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Risk Management in Finnish Pension Funds: A Survey¹

ABSTRACT

We present results from a survey of risk management practices at 20 Finnish corporate pension funds. The funds surveyed have a total of 8.1 billion euros of assets under management. 54% of this wealth is allocated to fixed income instruments, 29% to equity, 15% to real estate, and 1% to other investments such as private equity. The funds have implemented many of the guidelines presented by the Risk Standards Working Group (1996), but there remains substantial need for improvement in areas such as risk-adjusting returns, stress testing, and external review.

¹ This report is based on a survey that was carried out at Helsinki School of Economics in Spring 2002 as a part of the course 'Advanced risk management (28E300)'. We thank all 62 students who participated in collecting material for the survey. Folke Bergström (The Association of Pension Foundations) and Risto Veijola (Stradea Consulting) kindly helped us in preparing the questions. An anonymous referee, Matti Keloharju, Samuli Knüpfer, Tommi Walther, and the participants of the research seminar at the University of Oulu provided helpful comments. We also wish to thank all the pension institutions surveyed and are particularly delighted that all the selected pension institutions decided to take part in the survey.

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1. INTRODUCTION

Pension fund risk management currently attracts large interest, largely because of the demise of Enron's pension fund. Nearly \$1 billion were wiped out of the fund due to its excessive position in the company's own stock. This spectacular risk management failure has even prompted the US Congress to draft a bill entitled "The Employee Abuse Prevention Act of 2002". (The Economist, 2002). Now more than ever, an investigation into pension fund risk management practices seems very much in the public interest.

What constitutes adequate risk management? Many in the asset management industry have long realized that risk management practices require codification. The Risk Standards Working Group set out in 1996 to create a set of best practice standards for institutional investment managers and institutional investors. The result was a document entitled "Risk Standards for Institutional Investment Managers and Institutional Investors" (1996). For a contemporary description, see also Bensman (1996). These guidelines consist of 20 Risk Standards (Appendix I) that a prudent institutional investor should fulfill. The Risk Standards are grouped into three categories: management of risk, measurement of risk and oversight requirements.

The Working Group noted that few, if any, institutional investors had implemented all of the Risk Standards at the time of their publishing. Very little, however, is known about the subsequent implementation of the Risk Standards. Some preliminary empirical results for U.S. companies were reported in Capital Market Advisors (1997). This study applies the Risk Standards in the Finnish pension institution market. An analysis of Finnish pension funds, is not only important from a national point of view, but also provides an interesting comparison to earlier U.S. results. In addition to the direct risk management questions we also cover some general investment policy issues².

Earlier literature relating to pension fund risk management is relatively limited. Bodie (1988) examines pension fund investment policy in the defined contribution versus defined benefit framework. Bodie and co-authors have numerous other papers studying aspects of the US pensions systems. Other relevant papers include Shah (1997) on the optimal regulation of private pension funds and Thaler and Benartzi (2002) on behavioral approaches to increasing employee savings rates in company pension plans.

Papke (1991) provides data on asset allocation of private pension plans. He finds that the average single employer defined benefit plan holds about 50% in fixed income instruments

² It has been noted by the Finnish Association of Pension Foundations (1996) that pension foundations may be more profitable than pension insurance companies, with respect to both the investment returns achieved and the proportion of these returns obtained by the employer. However, this calls for an adept investment policy and an operating environment that is comparable to that of the other pension institutions.

and 20% in equities. More recent data on US pension fund allocation and risk management is provided in a survey by Capital Market Advisors (1997). Their results are compared and contrasted to ours in relevant sections of this paper.

The 20 funds we study have a total of 8.1 billion euros capital under management. 54% of this amount is allocated to fixed income instruments, 29% to equity, 15% to real estate, and 1% to other investments such as private equity and hedge funds. Many of the Risk Standards proposed by the Risk Standards Working Group (1996) have been well implemented. For example, all funds surveyed have a proper set of investment guidelines approved by their board.

In many other areas of risk management, however, Finnish pension funds present an unfavorable contrast to US survey data. Additional work remains to be done in such diverse areas as risk measurement, historical and stress testing, and external oversight. It is particularly surprising to note that most funds do not use risk-adjusted return measures and that a few do not even measure their risk level in any quantitative way.

