

PERS AND THE PENSION REVOLUTION:

REDESIGNING THE INVESTMENT FUNCTION

"If the whole market became more long-term and was trading on a 10-year outlook, that would be fine. But they're not, so you just have to trade on what they're trading on..."

Quote from a study on institutional investment behavior titled
"Meeting Objectives and Resisting Conventions"
by Danyelle Guyatt, University of Bath, UK

Case Description

Alyson Green took on the CEO responsibilities for the 150,000 member, \$55B *Public Employees Retirement System (PERS)* one year ago. She had convinced her Board of Trustees, as well as the Governor of the State and the key unions, that the State's pension plan was materially under-funded and that three bold steps should be taken to return the State's pension finances to long-term sustainability ^[1]:

1. Increase the current defined benefit (DB) plan contribution rate from 15% of pay to 20% of pay (from 7.5% each from employer and employees to 10% each). However, her argument that the inflation indexation of pensions should be made conditional on the balance sheet funded ratio had fallen on deaf ears.
2. Close the DB plan to new employees. However, with the benefit formula unchanged, the balance sheet funded ratio of the now-closed DB plan currently stands at 80% on a mark-to-market basis (i.e., plan assets \$55B, plan liabilities \$70B).
3. Start a 'hybrid' plan for new employees with the same 20% of pay contribution rate as the closed DB plan. The new plan is to be based on an individual 'life-cycle, target-pension' approach, with a number of 'auto-pilot' features related to investment and contribution policy adjustments. For example, the contributions of young employees are first invested in a high-expected return, but risky portfolio. Then, as these young employees age, they would automatically begin to slowly acquire inflation-indexed, deferred annuities. As employees approach retirement, the bulk of their pension assets would consist of these deferred annuities.

Alyson had next turned her attention to the investment side of the *PERS* operations. The new priority for the organization would be to assess the investment function of the \$55B *PERS* pension fund to ensure that it would sustain the State's recent public sector pension reform decisions. A logical place to start the assessment process had been to see where *PERS'* investment function stood today.

The Case Description, Teaching Notes and Discussion Summary were written by Keith Ambachtsheer. He is Director of the Rotman International Centre for Pension Management and Adjunct Professor of Finance. Editorial assistance was provided by Prof. Alexander Dyck of the Rotman School of Management, and technical assistance by Hubert Lum of CEM Benchmarking Inc. www.rotman.utoronto.ca/icpm

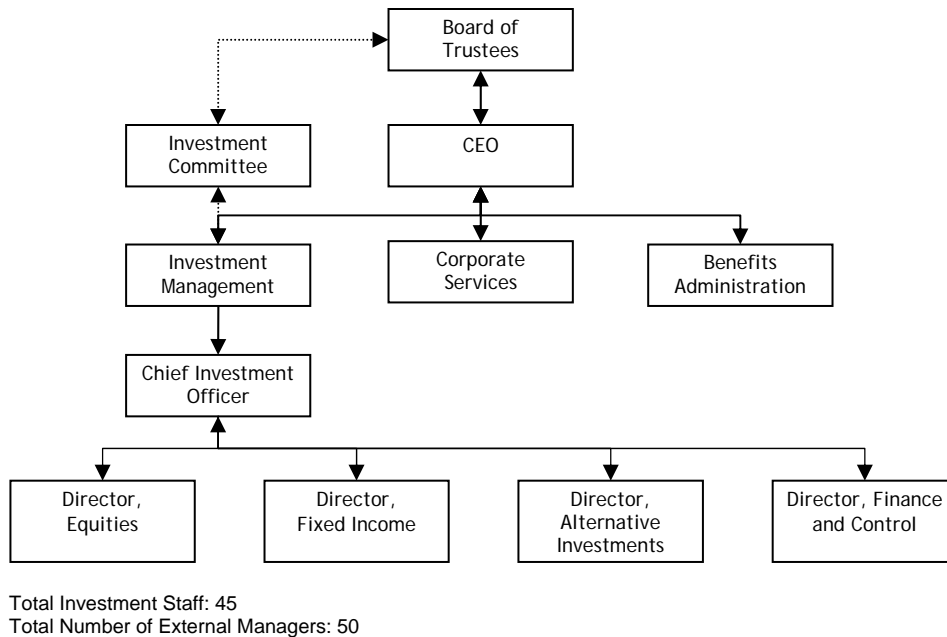
PERS' Current Investment Approach: Facts and Questions

Alyson had noted four key elements of the current approach were:

