

Risk-Management Practices at Large Pension Plans: Findings from a Unique 27-Fund Survey

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This survey-based study looks at the risk-management practices of large pension funds, relying on responses from 27 funds around the world with total assets of US\$2.7 trillion. The primary driver for differences in the number of full-time-equivalent risk-management staff (risk FTE), which ranged from 3 to 96, is the complexity of the investment program. We explore differences in risk FTE across seven different risk activities and discuss sources of variation between funds. We also look at “new paradigm” risk-management practices, which have become more common among the participating funds, demonstrating that risk management has become much more prominent.

Keywords: Benchmarking, Enterprise Risk Management, Organizational Design, Pension Fund, Risk Management

A Unique 27-Fund Survey

Through a collaborative benchmarking forum organized by CEM Benchmarking Inc. (CEM),¹ 27 leading pension funds from Australia, Canada, Europe, Korea, New Zealand, the United Kingdom, and the United States came together last year to share information on their risk management practices. Each of these organizations has significant internal operations and varying degrees of complexity. The overarching goals of the forum were for the funds to learn from each other and to gain new perspectives on shared management challenges related to risk management.

This article focuses on the differences in the number of full-time-equivalent risk-management staff (risk FTE), both at the global level and at the level of seven different individual activities. We establish that the principal driver of differences in risk FTE is the complexity of the investment program. We also discuss “new paradigm” risk-management practices, which have become more common at many of the participating funds, demonstrating that risk management has become more prominent. Finally, we note what participants identified as their biggest risks.

The participating funds ranged in size from US\$15 billion to US\$325 billion, with an average size of US\$99 billion and total assets under management of US\$2.7 trillion,

as of December 31, 2011. On average, 52% of assets were managed internally and 22% of assets were private. The total number of investment, governance, and support FTE (investment FTE), which includes risk FTE, ranged from a low of 12 to a high of 763, with a mean of 204 and a median of 102. Data for this study were obtained from a comprehensive survey followed by interviews with each participant, as well as from CEM’s annual investment benchmarking service.

Total Risk FTE

The total number of risk FTE ranged from a low of 3 to a high of 96, with a mean of 23 and a median of 13. Risk FTE were divided among seven different risk activities, which are listed and defined in Table 1. Activity (c), “asset mix policy development and insight,” was included as a risk activity because, for most participants, the asset mix decision is the largest contributor to financial risk. Indeed, at 14 of the 22 funds with a centralized risk team, that team was either fully or partly responsible for asset mix policy development and insight.

Table 1: Risk Activity Definitions

Risk Activity	Definition
A. Enterprise risk management (ERM)	<p>ERM provides a centralized framework for identifying, analyzing, responding to, and monitoring both investment and non-investment risks that might adversely affect realization of the organization’s business objectives:</p> <ul style="list-style-type: none"> • Include staff doing ERM oversight, policy and framework development, and ERM-level reporting and monitoring • Exclude any ERM staff primarily dedicated to developing the investment risk policy and framework • If you do not use a centralized ERM framework, indicate 0 FTE
B. Investment risk policy development, insight, and oversight	<p>Investment risk policy development, insight, and oversight includes:</p> <ul style="list-style-type: none"> • Developing investment risk policies • Developing and overseeing the risk framework • Vetting benchmarks • Vetting risk models • Ensuring effective risk oversight • Providing insights into <i>ex ante</i> risks and strategies to mitigate them • Supporting risk committees • Risk communication, interpretation, and education to Board, partners, etc.
C. Asset mix policy development and insight	<p>Asset mix policy development and insight (include FTE performing these activities even if they are not part of your risk group) includes:</p> <ul style="list-style-type: none"> • Developing asset mix policy (or reference portfolio or better beta portfolio) • Modeling the relationship between assets and liabilities (exclude staff dedicated primarily to modeling liability risk, if any, included in activity (d) below) • Investigating new products for asset mix • Economic and market outlook research
D. Liability risk modeling and insight	<p>Liability risk modeling and insight:</p> <ul style="list-style-type: none"> • Include only if you have FTE(s) primarily dedicated to either (1) developing the liability proxies for asset liability models or (2) modeling the impact on liabilities caused by changes in longevity, member demographics, inflation, and risk-related rule-change analysis. • Exclude actuarial staff performing annual accounting and funding valuations, determining contribution rates, or doing what-if cost analysis to quantify the impact of proposed rule changes by partners. • Exclude staff modeling relationships between assets and liabilities (these belong in (C) “Asset mix policy development and insight”)
E. Investment risk measuring, monitoring, and reporting	<p>Investment risk measuring, monitoring, and reporting:</p> <ul style="list-style-type: none"> • Includes limit reporting, counterparty limits, and counterparty creditworthiness. • Excludes mandate compliance and post-trade compliance.
F. Risk data	<ul style="list-style-type: none"> • Data collection, data cleaning, dealing with vendors
G. Investment risk IT/IS	<ul style="list-style-type: none"> • Risk systems, development, maintenance, dealing with third-party licenses

