion leads to the conclusion that improved models would not necessarily help managers and trustees. We must start by improving our understanding of the financial market, its underlying dynamics and how investors view and act within these markets. To structure this understanding, investment beliefs serve as powerful metaphors for identifying analogies and translating them into particular situations (Gray 1997). Investment beliefs accept the reality that economics and finance cannot be captured by hard, predictive models. Instead, they contain a *view* of how other participants learn (or fail to learn) on the capital market. Consider the case for active management, in which investors basically value a security by discounting the future cash flows of a security and comparing this to the current price (Minahan 2006). The trading strategy is straightforward: buy if the value is higher than the price, and sell if the value is lower than the price. In real life, the failure to do this successfully under active management is well documented. Human judgment and human behaviour stand in the way of strategies for objective valuation and trading. It is impossible to know a security's future cash flow, and there is no consensus regarding the discount rate to be applied. To make matters worse, if the security is an illiquid asset, determining the current price itself is the result of an arbitrary valuation. In addition to the failure to make an objective assessment, the dissemination of news also affects the security and creates further noise if investors hold different views, as extensively documented by behavioural finance.

The question in this regard is not *why* the market is unable to deliver a consensus on the future cash flows or the discount rate, but rather whether an investment manager has a clear view of the pricing (or mispricing) of securities and assets, and *how* the manager is able to identify and exploit any mispricing. This is the foundation for a workable investment belief.

Investment beliefs are implicit in every investment decision or strategy, but it is not common for them to be made explicit (Raymond, 2008). For example, in preparation for this study, we updated a literature and website search for investment beliefs and investment philosophies for the world's 500 largest funds, as published by Investment Pensions Europe, a website and magazine concerning pensions. We identified 40 funds that published explicit investment beliefs – a number that has not increased over recent years, despite the growing focus on governance and investments.¹ Interestingly, almost all funds affiliated with the ICPM have also published investment beliefs. Investment beliefs are vital in the development of investment policies. As such, they are an important governance instrument, reducing the governance gap (Ambachtsheer, Capelle and Lum 2008). From the perspective of governance, these

¹ Obviously, it is possible that there are funds with explicit investment beliefs that they have not published. To test this, we asked several funds at random if this was the case. Our results suggest that the publication of investment beliefs is an adequate indicator of explicit beliefs.

investment beliefs should be made explicit, documented, shared and understood by both fiduciaries and investment professionals (Ambachtsheer 2004). An investment belief system or philosophy has four main elements (Koedijk and Slager, 2007): basic beliefs, the investment theory or arguments supporting the beliefs, their translation into a workable investment strategy and the requirements for the organization to implement the beliefs successfully (Figure 2).

Basic investment beliefs are generally formulated as observations of the mechanisms of human behaviour in the financial market place; ‘Markets overreact’ is an example. Beliefs usually address the fallibility of human behaviour in some way, and they implicitly enable the asset-management organization to deal with behavioural mechanism in a more sophisticated way. The term ‘belief’ reflects the fact that there are no objective truths in the financial markets and that investors can choose to interpret observations or mechanisms in different ways.

Investment theory considers whether there is a sound basis for the investment belief. Which aspects of the mechanism cause mispricing? More importantly, is it a structural phenomenon that could be repeated in the near or distant future? Can we identify performance measures beforehand that are directly linked to this investment belief; in other words, can we verify the claim that is made here? If a mechanism is observed in the financial markets but arguments for a theoretical basis cannot be found, the investment organization risks not knowing how to design a strategy for it because it cannot predict future performance.

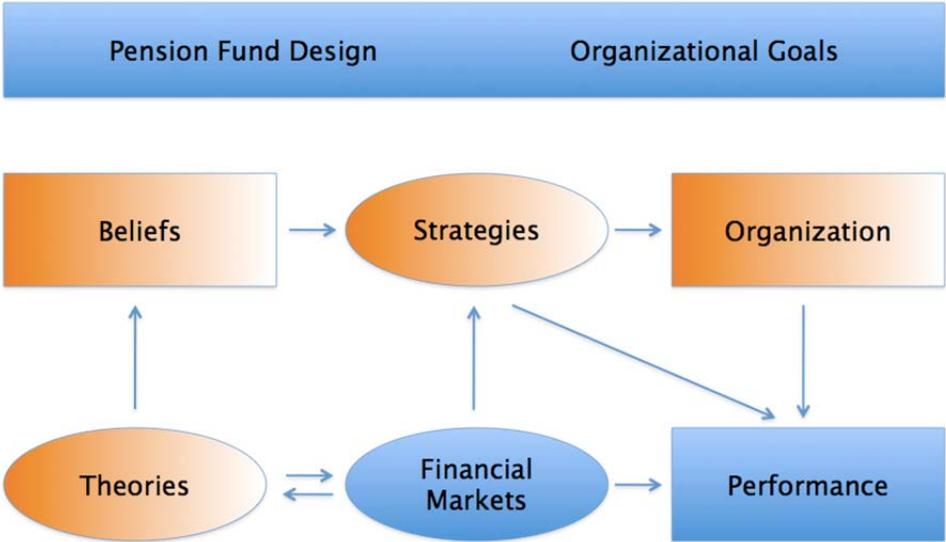


Figure 2: Framework for analysing investment beliefs

The **investment strategy** is a plan or approach that describes how the investment belief can be exploited. It specifies decisions relating to four issues: 1) the investment rules, 2) the quantitative and qualitative parameters to be applied with the investment rules, 3) the investment instruments that can be used and 4) the time horizon that applies to the rules. Investment rules can be straightforward and are usually formulated in an ‘if..., then...’ syntax: *if* an asset class appears undervalued, *then* overweight the asset in the portfolio. The question here then becomes what determines undervaluation? For example, to build upon our market overreaction example, an exploitable strategy is to sell stocks the same day after a positive news announcement and buy them the day after a negative one, and to close the positions two weeks later, when the overreaction effect has subsided.

Not surprisingly, different views, theories and investment beliefs have emerged over time about how to view the markets. Studies by Ambachtsheer (2007), and by Slager and Koedijk (2007; 2009) involve surveys of investment beliefs among pension funds. Table 2 lists the main debates.

Pension funds are, first and foremost, investors with a *long-term horizon*. Pension funds appoint investment managers whose focus is on short-horizon processes, predicting and exploiting temporary discrepancies in securities pricing, and they are zero-sum games before expenses (Ambachtsheer 2007). Pension-fund managers must inevitably be concerned with short-term returns, which are part of the benchmarking process fundamental to fiduciary duty (Clark and Hebb 2004).

The main idea is that a longer horizon allows the investor to profit more from time diversification. Longer holding periods reduce errors in the estimated returns. It is this form of reasoning that underpins Zvi Bodie’s argument that, with time diversification, ‘the riskiness of stocks diminishes with the length of an investor’s time horizon’ (Bodie 1995). Statistically, longer investment periods reduce the standard error of the estimated returns. Intuitively, by holding risky assets for long enough, investors weather the investment cycle and earn the risk premium. In theory, this period should be long enough to capture the peaks and troughs in the investment cycle, or to capture the additional returns of undervalued stocks. Thinking about investing over the cycle introduces a fallacy to trustees: the inevitability of *mean reversion* – the belief that securities revert to a long-term average trend growth. The empirical evidence for this is not strong, and it basically implies a risky bet on contrarian strategies.

When researchers take an historic view of the securities markets, several issues emerge. First, having a long investment horizon does not guarantee positive returns from riskless assets – the ‘risk premium’. There is no such thing as a long-term average returns and risk on equities, bonds or cash. This is highly dependent on timing – the choice of start and end points for the holding period are important. Time diversification provides no guarantee against losses (Fisher and Statman, 1999); stocks go down just as easily as they go up, even in the long term. The discussion is further complicated by the confusion regarding what a risk premium actually is – in other words, what should be expected from long-term

investment. Confusion arises from not distinguishing among the various concepts that the word equity premium designates (Fernandez 2009).