1. *PERS* had come through the 1990s into the new decade with the same 60-40 equity-debt asset mix policy that seemed to be very common in the pension industry. While there was a history of asking consultants to do an asset-liability study every three years or so, these studies always seemed to confirm that a 60-40 asset mix policy was right for *PERS*. The 1990s bull market in equities had moved the actual mix to 65-35. As a new era of high equity returns seemed to have unfolded, *PERS*' asset mix policy was adjusted to 65-35 in 2000.
2. Policy implementation had also been quite conventional, with an ever-growing number external investment mandates (there are 50 today) being created. These mandates were of the traditional 'active' type, with external active managers being asked to 'beat' specific stock and bond market-based benchmarks that reflected the managers' 'styles', usually within narrow 'tracking error' limits. So for example, today *PERS* has equity managers and bond managers, domestic managers and foreign managers, large-cap managers and small-cap managers, growth stock managers and value managers, emerging markets managers and high-yield debt managers. In more recent years, *PERS* had also acquired modest exposures to real estate, private equity, and hedge funds.
3. Organizationally, *PERS* has a long history of having an Investment Committee made up of a blend of members of the Board of Trustees and outside experts, as well as an external investment consultant. Historically, both the Investment Committee and the external consultant had been quite influential in setting pension fund investment policy and in manager selection. The respective roles of the Investment Committee, the external consultant, and *PERS*' small internal team of investment professionals have never been clearly defined.
4. *PERS*' current Chief Investment Officer (CIO) David Fraser had built his team of internal investment professionals over the course of the last 10 years. Today he has four Directors reporting directly to him: Patricia Gray (Equities), Bruce Wong (Debt Securities), Peter Armstrong (Alternative Investments), and Barbara Lipton (Finance and Control). His four Directors in turn have a number of investment, finance, and IT professionals reporting to them. In all, including support staff, total Investment Division membership currently totals 45 people (see *PERS* org. chart in Figure 1).

In talking with David and some of the Investment Committee members, Alyson had sensed a high comfort level with *PERS*' current approach to investing, and resistance to any fundamental re-examination of it. However, Alyson was skeptical that maintaining a constant 65-35 asset mix policy for the now-closed DB plan, and splitting *PERS*' \$55B into 50 externally-managed pieces is good strategy. It seemed to her that *PERS* should have a serious look at its asset mix policy approach, and either greatly simplify how that policy is implemented, or build a 'high-performance' investment organization that could compete with the best. These two choices would both have significant implications for the *PERS* investment organization structure and staffing. The first choice implies lots of low-cost, passive management and significant down-sizing of the investment organization. The second choice implies a significant build-up of the internal investment team and acquiring experience and skills the organization did not currently possess. Was one of these two strategic choices right for *PERS*, and was Alyson and her Board of Trustees ready to manage the changes either choice would entail?

**Figure1:
Public Employers Retirement System (PERS) Organization Chart**

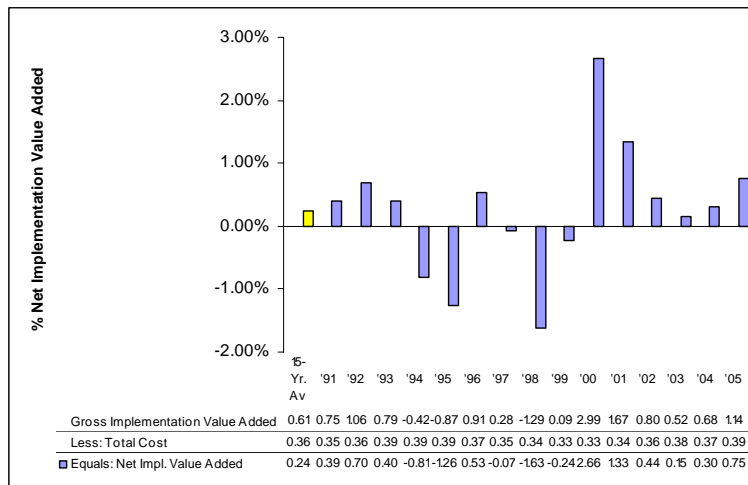


Key Research Findings from the *CEM* Pension Fund Universe

To help her accomplish the task of shaping and implementing a *PERS* investment policy for the 21st century, Alyson had invited the global pension fund benchmarking firm *CEM Benchmarking Inc. (CEM)* to conduct a benchmarking study on the *PERS* investment function, focusing especially on the five-year period ending in 2005 [2].

CEM began collecting data on US and Canadian DB pension fund returns and costs, as well as on their asset mix policies and liability structures, in 1991. Over time, European and Pacific Rim pension funds also began to participate in the database. By 2005, participation had increased to some 250 funds with collective assets of \$3 trillion. Alyson found two overall database results especially interesting. The first of these findings is displayed graphically in Figure 2, and addresses the question of whether the pension fund universe managed to get a positive pay-back from active management. Pooling all of the 15 years' worth of accumulated fund results together, the entire fund pool managed to generate an average pre-expense implementation value-added of 0.61% per year relative to the funds' own asset mix policies if these policies had been passively-implemented. After deducting an average 0.36% for expenses, the net implementation value-added (NIVA) declines to a still-positive average 0.24% per year, with the negative results of 1994-1999 period more than offset by the positive results of the 2000-2005 period.