Table 2: Impact of Increasing Investment Program Complexity

	Indexed	Simple Active	Complex Active
Type of holdings	E.g., public stocks, local government debt	• E.g., corporate debt, simple derivatives used in a limited fashion (indexed equity swaps)	• Complex derivatives • Illiquid assets
Risks to monitor	Asset/liability mismatch Medium/long term risks	• Active risk, Liquidity & counterparty risk, Credit risk	• Operational risk • Risk measurement quality
Types of decisions	Plan design Policy asset mix	• Size and design of active program, liquidity & counterparty oversight	• Extensive liquidity and counterparty risk, risk governance structure (Chief Risk Officer)
Tools	Asset liability model	• Risk system	• Flexible & extendable risk system, enterprise risk management framework
People skills needed on the risk team	Economics, Investments, Actuarial, Modelers	• Quants	• More quants, model vetters, internal subject matter experts on systems etc., risk team members that understand illiquid assets, strong risk IT and ops teams
Metrics	Risk impact to stakeholders/ members	• Simple value-at-risk type metrics with attribution	• Liquidity & counterparty risk, risk measurement quality, data quality, detailed risk and risk attribution measures

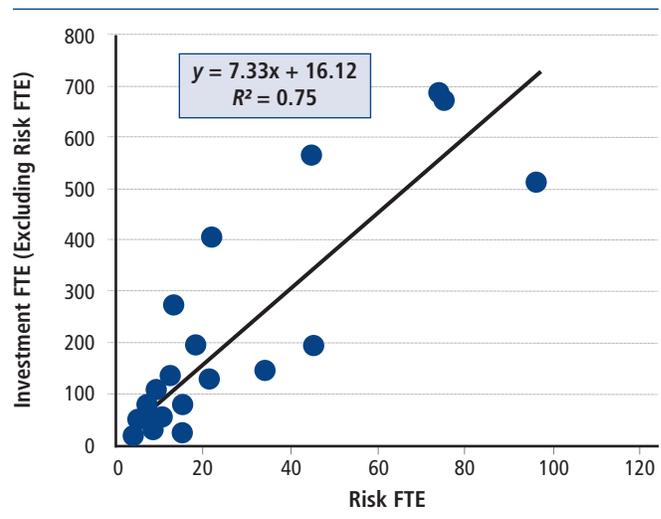
Source: From a presentation by Barbara Zvan, Senior Vice President, Chief Investment Risk Officer, Ontario Teachers' Pension Plan, at the 2011 Global Leaders Conference. Reproduced by permission.

Total Risk FTE is Primarily Driven by the Complexity of the Investment Program

The biggest reason for differences in the total number of risk FTE is the complexity of the investment program: simple indexed programs require the fewest risk staff, while internally managed programs with levered active management, complex derivatives, and illiquid assets require the most risk staff. Table 2 shows the evolution of a fund's investment program from a simple indexed program to a complex active program, and the resulting impact on the types of risks monitored, risk decisions, tools required, risk metrics, and skills required by risk FTE.

Complexity of the investment program explains an estimated 75% of differences in the total number of risk FTE, based on regressing the number of risk FTE versus the total number of investment FTE (including front office, governance, and support FTE but excluding risk FTE), as shown in Figure 1.

Figure 1: Investment FTE less Risk FTE vs. Risk FTE



The CEM Global Leaders 2011 organizational design study (MacIntosh and Scheibelhut 2012) showed that the number of investment FTE is a good proxy for investment program complexity, because a higher total is closely correlated with an increase in assets internally managed, higher transaction volumes, and higher transaction complexity (i.e., more complex derivatives and private assets).