The rest of this paper is organized as follows. Section 2 describes the methodology used in the survey as well as some general characteristics of the data. The subsequent sections are organized in accordance with the Risk Standards Working Group guideline, in that section 3 covers the issues in the management of risk, section 4 the measurement of risk, and section 5 the oversight required. Section 6 concludes.

2. METHODOLOGY AND DATA

The survey was carried out in February – March 2002. The questionnaire presented to the respondents is shown as Appendix 2. A total of 20 corporate pension funds were identified as the target population of the survey. 62 students, working in teams of three or four, interviewed 19 pension funds. One of the authors interviewed the twentieth institution. We are particularly grateful that all 20 institutions approached chose to respond to the study.

The respondents were all directly responsible for investment activities, although their titles differed: they worked under such diverse headings as CEO (3), CFO (1), investment manager (1), fund manager (6), trustee (2), risk manager (1), treasurer (2), payments manager (1) or administrative officer (1). Two companies chose not to disclose the respondent.

Technically, 16 of the institutions interviewed were independent pension foundations or trusts ("eläkesäätiö"), while two were incorporated as savings co-operatives ("eläkekassa") and two as special insurance companies ("eläkelaitos"). All 20 are linked to particular companies and as such resemble US defined benefit pension funds. For simplicity, all of these institutions are referred to as 'pension funds' in this study. In Finland, large and established companies often tend to have their own pension funds for historical reasons, while smaller companies

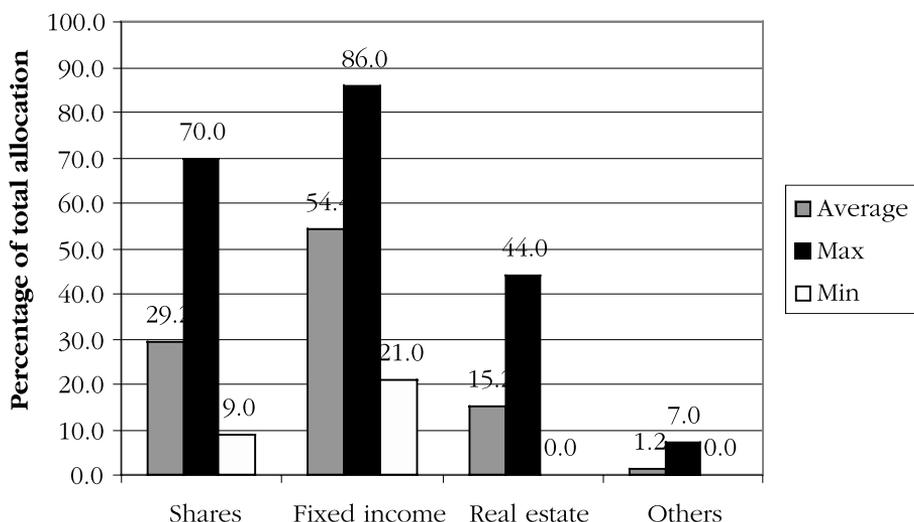


FIGURE 1. Descriptive statistics on fund allocation.

The figure shows statistics on the equally weighted average of asset allocation of the 20 funds in the study, as well as maximum and minimum allocations in each major asset class. The group 'Others' denotes assets such as hedge funds and private equity.

insure their employees through larger outside insurance companies. The larger insurance companies participating in the government scheme are excluded from this study.

The 20 funds in this study had total assets under management of 8.1 billion Euros³ at the time of the interview. Accordingly, the results provide a comprehensive picture of current risk management practices in the Finnish pension fund market.

Some basic facts about the size and allocation of assets under management started off the survey. The average assets under management were 407 million euros, while individual funds ranged from 60 million to 800 million euros.

On an equally weighted basis, the funds surveyed allocated 54.4% to fixed income instruments, 29.2% to equity, 15.2% to real estate, and 1.2% to other investments (see Figure 1). The group 'other investments' includes private equity and hedge funds. On a value weighted basis, the allocation was 50.6% to fixed income instruments, 32.2% to equity, 15.9% to real estate, and 1.3% to other investments. The range spanned by the answers was included 21–86% for fixed income, 9–70% for equity, 0–44% for real estate, and 0–7% for the group 'other

³ At the end of 2001 there were total 8.3 billion Euros invested in Finnish pension foundations, 3.5 billion Euros in pension funds and 9.7 billion Euros in special pension insurance companies (www.tela.fi).