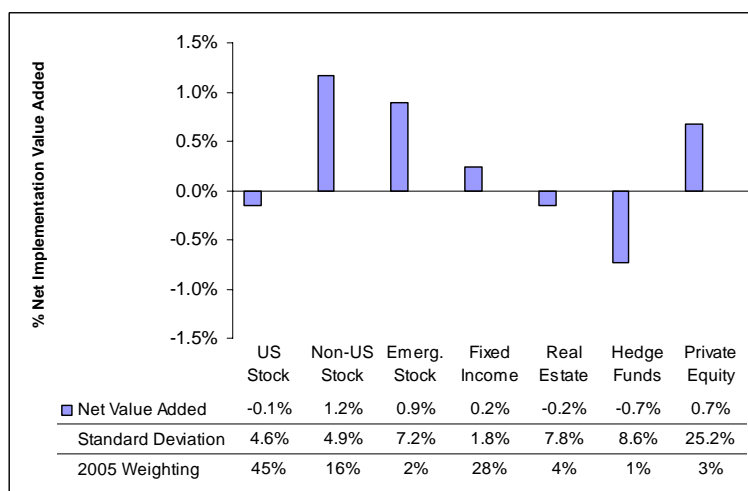
Figure 2:
Net Implementation Value-Added for the CEM Universe, 1991-2005



Source: CEM Benchmarking Inc.

Figure 3 suggests that a major source of this modest positive overall NIVA result since 1991 is generally positive excess returns achieved in the non-US global equity markets, with according to CEM's researchers, the likely key factor being the pervasive under-weightings in Japanese stocks relative to the EAFE index weighting by most pension funds over the course of the 15-year measurement period. For Alyson, the more profound message coming out of Figure 3 was the tendency for the net results within most asset classes to average out to a small positive or negative number over the 15-year period, relative to the variability of the results as captured by the standard deviations.

Figure 3:
CEM Universe Net Implementation Value-Added by Asset Category, 1991-2005



Source: CEM Benchmarking Inc.

On the one hand, at the total universe level, the good within-asset class results of some funds seemed to generally be cancelled out by the bad results of others. On the other hand, the relatively large standard deviations also suggest that the potential gains from successful active management are significant.

Four Statistically-Significant Relationships

The *CEM* researchers had subjected the database to further statistical analyses. Using multiple regression techniques, they had discovered that the following four fund characteristics all had statistically significant positive relationships with fund net implementation value-added (NIVA):

1. Fund asset value
2. Universe-relative high proportions of internal management
3. Universe-relative high proportions of passive management
4. Universe-relative high weightings in private equity and small-cap stocks

Alyson asked the research team at *CEM* to interpret these database findings and they made the following observations:

1. The positive relationship between net implementation value-added and fund asset value has the most straight-forward interpretation. There is strong negative relationship in the database between fund size and unit cost, reflecting the significant economies of scale present in funds management. All other things equal, the relatively lower unit costs generated by economies of scale translate directly into higher relative fund net implementation value-added. Specifically, *CEM* researchers isolated a NIVA/Size co-efficient of 0.16. This means that, all other things equal for every 10-fold increase in fund asset value, fund NIVA was an average 16 basis points higher. A separate calculation showed a Unit Cost/Size co-efficient of -0.17. This means that for every 10-fold increase in fund asset value, unit cost (i.e., total operating cost per dollar of assets) was an average 17 basis points lower. So the database indicates an almost one-for-one correspondence between increases in fund NIVA and size-related decreases in unit costs.
2. The positive relationship between fund NIVA and the fund proportion being internally managed likely also has a cost-related explanation element to it. Again, the database indicates that, all other things equal, internal management is less expensive than external management for comparable functions or services such as portfolio management. An additional possibility is that internal management leads to a better alignment of interests between fund stakeholders and fund investment managers. The calculated NIVA/%Internal co-efficient was 0.41. This means that, all other things equal, a 10-percentage point higher proportion of internal management was associated with an average 4.1 basis point higher fund NIVA.
3. The positive relationship between fund NIVA and the fund proportion being passively managed also likely has a cost-related explanation element to it. All other things equal, passive investment management is less expensive than active management. Likely, well-governed pension funds think more carefully about where their comparative advantages lie, and are 'active' only in these carefully-selected areas. The calculated NIVA/%Passive co-efficient was 0.50. This means

that, all other things equal, a 10-percentage point higher proportion of passive management was associated with an average 5.0 basis point higher fund NIVA.

4. The positive relationship between fund NIVA and the fund proportion in private equity/small-cap stock investments cannot have a cost-related explanation. Indeed, these two asset classes are generally more expensive to manage than plain-vanilla stock or bond portfolios. More likely, the explanation is governance-related. Funds with relatively large exposures to risky, high-cost private equity/small-cap stock investments likely have a greater degree of justifiable confidence in what they are doing, and benefit accordingly by successfully taking on more significant exposures to these asset classes than the average fund. The calculated NIVA/%PrivateEquity and NIVA/%SmallCap co-efficients were 4.93 and 2.70 respectively. This means that, all other things equal, 10-percentage point higher proportions in private equity or into small cap stocks were associated with average 49.3 and 27.0 basis point higher levels of average fund NIVA.