Risk FTE by Risk Activity

Table 3 shows the number of risk FTE segmented by the seven risk activities defined in Table 1. On average, the activities with the most risk FTE are investment risk policy development, insight, and oversight; asset mix policy development and insight; and investment risk measuring, monitoring, and reporting. The activities with fewer risk FTE are enterprise risk management; information technology / information systems (IT/IS); risk data collection and cleaning; and liability risk measuring, monitoring, and reporting. The reasons for differences in the number of risk FTE at the participating funds are discussed below in order of the definitions in Table 1.

Table 3: Risk FTE by Risk Activity

Risk Activity	FTE	
	Mean	Max*
Enterprise risk management	2.6	16.5
Investment risk policy development, insight and oversight	4.2	21.5
Asset mix policy development and insight	6.6	37.0
Liability risk modeling and insight	0.7	4.0
Investment risk measuring, monitoring, and reporting	4.9	25.5
Risk data: collection, cleaning, dealing with vendors	1.2	4.0
Investment risk IT/IS	2.6	25.0
Total Risk FTE	22.8	96.0

* Minimum value is always zero.

Enterprise Risk Management (ERM)

ERM provides a centralized framework for identifying, analyzing, responding to, and monitoring both investment and non-investment risks (e.g., HR risks, IT risks, risks associated with the breakdown of internal processes) that might adversely affect realization of the organization’s business objectives.

ERM FTE include staff doing ERM oversight, policy and framework development, and ERM-level reporting and monitoring. Risks are usually organized in a matrix of likelihood vs. impact for each identified risk. Although some organizations include investment risks as part of their ERM framework, the day-to-day responsibility of managing and monitoring investment risks typically lies with a group dedicated to that function, separate from the ERM FTE. ERM is a relatively new activity for many of participating funds: 9 of the 22 with ERM started their program within the past 2 years.

ERM FTE ranged from a low of 0 FTE to a high of 16.5 FTE, with an average of 2.6 FTE. Funds with no ERM program either had less complex investment programs or were not persuaded that the benefits of such a program justify the costs. Funds with ERM programs typically had 1–2 dedicated FTE plus fractions of additional FTE from staff across the organization. The funds with the most ERM FTE tended to have more review and control functions, such as providing an independent review of compensation structures, operational-risk due diligence of potential external partners, and monitoring activities that overlap with compliance.

Investment Risk Policy Development, Insight, and Oversight

Investment risk policy development, insight, and oversight FTE are charged with developing the investment risk policies and framework. Other day-to-day tasks include vetting benchmarks and risk models, ensuring effective risk oversight, providing insights into *ex ante* risks and strategies to mitigate them, supporting risk committees, and risk communication and education to the Board.

Investment risk policy development, insight, and oversight FTE ranged from a low of 0 FTE to a high of 21.5 FTE, with an average of 4.2 FTE. The six funds with above-average investment risk policy development, insight, and oversight FTE tended to have more complex investment programs, resulting in more policies, more custom models, more need for model vetting, and more oversight. They also tended to have more interaction with the front office investment teams, providing insight into the investment process as opposed to just monitoring.

Asset Mix Policy Development and Insight

Asset mix policy development and insight FTE are responsible for developing the asset mix policy, modeling the relationship between assets and liabilities (excluding staff dedicated to modeling liability risk), investigating new products for the asset mix, and researching economic and market outlook.

Asset mix policy development and insight FTE ranged from a low of 0 FTE to a high of 37 FTE, with an average of 6.6 FTE. The 18 funds with below-average asset mix policy development and insight FTE tended to rely on partial time of the CIO or other senior front office or risk staff. They often were not responsible for setting or recommending asset mix policy, tended to revisit the asset mix decision less frequently (i.e., every two or every three years vs. every year), and relied heavily on external consultants.

The nine funds with above-average asset mix policy development and insight FTE tended to have staff dedicated to asset or asset–liability modeling (several funds had staff dedicated to modeling expected returns and risks under various historic and future economic scenarios and extreme events); designing and maintaining in-house asset or asset–liability models; forecasting asset class returns and inflation under different economic scenarios to feed into their models; and investigating new products for the asset mix.

Liability Risk Modeling and Insight

Liability risk modeling and insight FTE are charged with developing liability proxies for asset–liability models; modeling the impact on liabilities of changes in such factors as longevity, member demographics, and inflation; and risk-related rule-change analysis. This category excludes actuarial staff performing annual accounting and funding valuations, determining contribution rates, and other actuarial activities, as well as those modeling relationships between assets and liabilities.