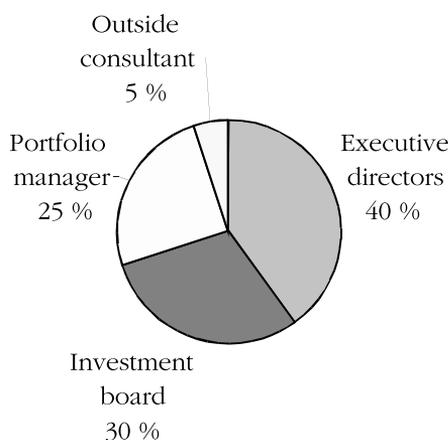


FIGURE 2. Preparation of investment policy.
 Answers to the question 'Who has prepared the investment policy of your pension fund?' for the 20 funds surveyed.

investments'. Larger funds invested slightly more into equity and real estate and slightly less to fixed income instruments, although the respective correlations are not statistically significant at conventional levels. Only 25% of funds have any investments in hedge funds or private equity funds.

3. MANAGEMENT OF RISK

All the funds have a written investment policy which has been accepted by the board of the pension fund. This is as it should be, since a written investment policy is required by Finnish law⁴. Capital Market Advisors (1997) suggested that most but not all US institutional investors had such a written investment policy in 1997.

The answers for the question 'Who has prepared the investment policy?', presented in Figure 2, are relatively varied. One reason is simply terminology (it seems that e.g. terms 'portfolio manager', 'fund manager', 'executive director' and 'trustee' were used interchangeably). Some funds have a specific 'investment board' (or 'committee'), while some are calling the somewhat corresponding organ more loosely as 'executive directors'. Interestingly, only half of the funds have an organizational chart (or a corresponding list of all responsibilities) that specifies the responsibilities of each individual and key roles. The corresponding survey in the US suggested that 3 out of 4 institutional investors employ organizational charts and another 15 percent plan to do so.

⁴ Eläkesäätölaaki 47a §.

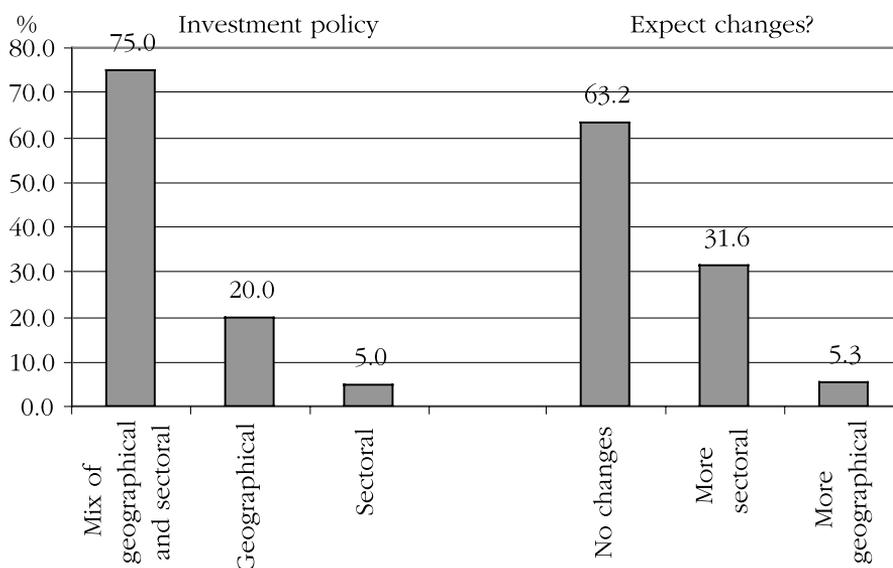


FIGURE 3. Diversification approach.

Answers to the questions 'Is your equity investment policy based on Geographical diversification, Sectoral diversification or Mix of these two?' and 'Do you expect changes in this in the next two years?' for the 20 funds surveyed.

As shown in Figure 3, the equity investment philosophy of the funds is mostly based on a mix of geographical and sectoral diversification. Most of the funds do not expect changes with this respect but it is worth noticing that 30 percent of the funds expect the sectoral dimension to become more important within the next two years.