Debate	Pension Funds' Stylized Investment Belief
1. Long-term investing	Long holding periods allow investment in assets with higher risk premiums, notably illiquidity and equity risk, earning additional returns.
2. Diversification	Diversification is the only 'free lunch' in investment management. It should be exploited as much as possible. Larger funds can realize additional diversification advantages by adding niche, sophisticated strategies.
3. Active management	With the right skills, resources and process, an investor should be able to create excess returns with active strategies. Passive management should be the norm in markets with high management costs, limited inefficiencies to explore and difficulties in separating noise from skills.
4. Costs	Costs are certain and a drawn down on net returns. Future returns are uncertain. So any investment strategy with ex ante lower costs should deliver higher net returns in the future.
5. Organization	Pension funds can access the right skills by combining internal and external management, lowering principal-agent costs and enhancing returns.
6. Innovation	Pension funds are able to exploit the early adapter advantage when moving into new markets that other investors cannot, or only with a considerable time/cost lag (e.g. hedge funds and private equity), earning additional returns and/or achieving a more stable returns.

Table 2: Investment Beliefs. This table list main debates in pension investments. It is based on the classification of investment beliefs. The initial selection amounted to 20 different investment beliefs; we narrowed the list down using a qualitative review of subjects in practitioners' magazines (the IPE Magazine and Pension & Investments), and academic journals that are generally viewed as close to practice (Financial Analyst Journal, Journal of Portfolio management).

Diversification is another pillar of modern finance. Within a given investment universe, adding new securities to the portfolio is expected to lower systematic risk, given the targeted returns. Diversification is usually applied at different levels, both between assets (bonds vs. equities vs. real estate vs. alternatives) and within assets (region, style). How can diversification be improved? Large funds have argued that their size and deep pockets mean that they can access an ever-increasing opportunity set of strategies, expanding the investment universe and allowing them to improve their risk/return strategies further. Views on diversification have changed dramatically over recent decades. Pension funds in the 1970s were content to confine themselves to bonds and real estate – assets that were considered 'safe'. By the late 1990s, the cult of equity had taken a firm hold. Pension funds increased their equity allocations dramatically (Ellison and Jolly 2008); followers became disciples of the equity cult, placing a strong belief on the equity risk premium. This belief was challenged severely in the early 2000s. Since

then, funds increasingly added new – alternative – investments to uphold their diversification advantages (Fabozzi, Gordon and Hudson-Wilson 2005), which mitigate these risks to a large extent. However, alternative investments have also produced disappointing results in recent downturns.

Another of the perennial debates in the investment management industry focuses on *active versus passive management* and targets one of the central tenets in finance. The debate has currently produced two conclusions. First, inefficiencies abound; markets can be imperfect, and the consensus in investment research converges towards the notion that investors are more irrational than rational in interpreting and acting on information. The second conclusion centres on implementation; exploiting inefficiencies is very hard, especially when many investors are active in a liquid market. Moreover, investors who earn excess returns find it difficult to hold on to these returns in the longer term. The claim made by pension funds is that earning excess returns is well within their scope for a combination of reasons: a) they have access to markets and strategies that retail investors do not; b) they have deeper pockets and resources to select or craft the best active strategies; and c) they have a long-term horizon over which to earn the returns.

Costs form an integral part of the active/passive debate, but are also linked to other debates. Beliefs about costs are based on the premise that, all other things being equal, lower investment costs are always better than higher investment costs. Investors tend to suffer from an overconfidence bias when assessing uncertain future returns against certain costs. This tends to lead investors to incur costs that are higher than optimal. Low costs are a strategic ‘unique selling point’ for pension funds; in some countries, they are even considered a license-to-operate. In the Netherlands, the benefits of intergenerational risk sharing and lower operating and investment costs are a crucial argument in the debate (cf. Steenbeek and Van der Lecq, 2007).

How much thought (and research) has gone into the *organizational* set-up and structure of the pension plan, and how it manages internal and external managers? Our research pinpoints three choices that funds consider: whether to appoint internal managers or to outsource, and the role of investment managers as compared to the role of the investment process. Outsourcing asset management should improve investment returns, as external investment managers are likely to bring superior professional experience and skills to investment decisions within the pension plan. Moreover, contracting-out allows a retirement system to change its investment managers more rapidly in response to poor performance. A pension fund is likely to find it more difficult to oust internal managers for weak results than it would be to dismiss an outside firm for similar shortcomings. External managers may also be further removed from political pressure to select local or national companies for investment. A comparison of internally-managed pension funds with mutual funds during the late 1970s and early 1980s revealed lower risk-adjusted returns among the former, suggesting that external management has yielded superior results in the past (Berkowitz, Finney, and Logue, 1988).

Innovation is a key characteristic that many organizations place high on their list of priorities. How important is innovation to the organization? Is this innovation aimed at building a better mousetrap, fine-tuning or redesigning the investment process, or accessing new markets or strategies in order to gain first-mover advantages? Innovation satisfies a genuine demand from large institutional investors. They have the resources and the excess capacity to take on new investments; by doing so, they are able to position themselves as attractive employers (Plender 2009).

4. Analysis

4.1 Data set and Methodology

Having identified the major debates surrounding beliefs in investment management, the next step is to identify measures in the investment literature that can be directly related to these investment beliefs, and analyse the relationship between investment beliefs and the performance of pension funds worldwide. Our study adopts the view that patterns that have been realized in the past are the best indicators of an organizations' strategy (cf. Mintzberg, 1995) – outsiders can observe these realized patterns. For example, if a pension fund allocates a substantial amount in active mandates, it is reasonable to assume that the fund believes that active management pays off - it believes that it is uniquely positioned to exploit inefficiencies, either by investing itself or through its unique selection and monitoring process of external mandates.

The data for this study were provided by CEM Benchmarking Inc. (CEM), which collects detailed information on pension fund performance. The data from CEM is a unique dataset that has substantial advantages for our analysis. Each year, CEM distributes questionnaires to pension funds, requesting information on their gross performance, fund-specific benchmarks and cost breakdown. In addition, the database contains a variety of fund types: DB and DC, corporate and public funds, as well as funds from six different countries. The CEM database enables us to extract information about the investment strategies that were used and subsequently to infer the investment philosophy behind the strategy. Bauer and Frehen (2008) show convincingly that this approach generates new insights that can foster integrative thinking about how pension organizations work. The structure of the CEM database allows for an accurate evaluation of performance and persistence among several dimensions. It provides the opportunity to evaluate large and small funds, actively and passively managed mandates, and internal and external mandates over a range of asset classes (see Appendix 1 for a breakdown of the database structure used).

The panel data is unbalanced; the database covers the years 1992 to 2006, but does not include every fund in every year. Following the approach taken by Bauer and Frehen (2008), we exclude funds with less than three consecutive years of information from the database, as these cases provide no information. In three cases, funds reported consecutive information, showed a gap for at least one year, and then resumed providing information. In these cases as well, we chose to include only information from consecutive years, excluding the incidental reporting. Descriptive data are presented in Appendix

1. Table 3 and Table 4 in Appendix 1 illustrate the diversity of the database by reporting the number of funds, classified by country, size and type of pension fund.

The CEM pension-fund database contains information on fund returns, benchmarks and costs. Our analysis develops three performance measures for excess returns, risk-adjusted excess returns and risk-adjusted total returns. The formal variable construction is included in Appendix 2. Excess returns are measured as net returns, with fund-specific benchmark returns and the total costs of the fund subtracted from gross returns.

Our analysis starts at the highest fund level, incorporating all assets. Excess returns are calculated as the difference between benchmark returns, based on the benchmark portfolio weights, and on the realized portfolio returns and weights. It aggregates the performance effects of *all* active investment choices, including tactical allocation, manager selection and individual strategy implementation. The risk-adjusted excess and total returns measures focus on the portfolio construction. Does the organization combine assets and strategies to exploit inefficiencies that result in a better risk/return trade-off? The effect of superior strategic allocation and diversification strategies should be reflected in this measure to some extent. Superior strategic allocation and diversification can also be manifested through the concentration of assets.