Liability risk modeling and insight FTE ranged from a low of 0 FTE to a high of 4 FTE, with an average of 0.7 FTE. Fourteen participating funds had no staff performing this activity, and three had ≤ 0.5 FTE. Many of these funds either did not have explicit liabilities (i.e., buffer funds) or were not responsible for the asset mix decision. Other reasons for not having any FTE for this activity were relying on external consultants, having a mandate to maximize total return, or simply ignoring asset–liability mismatch risk.

Ten funds had some staff dedicated to liability risk modeling and insight. Reasons cited for having staff dedicated to this activity included:

- ***Better asset–liability modeling and understanding of liability sensitivities:*** Dedicated liability risk FTE can help

capture a fund’s unique sensitivities, such as conditional indexing, early retirement windows, or longevity risk, which often require custom studies best performed in-house.

- ***Better understanding of actuarial and regulatory impact:*** Dedicated liability risk FTE can model the actuarial, accounting, and regulatory impact of de-risking and more accurately quantify how changes will affect required contributions and reported funded status.
- ***Proactive and real-time understanding of liabilities:*** Dedicated liability risk FTE can provide proactive recommendations to plan sponsors as to changes that will best reduce risk and can also more quickly model proposed changes to plan rules.

Investment Risk Measuring, Monitoring, and Reporting

Investment risk measuring, monitoring, and reporting FTE are responsible for measuring, monitoring, and reporting of investment risks, including limit reporting, counterparty limits, and counterparty creditworthiness. The definition excludes FTE performing mandate and post-trade compliance.

Investment risk measuring, monitoring, and reporting FTE ranged from a low of 0 FTE to a high of 25.5 FTE, with an average of 4.9 FTE. Similar to the other activities, the 17 funds with below-average investment risk measuring, monitoring, and reporting FTE had less complex investment programs. Many of these funds relied on third-party risk software and/or monitored the risk of the entire fund less frequently than daily. Illiquid investments such as private real estate and private equity were either not modeled by their risk systems at all or included by modeling them via proxy to liquid public assets.

The 10 funds with above-average investment risk measuring, monitoring, and reporting FTE had very complex investment programs. One fund, for example, had a 5-FTE team dedicated to monitoring credit and counterparty risk because of their large derivative exposure.

Risk Data

Risk data FTE are charged with data collection, data cleaning, and dealing with vendors of investment data.

Risk data FTE ranged from a low of 0 FTE to a high of 4 FTE, with an average of 1.2 FTE. The eight funds with no risk data FTE used third parties to collect and clean their data. For example, one participating fund has an FTE from their custodian on site to manage their data. Funds with above-average risk data FTE again tended to have more complex investment programs. They also tended to use daily monitoring and reporting and/or had more complex investment risk models and systems that required close inspection of data for inconsistencies.

Investment Risk IT/IS

Investment risk IT/IS FTE are responsible for developing and maintaining risk systems, licensing risk software and systems, and dealing with third parties.

Investment risk IT/IS FTE ranged from a low of 0 FTE to a high of 25 FTE, with an average of 2.6 FTE. Funds with the smallest numbers of investment risk IT/IS FTE tended to use off-the-shelf risk software with only minor modifications; the fund with the most investment risk IT/IS FTE had substantially customized its third-party software by integrating custom pricing models for their complex derivatives and private asset portfolios. They also maintained an internally developed asset-liability model that required staff for maintenance and to feed data into the system.

“New Paradigm” Risk-Management Practices

Risk-management practices have changed substantially in the past 10 years. We found that many “new paradigm” risk-management practices have become more common at many of the participating funds, which shows that risk management has become more prominent.

Risk Governance Framework

- **Board experience:** Best practice is to have a Board of Directors with diverse and relevant skill sets, experience, and expertise, because this will enable the Board to make better decisions. Risk expertise is part of the relevant skill set; 54% of participating funds had at least one Board member with external experience in probability-based risk systems.
- **Board risk committees:** Boards are increasing their focus on risk. Two examples are
 - **Dedicated risk committees:** Six of the 27 funds have Board committees dedicated to investment risk, operating risk, or both; one has an Asset-Liability Management Committee dedicated to its largest risk.
 - **Increased prominence of risk in committee names and mandates:** At several funds, traditional “Investment Committees” and “Audit Committees” have been renamed to include risk in the name (e.g., “Investment and Risk Committee”); this presumably reflects an increased focus on risk oversight as part of the committee’s mandate.
- **Risk policy documents:** Investment risk policy used to be buried in regulatory documents such as the Statement of Investment Policies and Procedures. The majority of participating funds now have separate documents for risk appetite, enterprise risk policies, and/or investment risk policies, which allows for greater transparency and focus on risk.