On average, the pension funds surveyed have made 2.7 discretionary portfolio management contracts with external portfolio managers (excluding mutual fund managers). Five (out of 20) do not employ discretionary portfolio managers. The maximum number of external portfolio managers was 10 for one pension fund. The contracts are mostly defined as full mandates with some specific limits (e.g. 'Finnish equity', 'Euro-zone fixed income'). Larger funds and funds with high equity allocations tend to use external managers more frequently: the bivariate Pearson correlations with the number of external managers are significant at the 5% and 1% level, respectively.

Pension fund managers employ 8.2 mutual funds on average. The maximum number of mutual funds is 25 at one pension fund. The exact number of mutual funds may not be in the hands of pension fund managers because fund investments can also be made under discretionary asset management contracts. Some pension funds restrict the use of balanced funds because of higher management fees and lack of transparency. Mutual funds are most com-

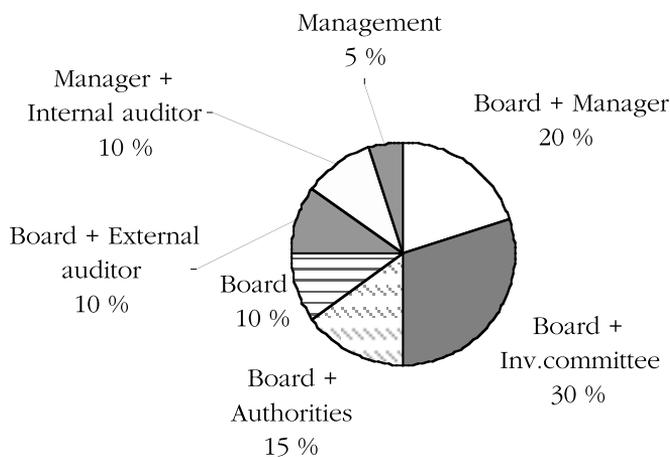


FIGURE 4. Monitoring responsibility.

Answers to the question 'Who is responsible for monitoring that the actions taken in the market are in line with your investment policy?' for the 20 funds surveyed.

monly used in fixed income and foreign equity markets. In 13 out of 20 pension funds the investment policy allows short term hedging⁵.

The next question relates to the organ responsible for monitoring that the actions taken in the market are in line with the investment policy. The answers obtained differ widely. Results are shown in Figure 4. The board is responsible for the monitoring function in 30% of the pension funds. Also other solutions exist. Some pension funds consider internal and external auditors their most important monitoring functions as to the actions fund makes in the market.

As pointed out by the referee, this discussion leaves some questions as to what extent managers see risk management as outsourced to mutual funds. Outsourcing to outside mutual funds may involve an implicit assumption that officially monitored mutual funds are committed to a particular set of risk standards themselves. This may be worth further investigation.

Six out of 20 pension funds have some kind of a formal back up and recovery plans for major physical disaster or for systems, communications and power failures. A couple of funds referred to external portfolio managers whose task it is to take care of these kind of risks. Some of the funds, especially smaller ones, were more concerned about personnel changes at least in short term.

Figure 5 reports different risk factors according to their importance, as estimated by the respondents on a scale of 1 to 8 (1 = most important). Equity price risk is clearly the most

⁵ A representative answer for the hedging question is: 'In theory we are allowed to use short term hedging but since pension funds are long term investors we do not take the risk to burn money in short term hedging because the timing of such hedges is always uncertain'.