Composition of CEM database

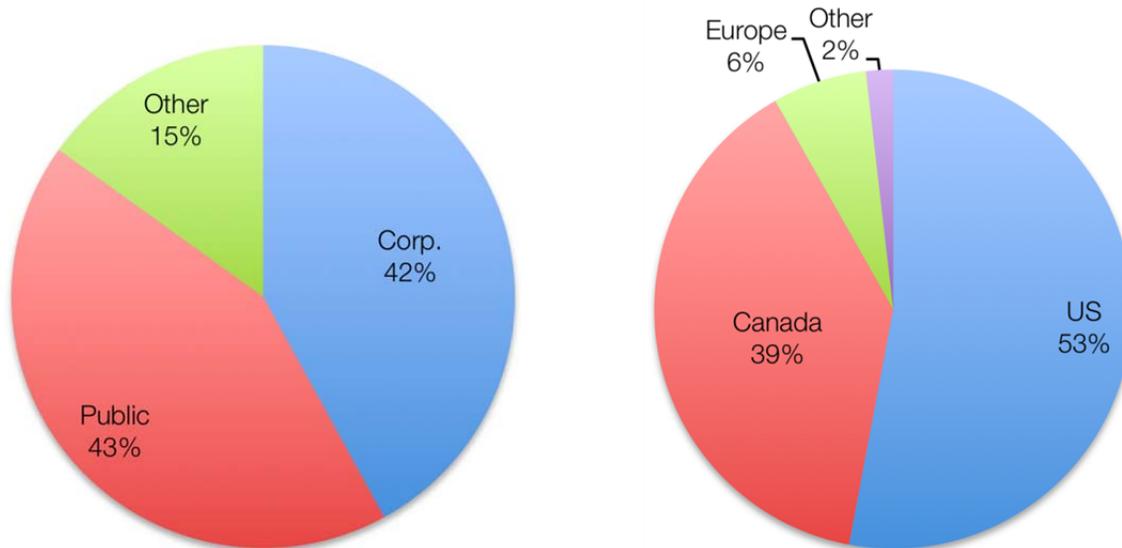
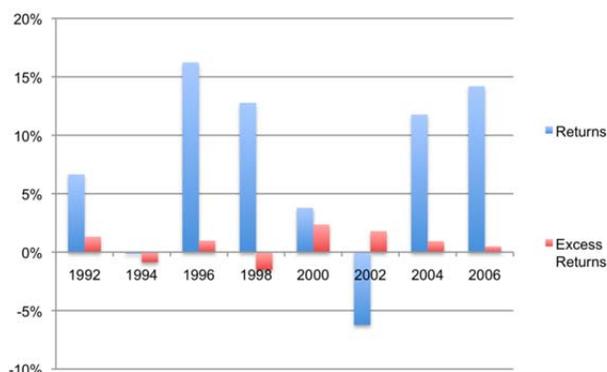


Figure 3: Distribution of pension funds in the CEM Database for region and type of fund (Figures for 2006).

Returns and Excess Returns



Return/risk ratio

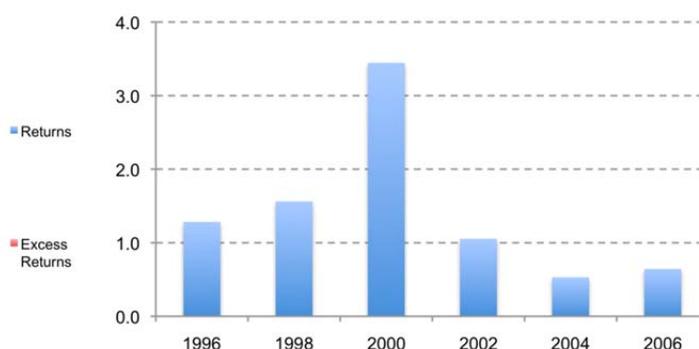


Figure 4: Development of returns, excess returns and return/risk ratio, for two-year periods between 1992 and 2006.

Investment Belief Variables

We now focus on proxies for asset diversification, investment style and costs (Tables 10 through 14 in Appendix 1). Diversifying over assets is a form of risk diversification that can be easily observed. If a fund acknowledges that diversification is crucial, assets are more likely to be allocated over different asset categories. Overall concentration tends to be lower, decreasing systematic risk. We measure **asset diversification** using the Herfindahl index, the sum of squared asset allocation weights for a portfolio, ranging from close to zero (relatively diversified) to one (highly undiversified). Diversification between the main asset categories has not changed substantially since the mid 1990s; within assets, funds have diversified further (for example, equities have expanded to include private equity; real estate has expanded to include infrastructure).

The interaction of the **illiquidity premium** and the **long-term horizon** is captured by the percentage of illiquid and real assets in the total portfolio. The major gamble within portfolios remains the equity-risk premium, increasing from 51% to 60% of asset allocation. The liquidity premium (from real estate, alternative assets) has increased in weight to an average of 8%. Interest-rate risk from fixed income has decreased gradually, as has holding cash.

The CEM database contains indicators for whether asset categories are managed **actively** or **passively**. We constructed active/passive indicators for the following asset classes: equity, fixed income, real assets and alternative assets. Table 12 in Appendix 1 shows the percentage of active mandates for equities, fixed income and equities, and fixed income combined for the total sample. Active management combines enhanced indexing with a more volatile active management strategy. Overall, the pension-fund database shows that pension funds consistently selected active mandates over passive mandates. Funds had a stable exposure to active mandates throughout the 1990s and 2000s (for example 81% for

equities in 2006, and 81% fixed income). For the active management belief, the consensus suggests that active management adds value.

The CEM database also contains indicators for whether asset categories are managed **internally or externally**. We constructed internally managed indicators for equity and fixed income for the main asset classes. Most funds manage their assets externally; the median for equities and fixed income for internally managed assets is zero.

We selected the total **cost**, measured in basis points, from the CEM database. Yearly figures were used in this case as well. Costs include management fees, administrative costs and other operational costs. The expense ratio reflects the competences of the organization: whether the organization has a clear view of its cost base and procurement process; which activities are kept inside, and which are outsourced. Median costs decreased during the 1990s to a low of 30 basis points in 2000, after which they increased to 35. This coincides with the shift towards alternative assets and real estate.

Methodology

We use a two-step approach to determine the potential impact of each implicit investment belief and subsequently how much of the effect is enhanced or diluted when other investment beliefs are considered simultaneously.

Our analysis focuses first on determining the isolated relationship of investment-beliefs variables and performance measures – ranking portfolios for separate investment beliefs. We sorted the pension funds in the CEM database into a number of portfolios. The sorting was performed according to a number of variables pertaining to ‘Investment Beliefs’. The value-weighted performance of the portfolio was subsequently measured and analysed. Our method was inspired by the portfolio construction methods of Fama and French (1992). We divided the individual pension funds into N equally sized portfolios. Many empirical equity market studies involve the construction of decile ($N=10$) portfolios. Given the limited number of pension funds available in the CEM database, we used periods of three and seven years. The sorting variable is one of the investment-beliefs variables (*in other words*, univariate sorts). For any year t in our sample (1990-2006), we constructed N portfolios.

For each portfolio, we investigated the performance over a future period. The performance measures we used were the five-year excess returns over the benchmark and the five-year Sharpe ratio. We computed the average returns and the standard deviation, both value-weighted, on these performance measures. In order to test for significant differences in the performance of the highest and lowest decile portfolios, we performed standard t -tests. Where multi-period performance measures were available, we tested whether the assumption of independence of returns could be rejected. Using a simple autocorrelation test, none of the cases allowed us to reject the null hypothesis of no independence. We computed the average returns and the standard deviation, both value-weighted, for these performance

measures. In order to test for significant differences in the performance of the highest and lowest decile portfolios, we performed standard t -tests.

An examination of the effects of investment-beliefs variables in isolation raised the valid question of how the interaction between the investment-beliefs variables takes shape. The second type of analysis uses a fixed-effects OLS panel-data model to study the relationships between the performance measures (dependent variables) and the investment beliefs (independent variables). All of our results are based on fixed-effects panel-regression models. For cases in which the dependent variable was constructed using information from more than one year, we added autoregressive terms in order to correct the regression equations for overlapping data samples. The overlapping samples produce inefficient parameter estimates, which could result in biases in subsequent hypothesis-testing procedures (see for example Hansen and Hodrick 1980).