Another thing Alyson was curious about was overall fund operating cost experience, and cost experience within some of the major asset categories. In response, CEM had produced Figure 4, which provides information for the US-fund segment of the CEM database. She was not surprised to discover that the median unit cost experience (i.e., cost per dollar of assets) was 40.5 basis points, but was surprised at the wide range of cost experience around that median (i.e., from a high of 138.3 bps. to a low of 2.8 bps!). Clearly, the 138.3 bps fund had a very different philosophy towards managing pension assets than the 2.8 bps fund. Likely, the low-cost fund is large, and uses passive investment styles to implement its investment policy. On the other hand, the high-cost fund is likely making very considerable investments (i.e., incurring additional costs) in attempting to generate positive NIVA. This wide range of cost experience was again evident at the major asset class level, with the cost of managing equity and fixed income portfolios even at the aggregate level (i.e., not disaggregated into many possible sub-categories) ranging from a hefty 102.5 bps to a tiny 0.1 bps.

Figure 4:
2005 U.S. Fund Cost Experience (bps)

		Max	Q1	Median	Q3	Min
Total Fund Operating Costs		138.3	53.1	40.5	28.7	2.8
Equities - Aggregate	Internal Passive	1.7	1.0	0.9	0.2	0.1
	Internal Active	19.5	8.0	6.7	2.3	0.4
	External Passive	40.0	4.3	2.3	1.3	0.2
	External Active	102.5	49.5	42.1	33.1	11.1
Fixed Income - Aggregate	Internal Passive	26.1	2.1	1.2	0.7	0.2
	Internal Active	13.7	6.2	2.2	1.4	0.1
	External Passive	10.4	4.0	3.0	1.9	0.5
	External Active	68.0	29.5	22.0	16.1	3.2

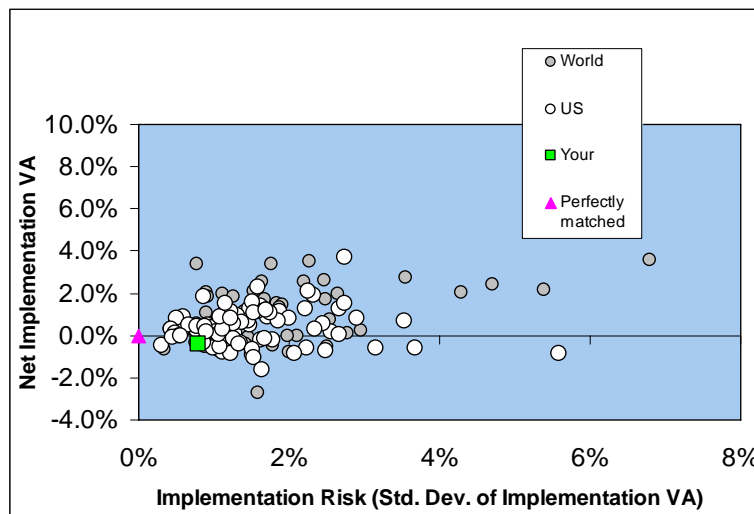
Source: CEM Benchmarking Inc.

While still absorbing the full meaning of these broad insights, Alyson now turned her attention to what the CEM study had to say about the PERS investment performance specifically.

The PERS Active Management Story: 2001-2005

It turned out that the broad insights gained from the 15-year statistical analysis of the *CEM* database were confirmed by *PERS*' own 2001-2005 investment story. Figure 5 positions *PERS*' 2001-2005 average annual net implementation value-added/ implementation risk combination versus the net implementation value-added/risk combinations of all funds in the database with continuous 2001-2005 histories. Alyson noted that *PERS*' active management reward/risk positioning at -0.4%/0.8% was close to the 0%/0% combination of a purely passive asset mix policy implementation strategy. The only material difference between the realized *PERS* result and a purely passive policy implementation strategy is that, according to the *CEM* database, the latter would have cost at least 30 bps less than the average annual 40 bps of assets that *PERS* actually spent on internal and external investment related-activities and services over the 2001-2005 period. Looking at the active management fees *PERS* was paying at the asset class levels, most seem to fall close to the medians of the *CEM* database experience. Alyson calculated that on *PERS*' average 2001-2005 asset value of \$45B, an overall 30 bps cost-reduction at the total fund level would have produced a cost saving to *PERS* of about \$135M per year.

Figure 5:
5-yr Net Implementation Value Added vs Implementation Risk for *PERS* (2001-2005)