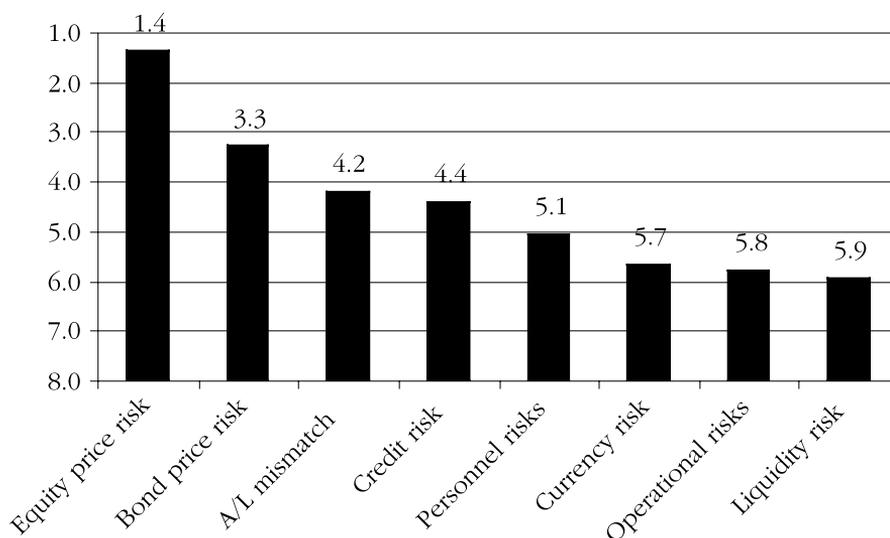


FIGURE 5. Perception of major risks.

Average of answers to the question 'What are the major risks you face?' on a scale of 1 to 8, where 1 = most important, 8 = least important.

important for almost all funds. 13 funds report it as being their most important risk, while a further six funds consider it their second most important risk. Bond price risk gets eight mentions as either the most important or second most important risk, followed by asset/liability mismatch, with seven mentions as one of the two most important risks. Currency, operational and liquidity risks are considered much less crucial by most of the pension fund managers.

The risk limits set vary widely from fund to fund. Some funds have minimum and maximum weights for each asset class, some funds have sector limits for equity investments and duration limits for fixed income, while a few funds have policies that restricts investments in bonds with certain rating.

4. MEASUREMENT OF RISK

Nine pension funds estimate the value of their equity and fixed income portfolio daily while 11 are satisfied with a monthly valuation. More illiquid asset classes such as real estate are typically valued once a year. Private equity or venture capital investments are also valued on an infrequent basis. Worzala et al. (2000) provide further discussion of the risk and return perceptions of institutional investors and their potential estimation biases.

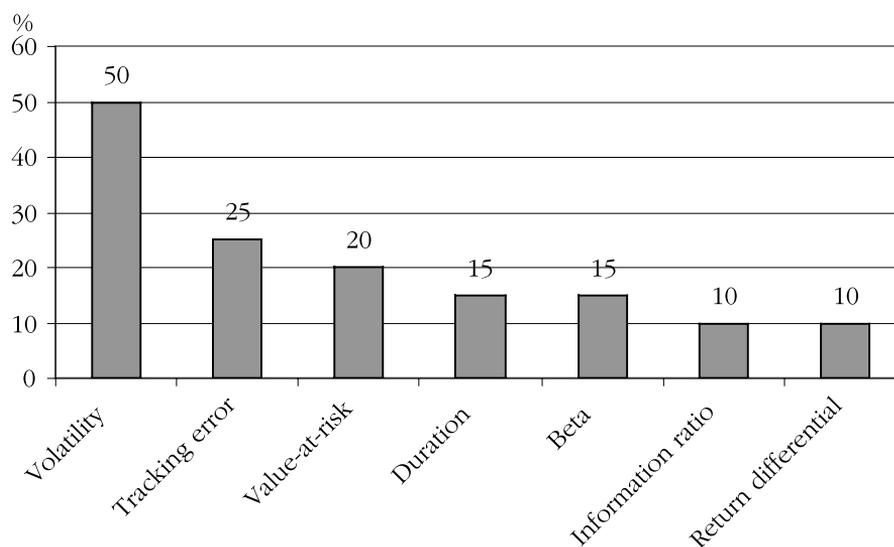


FIGURE 6. Risk measurement.

Answers to the question 'How are the risks of your portfolio measured (volatility, beta, tracking error, VAR)?' for the 20 funds surveyed. The funds could name several measures.

Figure 6 shows the percentage of pension funds that follow different risk measures.⁶ Funds were allowed to name several measures. Four funds do not follow the risk of total portfolio with any measure. Portfolio volatility is calculated by half of the pension funds, tracking error by one quarter of the pension funds. Four funds calculate value-at-risk measures. With respect to the previous question on valuation frequency, it is worth noting that volatility and VaR calculations are problematic for funds that do not even calculate the value of their fund on a daily basis. For a wider discussion of the use of VaR models by institutional investors, see Simons (2000).

One fund used only the risk measure required by the national Insurance Inspection (Vakuutusvalvontavirasto) and described in detail in decree (1282/1999) on risk limits (Vakavaraisuusasetus). This decree groups investments into seven risk categories, each of which is given a theoretical volatility and cross-correlations in the calculation of maximum "theoretical volatility".