- **Board reporting:** Reporting is another example of how risk is gaining increased prominence at the Board level. Among our participants, all but one Board receive regular investment risk reporting, and 67% receive ERM reporting. Boards are also beginning to seek views of risk that are independent of the CEO and CIO: at 48% of funds, the Board has regular solo sessions with the Chief Risk Officer.
- **Management-level risk committees:** 81% of participating funds have management-level committees dedicated primarily to investment risk, non-investment risk, or both. Several have multiple risk committees, including specialized ones dedicated to credit and counterparty risk, asset-liability management, liquidity, crediting rates, and so on. Here again, we found increased prominence of risk in committees’ names and mandates.

Organizational

- **Enterprise risk management:** ERM is a relatively new activity for many participants. Of the 22 funds using ERM, 17 have one or more ERM management committees dedicated either to non-investment risk or to all risks. Almost always, the chair of this committee is the CEO (or equivalent).
- **Centralized investment risk policy teams:** 81% of participating funds have centralized investment risk policy teams with a CRO.
- **Merging of asset mix and investment risk policy teams:** For the 81% of funds with a centralized risk policy team, 23% have one team responsible for both “asset mix policy development and insight” and “investment risk policy development, insight and oversight.” Another 41% have distinct teams for these activities, but both teams provide input into the asset mix decision.
- **Increased investment in risk insight and risk management versus monitoring:** For example, one participating fund has nine Business Unit Risk Managers who act as a bridge between the risk team and the front office investment teams.
- **Dedicated in-house asset-liability modeling staff:** 44% of funds have FTE dedicated to asset-liability modeling.

Investment Design

Many of the participating funds have migrated from

- traditional asset classes to risk classes (interest, credit, inflation, market, etc.);
- static to dynamic asset allocation;
- asset return optimization to surplus return optimization, liability-driven investing, and hedging of liability risks; and
- long-only portfolios to long/short portfolios using levered active management with alpha separated from beta.

Modeling and Measurement

- Better risk IT systems
- Consolidated picture of internal and external securities
- Daily feed of individual securities from external managers (80% of funds for public assets)
- Sophisticated private asset proxies and derivative models
- Traditional measures supplemented by VaR and SaR metrics
- Risk budgeting (70% of funds)

Biggest Risks

An important part of risk management is identifying the biggest risks and aligning the organization to manage those risks. However, we found that risk staff at many of the participating funds could not identify, or did not agree on, their biggest risks. Lack of clarity about the organization's biggest risks is a missed opportunity, because agreement between the Board and senior management on the relative importance of key risks can lead to better, more efficient decision making.

For the 19 funds with DB assets, there was a fundamental divide in how the funds view their biggest risk. Nine of the funds view asset–liability risk as their biggest risk; many of the other ten funds see the market's impact on total returns as their biggest risk, ignoring its impact on liabilities. Ignoring liabilities has a cost. Pension funds that ignore liabilities are more likely to misprice risk and miss opportunities to influence plan design to reduce risk and increase intergenerational fairness and plan sustainability.

Summary (New title to come)

Our key findings are as follows:

- The number of risk FTE at the participating funds ranged from 3 to 96. The biggest reason for differences in the number of risk FTE is the complexity of the investment program: for the most part, simple indexed programs require the smallest numbers of risk staff, while internally managed programs with levered active management, complex derivatives, and private assets require the largest numbers of risk staff.
- Risk-management practices continue to evolve. Many “new paradigm” risk-management practices have become more common at many of the participating funds; this demonstrates that risk management has become more prominent.
- Clarity about an organization's biggest risks is critical for decision making and organizational alignment; approximately one-third of participating funds did not have clarity on this issue.

The value of benchmarking is to gain new insights into best practices. The 27 funds that participated in this study are pleased to share the resulting insights.

Endnotes

1. CEM is an independent global benchmarking and research company located in Toronto, Canada, that has provided investment and administration benchmarking and research services to large pools of capital (including defined benefit and defined contribution pension plans, endowments, and sovereign wealth funds) since 1991.

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