4.2 Results

Ranked portfolio results

Tables 3 and 4 show the returns for portfolios ranked by investment-beliefs variables; we analyse the five-year excess returns over the benchmark, as well as the five-year Sharpe ratio.

	Costs		Size		Diversification		Alternatives		Equities		Illiquidity		Internal Man.		Active Man.	
Ranked Portfolio	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev
1	0.0040	0.0017	0.0040	0.0087	0.0046	0.0027	0.0027	0.0023	0.0034	0.0025	0.0030	0.0030	0.0016	0.0030	0.0056	0.0035
2	0.0064	0.0054	0.0053	0.0035	0.0052	0.0050	0.0042	0.0035	0.0061	0.0040	0.0046	0.0051	0.0043	0.0052	0.0045	0.0029
3	0.0071	0.0043	0.0050	0.0025	0.0053	0.0035	0.0063	0.0036	0.0052	0.0047	0.0062	0.0024	0.0059	0.0022	0.0032	0.0040
T-test (p-value)	3.2033	0.0094	0.4963	0.6304	0.8632	0.4082	3.9832	0.0026	1.1523	0.2760	3.4879	0.0058	8.6399	0.0000	-2.1927	0.0531
Ranked Portfolio	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev
1	0.0036	0.0017	0.0046	0.0085	0.0031	0.0058	-0.0038	0.0077	0.0021	0.0031	0.0028	0.0047	0.0029	0.0050	0.0057	0.0052
2	0.0057	0.0034	0.0036	0.0101	0.0067	0.0042	0.0039	0.0041	0.0060	0.0061	0.0050	0.0043	0.0025	0.0041	0.0047	0.0030
3	0.0029	0.0095	0.0034	0.0077	0.0015	0.0053	0.0074	0.0052	0.0029	0.0054	0.0029	0.0041	0.0040	0.0061	0.0065	0.0038
4	0.0056	0.0052	0.0056	0.0046	0.0062	0.0056	0.0020	0.0035	0.0070	0.0051	0.0033	0.0064	0.0041	0.0048	0.0064	0.0042
5	0.0091	0.0053	0.0050	0.0028	0.0059	0.0047	0.0074	0.0040	0.0064	0.0070	0.0061	0.0038	0.0049	0.0058	0.0002	0.0040
6	0.0048	0.0045	0.0039	0.0032	0.0052	0.0043	0.0073	0.0037	0.0053	0.0056	0.0072	0.0029	0.0079	0.0033	0.0029	0.0040
7	0.0099	0.0059	0.0052	0.0026	0.0032	0.0034	0.0046	0.0051	0.0061	0.0041	0.0042	0.0059	0.0043	0.0026	0.0058	0.0068
T-test (p-value)	3.7097	0.0040	0.3049	0.7667	0.0639	0.9503	2.6892	0.0227	2.4296	0.0355	0.8109	0.4363	1.0317	0.3265	0.0961	0.9253

Table 3: Average five-year excess returns for ranked portfolios of funds in the CEM database: 1992-2006. At the end of each year $t-1$, pension funds are assigned to three and seven portfolios using ranked values of Costs, Size, Diversification, Alternatives, Equities and Illiquidity variables. We compute equal-weighted returns on the portfolios for year t using all surviving funds. The Student's t -test of difference of means is used to test the significance of the difference between the first and last decile portfolio.

	Costs		Size		Diversification		Alternatives		Equities		Illiquidity		Internal Man.		Active Man.	
Ranked Portfolio	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev
1	1.4463	1.1901	1.6310	0.9813	1.4882	1.1662	1.3457	0.9736	1.5010	1.1666	1.3362	1.0351	1.3411	1.0779	1.4393	1.1896
2	1.4993	1.1221	1.4850	1.0508	1.4813	1.2032	1.4408	1.1220	1.4577	1.1362	1.4973	1.1814	1.4642	1.1421	1.4905	1.1846
3	1.4499	1.1768	1.4487	1.1899	1.3520	1.0962	1.5194	1.2659	1.4047	1.1940	1.4848	1.2207	1.4779	1.2005	1.4417	1.0521
T-test (p-value)	0.2951	0.7739	-2.0196	0.0710	-2.8971	0.0159	1.8277	0.0975	-3.1618	0.0101	2.3991	0.0374	2.9118	0.0155	0.0476	0.9629
Ranked Portfolio	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev	Average	Std.dev
1	1.4310	1.2190	1.6976	1.0591	1.5515	1.2775	1.3556	0.8005	1.5633	1.2537	1.2834	1.0415	1.3804	0.9548	1.4048	1.1991
2	1.4543	1.1162	1.6038	0.9723	1.4469	1.0871	1.3119	1.0926	1.5251	1.1451	1.3888	0.8976	1.4164	1.2330	1.4938	1.2116
3	1.4817	1.0475	1.6166	1.1026	1.4828	1.1490	1.4481	0.8948	1.4348	1.0813	1.5268	1.1472	1.5201	1.2796	1.4763	1.1607
4	1.5604	1.2230	1.4940	1.1033	1.5140	1.2741	1.4368	1.2147	1.4421	1.1336	1.4964	1.1420	1.4527	1.1076	1.5025	1.1457
5	1.4311	1.0728	1.4221	1.0248	1.4372	1.2377	1.4891	1.1769	1.4631	1.1588	1.4633	1.1611	1.4740	1.2439	1.4354	1.1527
6	1.4735	1.3012	1.4715	1.1260	1.3776	1.1529	1.5170	1.2671	1.4039	1.0949	1.5157	1.2865	1.4306	1.1545	1.6629	1.3296
7	1.4900	1.2274	1.4452	1.2070	1.2369	0.9087	1.5273	1.2915	1.4902	1.5435	1.4929	1.1697	1.5180	1.2517	1.3745	0.9812
T-test (p-value)	2.4224	0.0359	-2.1642	0.0557	-1.9430	0.0807	0.9307	0.3740	-0.5039	0.6253	4.6784	0.0009	1.2693	0.2331	-0.4043	0.6945

Table 4: Average five-year return/risk ratios for ranked portfolios of funds in the CEM database: 1992-2006. At the end of each year $t-1$, pension funds are assigned to three and seven portfolios using ranked values of Costs, Size, Diversification, Alternatives, Equities and Illiquidity variables. We compute equal-weighted returns on the portfolios for year t using all surviving funds. The Student's t -test of difference of means is used to test the significance of the difference between the first and last decile portfolio.

An increase in costs in Table 3 is positively related to five-year excess returns. This was to be expected. Based on the correlations (not reported here), costs are positively related to the share of illiquid strategies and the employment of active strategies. Because illiquidity and active management are expected to yield additional risk premiums, the net returns should improve. In Table 4, the five-year return/risk trade-off improves for costs as well, although less than might be expected based on the cost increase. This result can probably be explained by the underlying drivers of costs: illiquidity is positively related to the return-risk ratio, but the share of active management is not.

Some variables increase excess returns, as well as the Sharpe ratio: the share of equities, the share of illiquid investments and the share of internal investments. The share of equities and the share of illiquid investments are classic return-risk trade-offs in the long-term horizon framework: risk premiums that the funds aim to earn. The positive relationships between the share of internal investments in the total portfolio, excess returns and return-risk ratios suggest that internal management cuts both ways – it effectively lowers costs, increasing net returns. The second effect is probably more intangible: managing internal mandates provides the knowledge needed to monitor external mandates effectively and to improve the principal-agent relationship.

Diversification emerges where it was expected, in the return-risk trade-off. Higher portfolio diversification (indicating a lower variable value) is associated with a higher return-risk ratio. The share of active management increases five-year excess returns, but it does not improve the return-risk ratio. In other words, pension funds are not rewarded for the additional risk beyond the expected returns that might be expected in the form of a linear function (the security market line).

Finally, and in contrast, size improves neither excess returns nor the risk-return relationship. This is somewhat surprising, given that expected positive effects should feed through several channels in the design and process of investment, creating a more sophisticated investment policy (see for example de Dreu and Bikker 2009). From the outset, larger funds have the resources to employ more innovative strategies, to earn more excess returns due to first mover advantages and to lower systematic risk better than smaller funds do, due to their increased opportunity set for diversification. Their bargaining size also allows them to secure lower costs when negotiating external mandates or transactions. Our results suggest effects that might offset economies of scale to some extent – larger funds are able to lower their costs, although their size causes them to increase their use of cost-intensive strategies, thereby offsetting potential improvements in return-risk relationships.