⁶ As pointed out by the referee, this question does not take into account whether managers calculate risk measures themselves or whether they simply rely on reports by mutual funds.

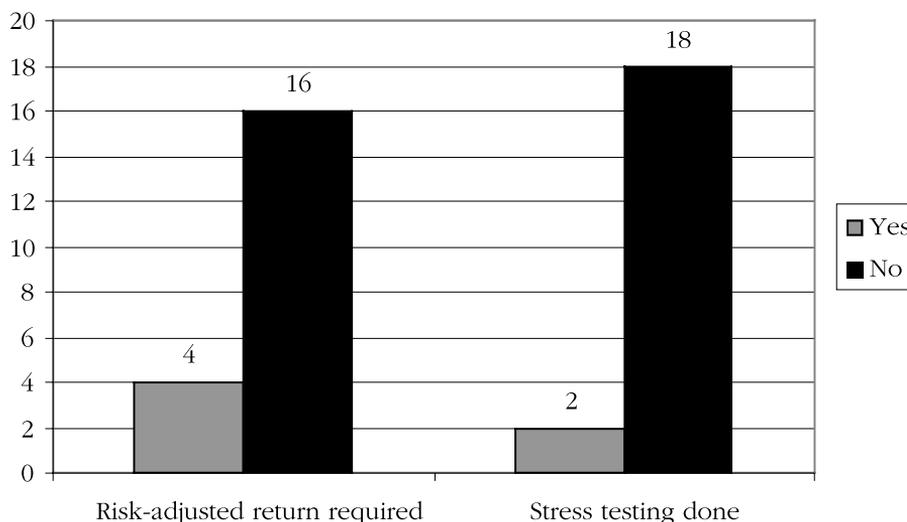


FIGURE 7. Risk adjustment and stress testing.

Answers to the questions 'Do you require risk-adjusted returns reported from your external portfolio managers?' and 'Do you test your portfolios' behavior under various, even unusual market conditions?' for the 20 funds surveyed.

Figure 7 reports a summary of two separate questions. Funds were asked whether they require risk-adjusted returns reported from their external portfolio managers. Only 20% of the funds require risk-adjusted returns. All of these are among the larger funds in the survey. This sounds surprisingly low, but is actually equal to the US figures reported by Capital Market Advisors (1997). However, 47 percent of the US institutions planned to do ask for risk-adjusted returns in the future.

An even smaller fraction of pension funds is making regular stress tests. A few of funds also carry out scenario calculations occasionally. One would have expected that after such a difficult year as 2001 these kinds of calculations would have become more common.

5. OVERSIGHT REQUIRED

The frequency at which portfolio performance is assessed varies widely. Most funds follow monthly portfolio performance, while others only analyze past performance once a year or once every two years. All funds using external portfolio managers, however, meet them several times a year to discuss issues of investment strategy and performance.

60 percent of the pension funds pay only fixed fees to external asset managers. Two funds use success fees. The remaining funds use fixed fee except in the case of hedge fund invest-

ments. Only one pension fund regularly employs an independent party to review the soundness of valuation methodologies, models and reporting systems. A couple of funds, however, use internal and external auditors for this purpose. According to the corresponding US survey (Capital Market Advisors, 1997), only 15 percent of the investors used and another 10 percent planned to use an independent review of manager activity.

Decisions about new instruments, assets classes or investment strategies are generally taken only by the board. This follows naturally from the fact that these questions are discussed in the investment policy approved at the board level.

6. CONCLUDING REMARKS

This study presents results from a survey of the risk management practices of 20 Finnish pension funds. The fund managers were particularly concerned with equity price risks, and made wide use of external fund managers and mutual funds. A number of risk management issues seemed to be well covered: all funds surveyed, for example, have a written investment policy that has been accepted at the board.

On the other hand, many other Risk Standards are only rarely implemented. A worryingly small minority of pension funds follows risk-adjusted returns, stress tests their portfolios, or submits their performance for external review. There is still much room for improvement in these respects. ■

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APPENDIX I

Summary of the 20 Risk Standards (Risk Standards Working Group, 1996)

I. MANAGEMENT OF RISKS

Risk Standard 1: Acknowledgment of fiduciary responsibility

Fiduciary responsibilities should be defined in writing and acknowledged in writing by the parties responsible.