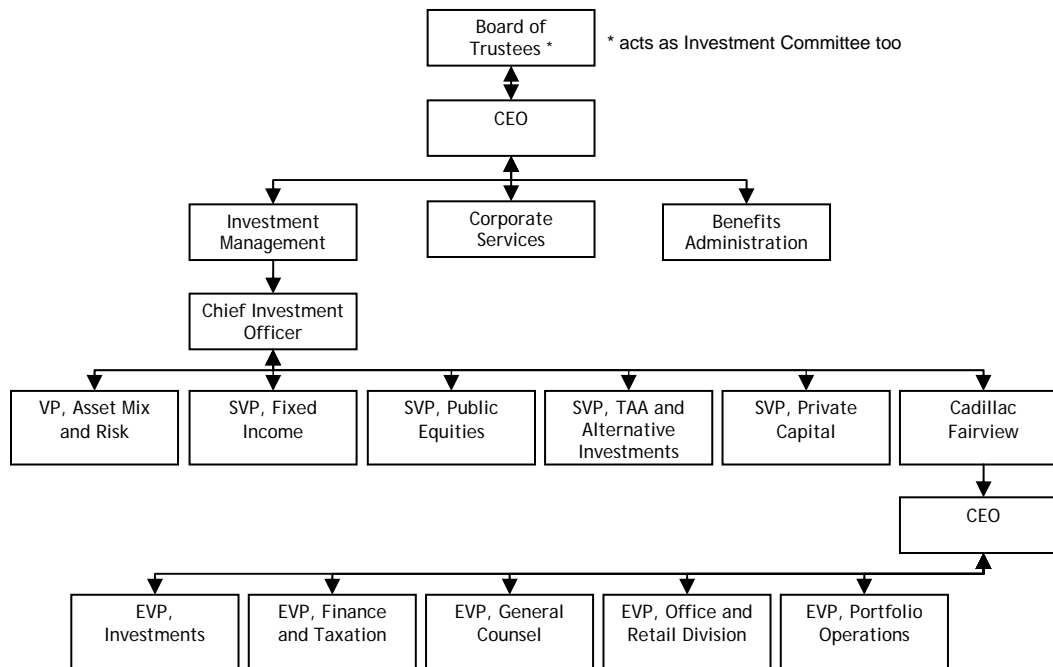


Source: *CEM Benchmarking Inc.*

The 2001-2005 *PERS* active management results offered quite a contrast with those of the Ontario Teachers' Pension Plan. Bob Bertram, OTPP's Chief Investment Officer, had shown Alyson that the 2001-2005 reward/risk positioning of OTPP was +3.4%/0.8% (see Figure 5). In telling OTPP's story, Bob indicated that Teachers' had consciously chosen to become a 'high-performance' pension fund organization in the late 1990s, and that they were now reaping the rewards of that decision [3]. Alyson realized that the 'high-performance' option is one possible choice open to *PERS*. However, listening to Bob, she knew that such a decision would have profound consequences throughout the *PERS* organization.

The organization design of the investment management function would have to change (see Figure 6 for Teachers' organization chart). The relationship between the Board, the Investment Committee, and the Chief Investment Officer and his team would have to change.

Figure 6:
Ontario Teachers' Pension Plan (OTPP) Organization Chart



Total Investment Staff: 300 (excluding Cadillac Fairview)
 Total Number of External Investment Managers: 246

Source: Created from 2005 Ontario Teachers' Pension Plan Annual Report

The way financial risk was defined measured and managed would have to change, and PERS' compensation system would have to change. For example, she had created her own matrix (see Figure 7) comparing the 2005 compensation levels of some of OTPP's top investment executives (as reported in OTPP's 2005 Annual Report) with the 2005 compensation levels of PERS' top investment team.

Figure 7:
2005 Compensation: OTPP vs. PERS

		Base Salary	Additional * Compensation	Total Compensation
OTPP	CIO	\$ 365K	\$ 4,773K	\$ 5,138K
	SVP, TAA and Alternative Investments	\$ 241K	\$ 2,941K	\$ 3,182K
	SVP, Public Equities	\$ 240K	\$ 2,792K	\$ 3,032K
PERS	CIO	\$ 140K	\$ 35K	\$ 175K
	Director, Alternative Investments	\$ 125K	\$ 25K	\$ 150K
	Director, Equities	\$ 115K	\$ 22K	\$ 137K

* Additional compensation includes incentive compensation and benefits packages, excluding pensions and medical.

Source: For OTPP data: 2005 Ontario Teachers' Pension Plan Annual Report

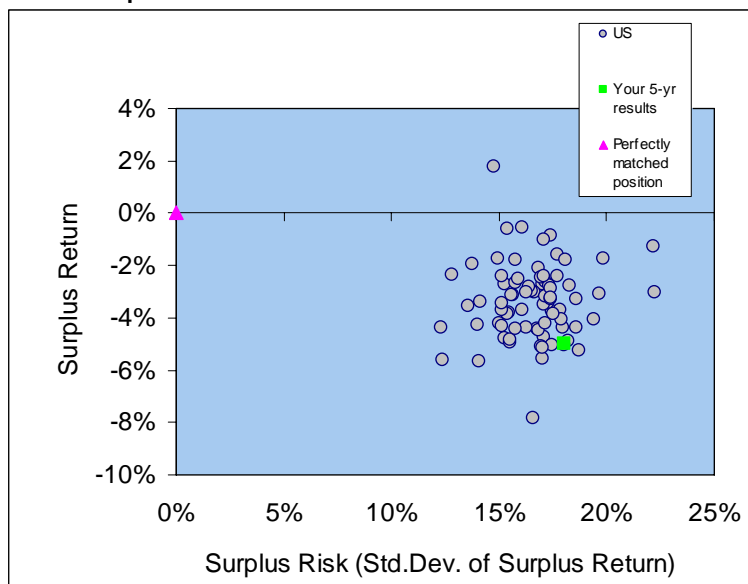
Alyson wondered how far it was possible to push an incentive compensation scheme based on investment performance in not-for-profit settings. She was reminded of the Harvard Management Company (HMC) story where investment performance-based compensation levels at the \$20-\$30M level led to a public outcry led by Harvard alumni, and the eventual departure of the top HMC team to establish their own private investment firm.