Panel data results

The results for ranked portfolios highlight the relevance of the investment-beliefs variables in relation to performance measures; the next step is to delve deeper into the relationship between the investment variables. Table 5 presents the major results, using a fixed-effects panel-regression model. Excess returns capture the sum of allocation and selection decisions, both within and between assets. Once again, asset diversification is positively related to excess returns – more concentrated portfolios tend to report higher excess returns. The percentage of illiquid assets also plays a positive role – higher weights in illiquid assets (private equity, real estate, infrastructure etc.) are associated with higher levels of excess returns. On the one hand, this appears to be good news. In their role as financial intermediaries, pension funds are specially equipped to take on long-term assets in order to earn the liquidity and illiquidity premiums that other investors do not earn. This interpretation, however, should not be stretched too far. Almost by definition, managers have difficulty finding the right benchmark for illiquid assets. This raises the question of whether our results have captured a skill (creating excess returns relative to a difficult benchmark) or an agency problem (cleverly choosing the right benchmark to increase the odds for excess returns).

Costs do not play a significant role, which seems to make sense. In the process of making the decision to take active positions in their portfolios, funds make trade-offs between costs, net returns and risk. Before the fact, higher costs should be related to higher gross returns, and not net returns.

Dependent Variable Variable	Excess Return		Excess Return, Risk Adjusted		Return/Risk Ratio	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
Constant	-0.2022	0.0091 **	-0.0563	0.8022	2.1650	0.1293
Asset Diversification	0.3794	0.0048 **	0.3677	0.3551	1.5055	0.5519
% Active Managed	0.0046	0.8516	0.1185	0.2480	-1.0988	0.2172
% Internally Managed	0.0677	0.0503	0.0547	0.4851	0.5655	0.4254
% Illiquid Assets	1.0556	0.0269 *	1.4391	0.2980	-11.5387	0.2046
Costs	-0.0002	0.6135	-0.0031	0.0163 *	-0.0142	0.0240 *
Dummy - Corporate Funds	0.0096	0.5683	0.0338	0.5660	-0.2233	0.5099
Dummy - Public Funds	0.0056	0.7330	-0.0663	0.2742	0.2743	0.5425
Dummy -Equity Exposure						
Dummy - US Region						
AR(1)	0.8367	0.0000 **	0.2100	0.0000 **	0.2639	0.0000 **
AR(2)	-0.0049	0.9194	-0.0936	0.0027 **	-0.1090	0.0001 **
AR(3)	0.0558	0.2863	-0.1077	0.0002 **	-0.1494	0.0000 **
AR(4)	-0.2230	0.0000 **	0.0347	0.2334	-0.1475	0.0000 **
Adjusted R-squared	0.6707		0.0943		0.3812	
Durbin-Watson	2.1621		1.9792		2.4153	
F-statistic	144.8795 **		8.3549 **		3.4932 **	

Table 5: Panel data estimation results for returns, excess returns and return-risk ratios for five-year periods between 1992 and 2006. * denotes p value < 0.10; ** denotes p value < 0.05. Autoregressive terms (AR(1) through AR(4)) are added to correct the regression equations for overlapping data samples.

Another question related to excess returns involves whether managers earn excess returns by increasing the total risk of their portfolio (alpha as ‘closet beta’), or whether excess returns are earned by exploiting inefficiencies, thereby creating additional returns with the same risk profile. In the first case, excess returns should be highly correlated to the returns, while correlations should be absent in the latter case. We find low correlations between returns and excess returns, suggesting that excess returns are not earned by simply ‘leveraging’ the underlying portfolio.

The final two estimation results presented in Table 5 focus on risk-adjusted returns. In addition to the risk-adjusted returns used in the ranked portfolio analysis, we also calculate the ratio of five-year average excess returns to the standard deviation of excess returns, yielding an information ratio measure in addition to the existing Sharpe ratio. On a risk-adjusted basis, however, costs do matter for total returns and for excess returns. This suggests that strategies with higher costs do not affect net returns, although they do increase risk. If it were known in advance that an investment decision would produce this combination (higher costs – same net returns – higher risk), few funds would adopt such a strategy. Explanations might be that the organization *overestimates* the ex-ante net returns, or *underestimates* the risk attached to higher cost strategies.

5. Discussion and concluding comments

From the perspective of pension-fund governance, it makes sense to explore which strategic investment choices have been made and why. We refer to these strategic options as investment beliefs: assumptions regarding how to view the financial markets and regarding what works best for the organization. As principals, pension funds can formulate investment beliefs as an effective tool for decision-making, thereby mitigating potential informational problems that stem from the principal-agent relationship between trustees and investors. The effectiveness of formulating investment beliefs benefits both small and large pension funds. Smaller pension funds at the lower end of the size scale have a higher margin of error in their strategic choices. A pension fund must make clear choices or risk overstressing its resources, creating monitoring risks. Large pension funds have fewer concerns about costs, but more concerns about the incentives of the pension-fund delivery organization. Size can generate incentives that might diverge from the pension fund's objectives. Investment beliefs help to manage these potential conflicts. Size also requires a clear vision on where to add value if the size of the fund leads to a market impact.

Investment beliefs echo the major debates in investment management, ranging from active versus passive management to the effectiveness of embedding innovative strategies in the investment portfolio. In general, investment beliefs are implicit in every investment decision or strategy, although few investors announce their beliefs and strategies publicly. Our research contributes to uncovering these beliefs by adopting the view that patterns that have been realized in the past are the best indicators of the strategies of organizations; outsiders can observe these realized patterns.

Which investment beliefs are crucial or irrelevant to success when investment beliefs are linked to the performance of a pension fund? We test whether a coherent set of investment beliefs translates into effective financial performance measures. Our approach combines a framework for investment beliefs with the uniquely rich information on pension funds that the database has accumulated over time. The data on DB pension funds were provided by CEM Benchmarking Inc., which collects detailed information on pension fund performance.

Debate	Pension Funds Stylized Investment Belief	Trends	Empirical Analysis
1. Long-term investing	Long holding periods allow investments in assets with higher risk premiums, notably illiquidity and equity risk, thus earning additional returns.	The major gamble within portfolios remains the equity-risk premium, increasing from 51% to 60% asset allocation. Liquidity premiums (from real estate, alternative assets) have increased in weight to an average 8%. Interest-rate risk from fixed income has decreased gradually, as has holding cash.	Equity risk is a main driver for the difference in total returns; the percentage of illiquid and alternative assets has explanatory power as well, although it has no effect on a risk-adjusted basis.
2. Diversification	Diversification is the only free lunch in investment management. It should be exploited as much as possible. Larger funds can realize additional diversification advantages by adding niche, sophisticated strategies.	Diversification between main asset categories has not changed substantially between assets since the mid 1990s; within assets funds have diversified further.	Increased portfolio diversification (in the highest asset-class level) is associated with higher return-risk ratios.
3. Active management	With the right skills, resources and process, an investor should be able to create excess returns with active strategies. Passive management should be the norm in markets with high management costs, limited inefficiencies to explore and difficulties in separating noise from skills.	Funds held a stable exposure to active mandates in the 1990s and 2000s.	Overall, funds tend to earn positive excess returns, but not on a risk-adjusted basis.
4. Costs	Costs are certain and drawn down on net returns. Because future returns are uncertain, any investment strategy with ex ante lower costs should deliver higher net returns in the future.	Median costs decreased in the 1990s to a low of 30 basis points in 2000; since then, they have increased to 35. This coincides with the shift towards alternative assets and real estate.	Costs play an important part in explaining total returns and risk-adjusted returns. Higher costs lead to lower returns. There is no such relationship for excess returns.
5. Organization	Pension funds can access the right skills by combining internal and external management, lowering principal/agent costs and enhancing returns.	Most funds manage their assets externally; the increase is mainly on an asset-weighted basis, suggesting that larger funds have increased their share of internal management	Internally managed portfolios have a positive impact on returns and return-risk trade-offs.
6. Innovation	Pension funds are able to exploit the early-adaptor advantage when moving into new markets that other investors cannot enter, or which they can enter only at a considerable time/cost lag (e.g. hedge funds and private equity). This allows pension funds to earn additional returns and/or achieve more stable returns.	New alternative assets were to the portfolio by an increasing number of funds in the 1990s	The percentage of illiquid and alternative assets increases excess returns and costs, although it has no effect on the return-risk profile. We find no evidence of first-mover advantages into new assets.