Risk Standard 2: Approved written policies, definitions, guidelines and investment documentation

The Primary and Manager Fiduciaries should approve formal written policies which reflect their overall risk management objectives. The Primary and Manager Fiduciaries also should approve investment guidelines, management agreements and all other contracts that govern investments. Technical terms should be defined. All policies, definitions, guidelines and investment documentation should be reviewed and updated as appropriate and more often if significant market events or changes in strategy occur.

Risk Standard 3: Independent risk oversight, checks and balances, written procedures and controls

Oversight of compliance with risk policies should be independent of line investment activity and conducted according to up-to-date, written policies and procedures. Front, middle, and back office activities should be separate wherever possible and sufficient checks and balances and appropriate controls should exist. When separation is not possible due to limited staff, alternative checks, balances and controls should be established.

Risk Standard 4: Clearly defined organizational structure and key roles

Organizational structure and reporting lines should be defined clearly and distributed to all parties. Key personnel and their roles in all front, middle and back office areas should be identified. Changes in key personnel should be communicated immediately to all relevant parties.

Risk Standard 5: Consistent application of risk policies

The Primary Fiduciary's risk policies should apply both to internal and external managers and should be consistent across similar asset classes and strategies.

Risk Standard 6: Adequate education, systems and resources, back-up and disaster recovery plans

The Primary and Manager Fiduciaries should ensure that adequate education, systems and resources are available to implement and administer their risk policies. They should also establish and test back-up procedures and disaster recovery plans.

Risk Standard 7: Identification and understanding of key risks

Risks should be analyzed to determine relevancy. This entails understanding strategies and their vulnerabilities, as well as assumptions built into an instrument, system, process, model or strategy. Key risks should be reviewed periodically as well as when significant events occur.

Risk Standard 8: Setting risk limits

Risk limits should be set for the aggregate portfolio and all individual portfolios. These may include limits on asset classes, individual instruments and specific types of risk.

Risk Standard 9: Routine reporting, exception reporting and escalation procedures

The Primary and Manager Fiduciaries should specify what positions, risks and other information must be reported and to whom. This policy also should define what constitutes required reporting or an exception

to guidelines, to whom the exception should be reported, what action must be taken for different levels of violation and what procedures must be followed for ongoing or increased violations.

II. MEASUREMENT OF RISKS

Risk Standard 10: Valuation procedures

All readily priced instruments should be valued daily, less-readily priced instruments at least weekly and non-readily priced instruments as often as feasible and whenever a material event occurs. The pricing mechanism and methodologies must be known, understood, follow written policies and be applied consistently by the Primary and Manager Fiduciaries, Managers, custodian and other subcontractors.

Risk Standard 11: Valuation reconciliation, bid/offer adjustments and overrides

Material discrepancies in valuation from different source should be reconciled following established procedures. A procedure for bid/offer adjustments and overrides to valuations should be established in writing and monitored independently.

Risk Standard 12: Risk measurement and risk/return attribution analysis

The Primary and Manager Fiduciaries should regularly measure relevant risks and quantify the key drivers of risk and return.

Risk Standard 13: Risk-adjusted return measures

Risk-adjusted returns should be measured at the aggregate and individual portfolio level to gain a true measure of relative performance.

Risk Standard 14: Stress testing

Simulation or other stress tests should be performed to ascertain how the aggregate portfolio and individual portfolios would behave under various conditions. These include changes in key risk factors, correlations or other key assumptions and unusual events such as large market moves.

Risk Standard 15: Back testing

Risk and return forecasts and models should be back tested at least quarterly and whenever material events occur to assess their reliability.

Risk Standard 16: Assessing model risk

Dependence on models and assumptions for valuation, risk measurement and risk management should be evaluated and monitored.

III. OVERSIGHT REQUIRED

Risk Standard 17: Due diligence, policy compliance and guideline monitoring

The Primary and Manager Fiduciaries should perform frequent, independent reviews of all Managers' risk policies and controls. Where policies and controls fall short of the requirements set forth by the Primary or Manager Fiduciaries, plans for future compliance or corrective action should be documented and communicated. Managers should ensure continuing compliance with their clients' risk policies and guidelines.