The PERS DB Balance Sheet Story: 2001-2005

The CEM study also reminded Alyson that managing and measuring active management reward and risk is not the whole story for DB plans like PERS. Pension funds don't just exist to attempt to generate excess returns relative to a passively-implemented policy asset mix like PERS' 65-35 equity-debt policy. More importantly, pension assets exist to secure and eventually pay for accrued pension liabilities. This implies that understanding and managing the relationship between assets and liabilities is important. A key metric for doing this is a fund's 'surplus return', which integrates the balance sheet's asset return with the return on a bond portfolio that mimics the payment pattern of the plan liabilities. Alyson was well aware that the 'surplus returns' on DB balance sheets had turned from generally positive during the 1990s, to generally negative since 2000.

This understanding was confirmed by Figure 8, which positions PERS' 'surplus return'/'surplus risk' combination at -5.0%/18.0% versus an average -3%/17% for all the US pension funds in the database. She made two additional observations. First, 'surplus return' volatilities in the 15%-20% range confirm most US DB plans (including PERS) had indeed been carrying a highly material amount of balance sheet mismatch risk. Second, that mismatch risk was generally not rewarded over the 2001-2005 period, with all but 1 out of 77 balance sheets deteriorating over the 5-year period (i.e., had negative 'surplus returns').

Figure 8:
5-yr Surplus Return vs Surplus Risk for PERS and the U.S. Fund Universe



Source: CEM Benchmarking Inc.

Obviously, it had not been *PERS*' active management strategies that had exposed *PERS*' balance sheet to the considerable volatility and losses sustained over the 2001-2005 period. Relative to passively implementing *PERS*' 65-35 asset mix policy, active management had generated annual return volatility of only 0.8%, leading to a small negative NIVA of -0.4% per annum. Yet, *PERS*' total annual 'surplus return' volatility over the 2001-2005 period was a much larger 18%, which was almost completely due to the decision to maintain a 65-35 equity-debt asset mix over the 2001-2005 period. Overall 'surplus return' was -5.0% per annum, leading to a 5-year decline in *PERS*' funded ratio from 105% to 80%. Does it really make sense for pension funds like *PERS* to maintain a constant high-risk asset mix like 65-35 year-after-year while engaging in only a very modest amount of active management at the margin? Or should total balance sheet risk be managed more dynamically over time, with all balance sheet exposures subject to regular re-examination and possible revision? Has the time come to stop distinguishing between asset mix decisions and active management decisions? Alyson realized that these questions would have to be answered as part of her review of the *PERS* investment function.

Thinking About Alternative Investment Management Frameworks

A recent Rotman ICPM workshop Alyson attended gave her an opportunity think further about these questions ^[4]. One speaker suggested that there are three functional investment 'styles', and one dysfunctional one:

1. Risk-Minimizing Investing (RM) attempts to match future payment obligations with like-cashflows.
2. Short Horizon-Risky Investing (SHR) attempts to generate excess return over cash returns through the execution of adversarial trading strategies with sufficient predictive content to overcome trading costs.
3. Long Horizon-Risky Investing (LHR) attempts to identify, acquire, and nurture cashflows at prices which permit earning net returns equal to, or greater than some pre-set hurdle rate.
4. Beauty Contest Investing attempts to gather assets from investors who don't understand that there are only three functional investment 'styles'.

Passively implemented, the LHR style offers a simple, low-cost way of gaining exposure to a broadly diversified portfolio of equities to pension plans that can take some risk. Alternatively, for expert active investors, the LHR approach offers access to a potentially attractive opportunity set. The investment universe is very large. The truly long horizon-focused investment style is vastly underutilized. That is not all. As great thinkers such as Keynes and Drucker pointed out many decades ago, a material shift to LHR investing by large, expert investors has the potential to be transformative by (a) reducing the agency costs embedded in institutional capitalism, and by (b) paying closer attention to long-horizon, intangible factors that will positively impact sustainable wealth-creation over time ^[5]. Alyson was well aware that thought-leading pension funds such as ABP, PGGM, TIAA-CREF, and Ontario Teachers' were consciously moving their LHR strategies in this direction, as well as using diversified hedge fund combinations to implement their SHR strategies.