Table 6: Summary of main findings

We used a two-step approach to determine the potential impact of each implicit investment belief, and then how much of the effect is enhanced or diluted when other investment beliefs are considered simultaneously. Our analysis focused first on determining isolated relationship of investment-beliefs variables and performance measures, ranking portfolios for separate investment beliefs. We sorted the pension funds in the CEM database into a number of portfolios. The sorting was performed according to a number of variables pertaining to investment beliefs. The value-weighted performance of the portfolio was subsequently measured and analysed. The second group of analyses focused on the interaction between the investment-beliefs variables and performance measures, using a fixed-effects panel-data approach. The combined results are presented in Table 6.

The following picture emerges:

- 💡 Pension funds do tend to earn excess returns, either through asset allocation decisions or through manager selection. Excess returns improve when funds increase their share of internal management, which lowers costs. However, a fund's return-risk trade-off does not improve with excess returns, suggesting that it is due more to market exposure than it is to the selection and exploitation of skills
- 💡 Greater size allows funds to operate more cost effectively and take on more varied assets in order to diversify effectively. Moreover, larger funds have the resources to invest in innovative new strategies, thereby earning first-mover advantages. We expected size to be a major influence in the analysis and therefore embedded it as a control variable. Our results show that larger funds are able to lower their costs, although their size causes them to increase their use of cost-intensive strategies, thereby offsetting potential improvements in return-risk relationships.
- 💡 Due to their long-term horizon and the general absence of short-term liquidity constraints, pension funds are better able than other participants are to invest in illiquid investments (e.g. real estate) and/or alternative investments (e.g. private equity and infrastructure, commodities), and they are better equipped to earn an illiquidity premium. Nonetheless, investing in these asset classes does not improve the overall return-risk relationship.
- 💡 The positive relationships between the share of internal investments in the total portfolio, excess returns and the return-risk ratio suggest that internal management cuts both ways: it effectively lowers costs, but increases net returns. The second effect is probably more intangible; the management of internal mandates provides the knowledge needed to monitor external mandates effectively and to improve the principal-agent relationship.
- 💡 Diversification is manifested in the return-risk trade-off. Greater portfolio diversification is associated with higher return-risk ratios. Diversification by adding more alternative strategies, however, apparently offsets the return-risk improvement.

- From our analysis, it is unclear whether innovation as a belief adds value. In our study, we interpreted innovation as adding new strategies to the portfolio, earning first-mover advantages and gaining from the most common sources (e.g. diversification, return-risk trade-off). Both indirect approaches (working with such variables as size, alternatives, illiquidity) and direct approaches (working with innovation dispersion measures) yielded indeterminate results.

A number of interrelationships that are not addressed in our research are important in assessing the overall role and impact of investment governance on the performance of pension funds. First, the process of developing and considering investment beliefs may be just as important as the actual investment beliefs. Further research into this line of enquiry may yield additional results. Several authors (Ambachtsheer 2007; Ambachtsheer et al., 2008) and in-depth studies of investment organizations have shown the importance of balancing the governance of the investment process, the quality of the decision-making process and the composition of decision-making boards (Ellis 1993; Swensen 2000). The outcome of our research process is a necessary step to take before the composition of the board can be determined in the investment beliefs analysis. Determining which debates matter in pension-fund investing, and how they interact, is of equal importance in determining the composition of the board (cf. Harper, 2008) and its governance, as it helps to specify the skill set that needed from trustees. A follow-up study on the role of board composition and the investment committee in the investment process would be worthwhile.

A related question of equal importance that deserves to be investigated in more detail involves the relationship with the external advisor or fiduciary manager. For example, are investment consultants leading or following in transferring their investment beliefs onto the pension-fund organization? External advisors fill an important gap in governance, particularly in the case of smaller funds, and they have the ability to play a significant role in shaping a fund's investment policy.²

Finally, we base our research approach on realized strategies. The underlying assumption is that patterns from the past are the best indicators of an organization's strategy; these measures can be observed by outsiders, and they reflect the intentions of the organization. Nonetheless, the chance of false positives or false negatives remains. Funds that hold strong positive beliefs about active management may not realize excess returns, and funds that do realize excess returns may have negative or no views on active management. After 2008, funds have become increasingly disgruntled with the results of alternative investments and active mandates. Why? Asset managers are responsible, but so are funds and trustees who have poorly developed systems of investment beliefs. Having earned

² Towers Watson is one of the investment consultants with published investment beliefs (Towers Watson, 2010).

positive returns in the past, a fund may mistake realized returns for a tested and proven, well considered skill or belief that serves as the foundation for these returns. Given the limited number of funds that have taken the effort to develop and publish investment beliefs, this result suggests that funds have ample room within in their investment processes for improvement in developing, implementing and adapting beliefs that matter.³

³ Due to anonymity of the underlying data, we were unable to analyse whether funds with published investment beliefs showed better results than did funds that did not publish investment beliefs. As an alternative, we used data from a previous study, in which we linked performance measures with funds that published investment beliefs (Koedijk and Slager, 2007), and we performed several means-differences tests with the CEM database. Funds with published investment beliefs realize better return-risk ratios, although this result is merely indicative and must be researched more thoroughly.

Appendix 1: Descriptive statistics

	1992	1994	1996	1998	2000	2002	2004	2006
Corporate	91	143	160	147	129	118	122	92
Public	29	66	82	91	108	109	110	94
Other	16	28	28	30	33	34	36	33
Total	136	237	270	268	270	261	268	219
US	66	146	167	160	157	151	159	116
Canada	70	88	97	100	97	92	89	85
Europe	0	3	6	8	14	15	16	14
Other	0	0	0	0	2	3	4	4
Total	136	237	270	268	270	261	268	219

Table 7: Characteristics CEM database – nr of firms in sample

		1992	1994	1996	1998	2000	2002	2004	2006
Total	Minimum	28	20	23.0	24	52	48	59	98
	25% Percentile	411	417	488	645	810	782	1,304	1,677
	Median	960	957	1,147	1,634	2,228	2,071	3,081	3,915
	75% Percentile	3,484	2,848	3,475	5,412.5	7,355	7,179	8,714	12,334
	Maximum	70,158	78,634	101,935	139,930	167,867	142,563	208,950	249,362
	Total	706,911	1,004,071	1,404,513	1,823,596	2,578,438	2,315,881	3,080,658	3,583,226
Type	Corporate	2,452	2,871	3,266	4,012	4,958	4,927	5,640	7,135
	Public	14,620	8,399	10,055	12,517	16,244	14,362	19,042	27,332
	Other	3,733	1,397	2,048	3,156	5,590	4,967	7,967	10,833
Region	US	8,688	5,499	6,753	9,266	12,403	11,018	12,574	17,740
	Canada	1,906	1,762	2,104	2,463	2,971	2,702	4,346	7,238
	Europe	NA	15,357	12,094	11,823	24,191	26,408	41,207	61,283
	Other	NA	NA	NA	NA	2,137	2,459	8,793	13,049

Table 8: Distribution of assets, in millions (US dollars)