Risk Standard 18: Comparison of Manager strategies to compensation and investment activity

The Primary Fiduciary should require each Manager to submit a statement of strategy and ensure that the Manager's activities and compensation are consistent with that strategy. Key risk and return factors should be documented and reviewed at least annually and updated whenever the strategy changes.

Risk Standard 19: Independent review of methodologies, models and systems

All methodologies, models and related systems should be independently reviewed or audited prior to use as well as annually. Significant market moves or changes in market practice should trigger interim reviews.

Risk Standard 20: Review process for new activities

The Primary and Manager Fiduciaries should document the review process for permitting the use of new instruments, strategies or asset classes. Policies for initiating new activities should be consistent with the Primary and Manager Fiduciaries' risk and return goals as well as the Manager's strategy and expertise.

APPENDIX II**The survey questionnaire**

General questions:

What is the size of your investment portfolio in euros?

How is your investment portfolio diversified across different asset classes (shares, fixed income, real estate, others)?

I. Management

Do you have a written investment policy? If not, are you planning to prepare one within the next two years?

Has the investment policy been accepted at the board of your pension fund?

Who has prepared the investment policy? How often is it updated?

Is your equity investment policy based on

- Geographical diversification
- Sectoral diversification
- Mix of these two

Do you expect changes in this in the next two years? If yes, in which direction?

Do you use external portfolio managers? If yes, how many (excluding mutual fund managers)?

How are the discretionary portfolio management contracts defined (e.g. full mandate without any limits, full mandate with some limits [e.g. max 30% in Finnish shares, all in one sector], consultative mandate)? Are all the external mandates equal or do they differ?

Have you invested in mutual funds? If yes, in how many? In which kind of markets do you prefer using funds? Does your invest policy restrict the use of funds somehow (e.g. no balanced funds, no hedge funds)? Do you expect changes in these questions in the next two years?

In the external portfolio management mandate, have you defined the person making the investments on your behalf?

Do you currently have organizational charts specifying the responsibilities of each individual and key roles? If not, do you plan to have such a chart within the next two years?

Does your investment policy allow short term hedging? If yes, how is hedging defined? Does your investment policy allow leverage (options, futures contracts, debt)? How are these issues defined in the external portfolio mandates?

Who is responsible for monitoring that the actions taken in the market are in line with your investment policy?

Who is authorized to make investments on your behalf? What happens if someone critical to the investment process changes jobs?

What kind of back up and recovery plans do you have for major physical disasters or for systems, communications and power failures? If none, do you plan to establish such plans within the next two years?

Which are the major risks you face on a scale of 1 to 8? (1 = most important, 8 = least important)

- Operational risks (e.g. unauthorized trading or system failure)

- Personnel (e.g. loss of a key person)
- Liquidity risk (e.g. unexpectedly large demand for cash that forces a fire-sale)
- Credit risk
- Equity price risk
- Bond price risk
- Currency risk
- Asset/liability mismatch

How are the risk limits set for each position (e.g. net position [combination of long + short positions], tracking error relative to a benchmark, duration relative to a benchmark [for a bond portfolio], industry concentration, percentage of a portfolio that is 'non-readily priced')? Do you expect changes in these limits within the next two years?

How are open positions reported (who is reporting to whom and how frequently)?

II. Measurement

How frequently is the value of your portfolio calculated? Does your portfolio contain instruments whose value is not available daily (e.g. real estate, private equity)? How often are these instruments valued and who calculates the values?

Is it possible that external portfolio managers value some instruments (e.g. real estate, private equity, OTC derivatives) differently from you? How are these cases treated?

How are the risks of your portfolio measured (volatility, beta, tracking error, VAR)?

Do you require risk-adjusted returns reported from your external portfolio managers? Do you calculate risk adjusted return for your total portfolio? If you follow risk adjusted return, how do you do it? Do you expect changes in these reporting procedures within the next two years?

Do you test your portfolio's behavior under various, even unusual, market conditions? If yes, how and how often do you do it?

III. Oversight

How frequently do you evaluate portfolio performance and risk policies?

Do you ask external portfolio managers to explain their strategies and how often is this done?

Does the compensation structure differ across different external portfolio managers you use (e.g. fixed vs. success fee)?

Do you use an independent third party to review the soundness of valuation methodologies, models and reporting systems regularly? Do you expect changes in this within the next two years?

What is the process or actions taken when a new instrument, asset class or investment strategy is introduced to your portfolio?