Another speaker offered evidence of a material gap between the stated aspirations of pension fund and insurance company 'owners' and their representatives to be LHR investors on the one hand, and the day-to-day behavior of most 'active' portfolio

managers working for them on the other. That day-to-day behavior seemed to be more that of Keynes' beauty-contest investors than of LHR investment theory's wealth-creators. Alyson was especially struck by a direct quote from a study the speaker had conducted: "If the whole market became more long-term and was trading on a 10-year outlook, that would be fine. But they're not, so you just have to trade on what they're trading on...". With this kind of culturally-anchored mind-set, genuine LHR investing becomes an impossibility^[7]. Still other speakers offered their views on what can be done to bridge the gap between LHR investment theory and beauty contest investment practice ^[8]. Brett Hammond of TIAA-CREF summarized the discussions by picking up on five participant observations made over the course of the workshop:

1. "Short-term investing can beat long-term investing".
2. "Long-term investing can be overdone".
3. "Long-term investing is more (less?) predictable.
4. "Warren Buffett can do it, but we can't (fewer agents involved)".
5. "One five-year performance period just turns into five 1-year periods".

With the *CEM* study of pension fund investment results generally and *PERS* specifically, with her discussions with industry leaders such as Bob Bertram, and with the ICPM workshop experience behind her, Alyson's time for action has come. A Board of Trustees meeting was looming in two weeks. She needed to think very carefully about how to present the investment challenges facing *PERS*' to the Board, and what course of action she should recommend ^[9].

NOTES

^[1] These issues were discussed in the 2005 ICPM Case Study (Case Description, Teaching Notes, Discussion Summary) titled "*PERS* and the Pension Revolution: Active Participant or Passive Bystander?" See www.rotman.utoronto.ca/icpm.

^[2] See www.cembenchmarking.com for more information on *CEM Benchmarking Inc.*

^[3] See the 2005 Annual Report of the Ontario Teachers' Pension Plan for more detail at www.otpp.com.

^[4] See "Redesigning the Investment Function: Key Workshop Findings and Conclusions", June 2006, at www.rotman.utoronto.ca/icpm for further details.

^[5] See Note ^[4] above.

^[6] See Note ^[4] above.

^[7] See Note ^[4] above.

^[8] See Note ^[4] above.

^[9] See Case Appendix I for four questions central to the issues facing *PERS*.

Case Appendix I

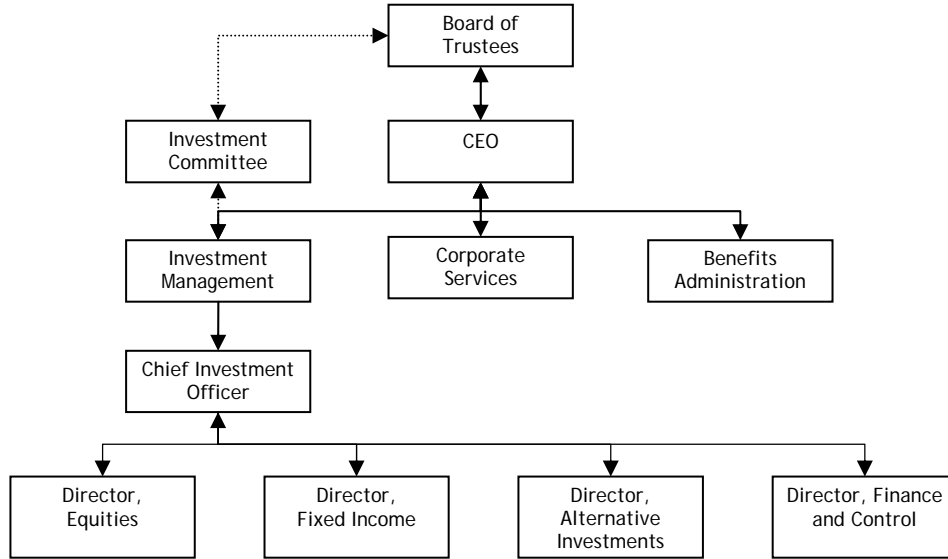
FOUR STRATEGIC QUESTIONS FACING PERS

The following four strategic questions capture the essence of the decisions facing Alyson Green and her Board of Trustees:

1. How should *PERS* deal with investment policy determination? Regarding the now-closed DB plan, should *PERS* continue the historical practice of making separate asset mix policy and implementation decisions? What is the relevance of the facts that the DB plan is (a) now closed to new entrants, and (b) that it has a current funded ratio of only 80%? Or should *PERS* move to a more dynamic, integrative process that would control macro financial risk through a single risk-budget at the balance sheet level, and have potential micro risk exposures evaluated, measured, and managed dynamically within that macro framework over time?
2. How should *PERS* deal with investment policy implementation? Should it continue the historical practice allocating many specialist 'active' portfolio management mandates by asset class, geography, style, and other 'micro' distinctions, with each mandate linked to a benchmark portfolio and a specified tracking error? Or should *PERS* move to one of two possible alternatives. A Minimum-Cost Strategy would get the investment job done without spending the current incremental \$165M per year (i.e., 30 bps on \$55B) on traditional active management services. Instead, it would employ only very low-cost, passive strategies to implement the chosen investment policy. Alternatively, a High-Performance Strategy would continue to 'invest' the current \$165M per year (and likely even more), but redesign the investment function so that the expected pay-back on marginal costs is large enough to justify the 'investment'.
3. What are the organizational implications of moving to a more dynamic, integrative investment policy determination process? Of moving to a minimum-cost implementation strategy with its implications for significantly down-sizing the current 45-member *PERS* Investment Department? Of moving to a high-performance implementation strategy with its implications for significantly expanding the current *PERS* Investment Department? Is moving to any of these alternatives from the status-quo even a realistic option for *PERS*? Could *PERS*' Board of Trustees and Investment Committee cope with the 'maverick' consequences of any of these changes? Would they dare to be different? What would the position of *PERS*' Investment Consultant be? And of *PERS*' Chief Investment Officer and his four department directors?
4. If the investment function is redesigned, will it be able to meet the needs of both the now-closed DB plan and the new hybrid pension plan for new employees?