		1992	1994	1996	1998	2000	2002	2004	2006
Returns	Minimum	0.0228	-0.0585	0.0000	-0.0244	-0.0898	-0.1801	0.0000	0.0000
	Median	0.0665	-0.0004	0.1623	0.1278	0.0379	-0.0622	0.1177	0.1420
	Average	0.0660	-0.0010	0.1580	0.1261	0.0424	-0.0599	0.1178	0.1357
	Maximum	0.1299	0.0498	0.2473	0.2650	0.3174	0.2483	0.2572	0.2037
	Std.Dev.	0.0181	0.0160	0.0387	0.0450	0.0561	0.0411	0.0267	0.0298
Excess Returns	Minimum	-0.0314	-0.0541	-0.1867	-0.1978	-0.0729	-0.1153	-0.1292	-0.1165
	Median	0.0132	-0.0086	0.0099	-0.0151	0.0236	0.0180	0.0094	0.0049
	Maximum	0.1125	0.0508	0.1072	0.0688	0.2493	0.2996	0.0871	0.0604
	Average	0.0133	-0.0074	0.0070	-0.0208	0.0313	0.0203	0.0058	0.0002
	Std.Dev.	0.0204	0.0182	0.0307	0.0407	0.0433	0.0316	0.0270	0.0218
Risk-Adjusted Returns	Minimum	-	-	0.7593	0.9720	0.9672	0.4287	0.0442	0.0414
	Median	-	-	1.2827	1.5610	3.4458	1.0533	0.5302	0.6444
	Average	-	-	1.2853	1.5411	3.4505	1.1560	0.6666	0.7482
	Maximum	-	-	1.6814	2.0616	8.3638	3.5112	3.5134	2.9349

Table 9: Descriptive statistics for dependent variables

	1992	1994	1996	1998	2000	2002	2004	2006
Asset Allocation								
Equities	51.3%	53.8%	57.7%	59.0%	59.8%	57.2%	60.6%	59.1%
Fixed Income	37.7%	35.8%	33.5%	33.5%	32.3%	34.3%	30.9%	30.6%
Real Estate	4.1%	3.6%	3.3%	3.0%	3.3%	4.0%	3.7%	4.5%
Cash	3.8%	3.5%	2.8%	2.2%	1.7%	1.4%	1.4%	1.5%
Alternatives	3.1%	3.4%	2.7%	2.2%	2.9%	2.9%	3.3%	4.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Diversification								
Min	0.29	0.30	0.30	0.32	0.32	0.30	0.28	0.27
Median	0.44	0.46	0.48	0.49	0.48	0.47	0.49	0.48
Average	0.45	0.47	0.48	0.49	0.49	0.47	0.49	0.47
Max	1.00	1.00	1.00	0.83	1.00	0.66	0.71	0.66
Std.Dev	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.08

Table 10: Asset allocation and asset diversification variable, calculated as the sum of the squared asset allocation weights, ranging from close to zero (highly diversified) to one (highly undiversified). The major asset allocation decision remains the equity weight, increasing from 51% to 60% asset allocation. Real estate and alternative assets have increased in weight; whereas fixed income has decreased gradually. Funds have diversified further since the 1990s.

	1992	1994	1996	1998	2000	2002	2004	2006
Min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Median	0.0163	0.0130	0.0114	0.0089	0.0113	0.0126	0.0137	0.0171
Average	0.0205	0.0200	0.0170	0.0146	0.0180	0.0203	0.0202	0.0259
Max	0.0917	0.1799	0.1755	0.1527	0.2409	0.1919	0.1266	0.1989
Std.Dev.	0.0203	0.0240	0.0212	0.0181	0.0249	0.0248	0.0231	0.0303

Table 11: Descriptive statistics for the illiquid assets variable, representing the combined share of illiquid and real assets (i.e. real estate, Infrastructure, private equity, hedge funds and commodities)

		1992	1994	1996	1998	2000	2002	2004	2006
Equity	25% Percentile	0.68	0.70	0.65	0.60	0.54	0.57	0.60	0.65
	Median	0.96	0.93	0.87	0.82	0.77	0.75	0.79	0.81
	Mean	0.81	0.81	0.79	0.76	0.72	0.72	0.75	0.78
	75% Percentile	1.00	1.00	1.00	1.00	0.99	0.92	1.00	1.00
Fixed Income	25% Percentile	0.89	1.00	0.83	0.75	0.67	0.67	0.67	0.67
	Median	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Mean	0.86	0.90	0.86	0.84	0.80	0.80	0.81	0.81
	75% Percentile	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Combined	25% Percentile	0.69	0.78	0.70	0.66	0.63	0.62	0.62	0.67
	Median	0.94	0.93	0.88	0.84	0.78	0.79	0.80	0.83
	Mean	0.83	0.85	0.81	0.79	0.74	0.75	0.76	0.79
	75% Percentile	1.00	1.00	1.00	1.00	0.94	0.92	0.97	0.95

Table 12: Descriptive statistics for active management. The table shows the share of active-management strategies for equities, fixed income and the combination of fixed income and equities. Funds have held a stable exposure to active strategies in the 1990s and 2000s.

		1992	1994	1996	1998	2000	2002	2004	2006
Equity	25% Percentile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mean	0.15	0.10	0.10	0.09	0.10	0.11	0.10	0.12
	75% Percentile	0.18	0.04	0.02	0.00	0.01	0.04	0.00	0.00
Fixed Income	25% Percentile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mean	0.27	0.21	0.21	0.19	0.21	0.21	0.18	0.21
	75% Percentile	0.64	0.20	0.18	0.04	0.21	0.20	0.08	0.19
Combined	25% Percentile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mean	0.22	0.15	0.15	0.13	0.14	0.15	0.13	0.15
	75% Percentile	0.44	0.13	0.15	0.13	0.14	0.14	0.08	0.12

Table 13: Descriptive statistics for internal management. The table shows the share of internally managed strategies for equities, fixed income and the combination of fixed income and equities. Most funds manage their assets externally. Weighted by assets, the share of internally managed strategies increased further, suggesting that mainly larger funds have increase their share of internal management

	1992	1994	1996	1998	2000	2002	2004	2006
Min	1.62	1.61	1.78	1.40	2.13	2.98	2.01	3.74
25%	20.17	22.66	22.87	21.77	21.03	23.42	24.22	26.41
Median	40.98	35.81	34.67	33.38	29.56	32.25	32.82	35.19
75%	44.17	50.89	48.06	44.53	42.62	45.13	47.80	47.49
Max	98.63	108.45	135.58	132.05	119.46	133.47	150.05	190.49
Average	34.21	37.63	36.69	33.84	32.82	35.14	37.04	40.98
Std.Dev.	17.74	18.74	18.74	16.99	17.33	17.66	18.97	23.97

Table 14: Costs in basis points; average total assets. Median costs decreased in the 1990s to 30 basis points in 2000, and increased since then to 35 in 2006. This coincides with the shift towards (more cost intensive) alternative assets and real estate.

Appendix 2: Data and Variables

Data structure

In line with Bauer and Frehen (2008), the data structure has five aggregation levels.

Level 1: Total Fund: DB Public. DB Corporate. DB Other. DC

Level 2: Asset Class

Equities: Home. Foreign. Emerging Markets. Global

Fixed Income: Home. Foreign. Emerging Markets. Global. (Credit +High Yield+Mortgages). Inflation Linked

Cash

Real Estate: Real Estate. REIT. Infrastructure. Other

Alternative Investments: TAA. Commodities. PE. Hedge funds. Non-public Equity

Level 3: Passive - Active

Level 4: Internal – External

Level 5: Holdings. returns. benchmark returns and costs.

Costs per aggregated asset class

Includes Total Direct Investment Management Costs + Overlays; Total

Oversight/Custodial/Audit/Consulting/Other

Variables

Excess returns are measured annually as net returns, and they are computed as $R - BMR - C$ with R denoting gross returns, BMR the fund-specific benchmark returns and C the total costs of the fund, including direct investment, oversight, custody and trustee fees, audits and other costs.

The risk-adjusted total returns performance (PRR) is calculated as the average gross returns on a fund

divided by the standard deviation: $RR_j = \frac{avg(R_{jt})}{std(R_{jt})}$, with R_{jt} the returns on the portfolio of pension fund

j in year t : $R_{jt} = \sum_{k=1}^K w_{kjt} R_{kjt}$. The weights w_{kjt} are calculated from the average holdings: $w_{kjt} = \frac{X_{kjt}}{\sum_{k=1}^K X_{kjt}}$.

Asset diversification is represented by the Herfindahl index, the sum of squared asset allocation weights for a portfolio, which ranges from close to zero (relatively diversified) to one (highly undiversified). Let w_{kjt} ($k=1.....K$) be the weight of an asset category in the total portfolio. These figures are calculated from the average holdings to the different assets. Weights are calculated on the following $K=5$ asset classes: Equity, Bonds, Cash, Real estate and Alternatives. The Herfindahl index is calculated for all pension funds

$j=1.....N$ and all time years as follows: $H_{jt} = \sum_{k=1}^K w_{kjt}^2$. The index ranges between $1/K$ and 1, with a higher index indicating a higher concentration. The interaction of **illiquidity premium** and **long-term horizon** is

captured by the percentage of illiquid and real assets in the total portfolio: $L_{kjt} = w_{ai,jt} + w_{re,jt}$ with the asset indications ai and re representing alternative and real assets, respectively.

References

- Ambachtsheer, K. and D. Ezra, 1994, *Pension Fund Excellence*. Wiley. New York.
- Ambachtsheer, K., R. Capelle, and Scheibelbut, 1998, "Improving Pension Fund Performance," *Financial Analysts Journal* 15-21.
- Ambachtsheer, K., 2004, "Should (could) you manage your fund like Harvard or Ontario Teachers?," *The Ambachtsheer Letter*.
- Ambachtsheer, K., 2007. *Pension Revolution. A Solution to the Pensions Crisis*. JohnWiley & Sons.
- Ambachtsheer, K., R. Capelle, and H. Lum, 2008, "The Pension Governance Deficit: Still With Us," *Rotman International Journal of Pension Management* 1, 14-21.
- Ambachtsheer, K., 2009, *Scale in Pension Fund Management: Does it Matter?*, *The Ambachtsheer Letter* #280, KPA Advisory Services Ltd., Toronto.
- Bauer, R. and R. G. Frehen. 2008, "The Performance of US Pension Funds", Available at SSRN.
- Bauer, R, Cremers, M. and Frehen, R. G. P., 2010, "Pension Fund Performance and Costs: Small is Beautiful" (April 30, 2010). Available at SSRN: <http://ssrn.com/abstract=965388>
- Beinhocker, E. D., 2006. *The origin of wealth: evolution, Complexity, and the radical remaking of economics*. Harvard Business Press.
- Berkowitz, S. A., L. D. Finney, and D. E. Logue, 1988, *The investment performance of corporate pension plans*, Quorum Books, New York.
- Bikker, J. A. and J. De Dreu. 2007. " Operating costs of pension funds: the impact of scale. governance. and plan design.", *Journal of Pension Economics and Finance*.
- Bodie, Z., 1995. "On the Risk of Stocks in the Long Run." *Financial Analysts Journal* 18-22.
- Clark, G. L., E. Caerlewy-Smith. and J. C. Marshall. 2006. "Pension fund trustee competence: decision making in problems relevant to investment practice", *Journal of Pension Economics and Finance* 91-110
- Clark, G. L., E. Caerlewy-Smith. and J. C. Marshall, 2007. "The consistency of UK pension fund trustee decision-making." *Journal of Pension Economics and Finance* 6. 67-86.
- Clark, G. L. and T. Hebb. 2004. "Pension Fund Corporate Engagement: The Fifth Stage of Capitalism." *Relations industrielles* 59. 142-171.
- Clark, G. L., and R. Urwin, 2008. "Best-practice pension fund management.," *Journal of Asset Management* 9, 2-21.

De Dreu. J. and J. Bikker, 2009. "Pension fund sophistication and investment policy". Working paper No. 211/2009, De Nederlandsche Bank. Amsterdam.

Ellis. C. D., 1993. *Investment Policy. How to Win the Loser's Game*. Irwin Professional Publishing. Chicago.

Ellison. R. and A. Jolly. 2008. *The pension trustee's investment guide*. Thorogood Publishing Ltd. London.

Fabozzi. F. J., J. N. Gordon. and S. Hudson-Wilson. 2005. "Why Real Estate?" *The Journal of Portfolio Management* 12-27.

Fama. E. F. and K. R. French. 1992. "The Cross-Section of Expected Stock Returns." *Journal of Finance* 47. 427-465.

Fernandez. P., 2009. "The Equity Premium in 100 Textbooks." Available at SSRN: <http://ssrn.com/abstract=1148373>.

Fisher. K. L. and M. Statman. 1999. "A behavioral framework for time diversification." *Financial Analysts Journal* 55. 88-97.

Frijns, J. M. G., J. A. Nijssen, and L. J. R. Scholtens, 2010, *Pensioen: "Onzekere zekerheid"*, Commissie Beleggingsbeleid en Risicobeheer,, Eindhoven – 's-Gravenhage – Winsum.
Gray. J., 1997, "Overquantification." *Financial Analysts Journal* 53. 5-12.

Hansen. L. P.. and R. J. Hodrick. 1980. "Forward Exchange Rates as Optimal Predictors of Future Spot Rates: An Econometric Analysis." *Journal of Political Economy* 88. 829-853.

Harper, J. T., 2008, "Public Sector Pension Governance in the United States: Up to the Task?," *Rotman International Journal of Pension Management* 1, 22-28.

Impavido. G., 2002, "On the Governance of Public Pension Fund Management". SSRN eLibrary. SSRN.

Impavido, G., 2008, "Governance of Public Pension Plans: The Importance of Residual Claimants," in J. Piggott, M. Orszag, and J. Evanns, eds, *Pension Fund Governance: A Global Perspective On Financial Regulation.*, Edward Elgar Publishing.

Jensen, M. C., 1986, "Agency Costs of Free Cash flow, Corporate Finance, and Takeovers," *American Economic Review* 76, 323-329.

Kentucky Public Pension Working Group, 2008, *Strategic Investment and Governance Review; Final Recommendations* Hammond Associates. St. Louis.

Koedijk, C. G., and A.M.H. Slager, 2009, "Do Institutional Investors Have Sensible Investment Beliefs?," *Rotman International Journal of Pension Management*, Vol. 2, No. 1, 2009.

Leibenstein, H., 1966, "Allocative Efficiency vs. "X-Efficiency"," *The American Economic Review* 56, 293-415.

Lo. A.W., 2005. "Reconciling efficient markets with behavioural finance: the adaptive markets hypothesis." *Journal of Investment Consulting* 7. 21-44.

- Minahan, J. R.. 2006. "The Role of Investment Philosophy in Evaluating Investment Managers: A Consultant's Perspective on Distinguishing Alpha from Noise." *The Journal of Business* 6-11.
- Mintzberg, H., J. B. Quinn, and S. Ghoshal. 1995. *The strategy process (European edition.)*. Prentice Hall International (UK) Limited. Hemel Hempstead.
- Moore, J. I.. 1992. *Writers on strategy and strategic management (2)*. Penguin Books Ltd. London.
- Plender, J., 2009. *Originative Sin*. *Financial Times*, January 5 2009.
- Raymond, D., 2008. *Investment Beliefs*. in Fabozzi (ed.). *Handbook of Finance: Investment Management and Financial Management*. John Wiley & Sons.
- Sherden, W. A.. 1998. *The Fortune Sellers*. John Wiley & Sons. Inc.. New York.
- Slager, A. M. H.. and K. Koedijk. 2007. "Investment beliefs." *Journal of Portfolio Management* 77-84.
- Steenbeek, O. W.. and S. G. van der Lecq (Eds.). 2007. *Costs and Benefits of Collective Pension Systems*. Springer Verlag.
- Stewart, F. and J. Yermo, 2008, *Pension Fund Governance: Challenges and Potential Solutions*. Working Papers on Insurance and Private Pensions. No. 18. OECD publishing.
- Swensen, D. F., 2000, *Pioneering Portfolio Management – An Unconventional Approach to Institutional Investing*. The Free Press. New York.
- Van Dalen, H. P., K. Henkens, K. Koedijk, and A. Slager, 2010, *Decision Making in the Pension Fund Board Room: An Experiment With Dutch Pension Fund Trustees.*, CentER Discussion Paper, Tilburg.
- Towers Watson. 2010, *2010 Global Pension Assets Study*.
- Verweire, K., and L. Berghe, 2004, *Integrated performance management: a guide to strategy implementation*, Sage.