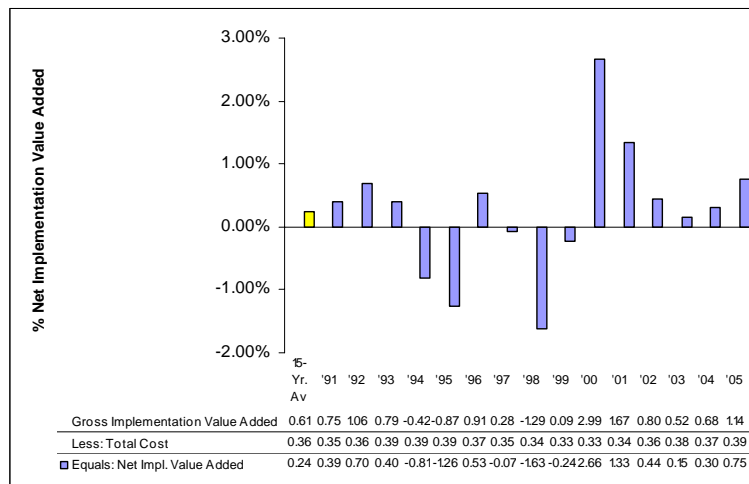
Case Appendix II (repeat of Figures and Tables)

**Figure 1:
Public Employers Retirement System (PERS) Organization Chart**



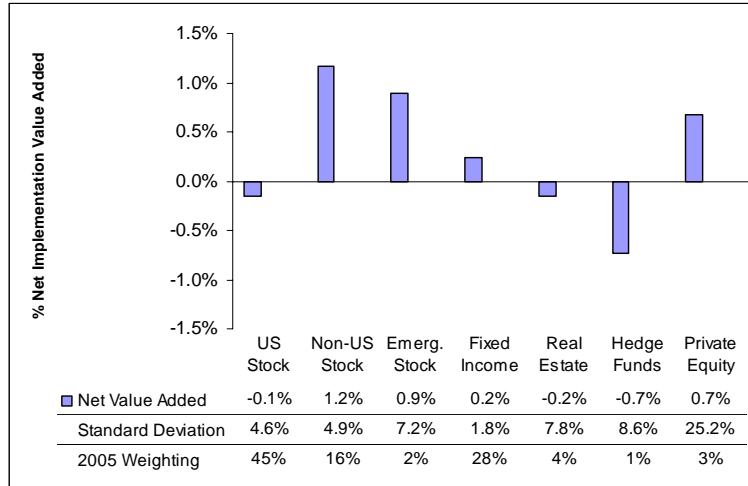
Total Investment Staff: 45
Total Number of External Managers: 50

**Figure 2:
Net Implementation Value Added for the Global Universe (1991-2005)**



Source: CEM Benchmarking Inc.

Figure 3:
Global Universe Net Implementation Value Added by Asset Category (1991-2005)



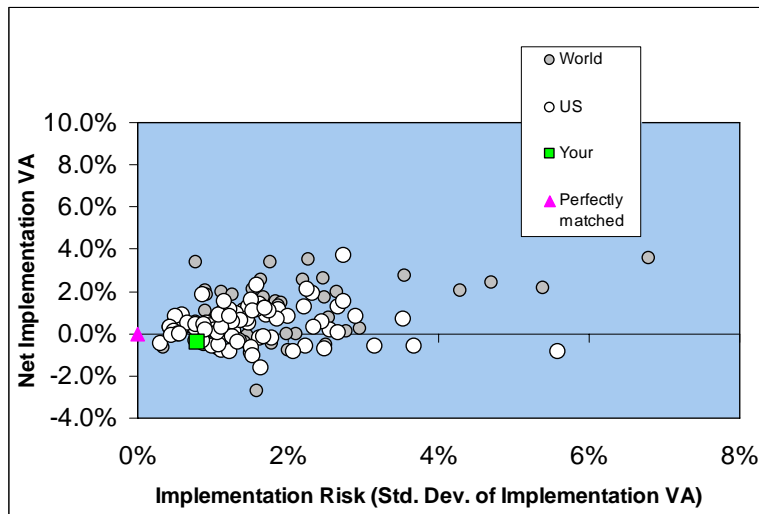
Source: CEM Benchmarking Inc.

Figure 4:
2005 U.S. Fund Cost Experience (bps)

		Max	Q1	Median	Q3	Min
Total Fund Operating Costs		138.3	53.1	40.5	28.7	2.8
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	External Active	102.5	49.5	42.1	33.1	11.1
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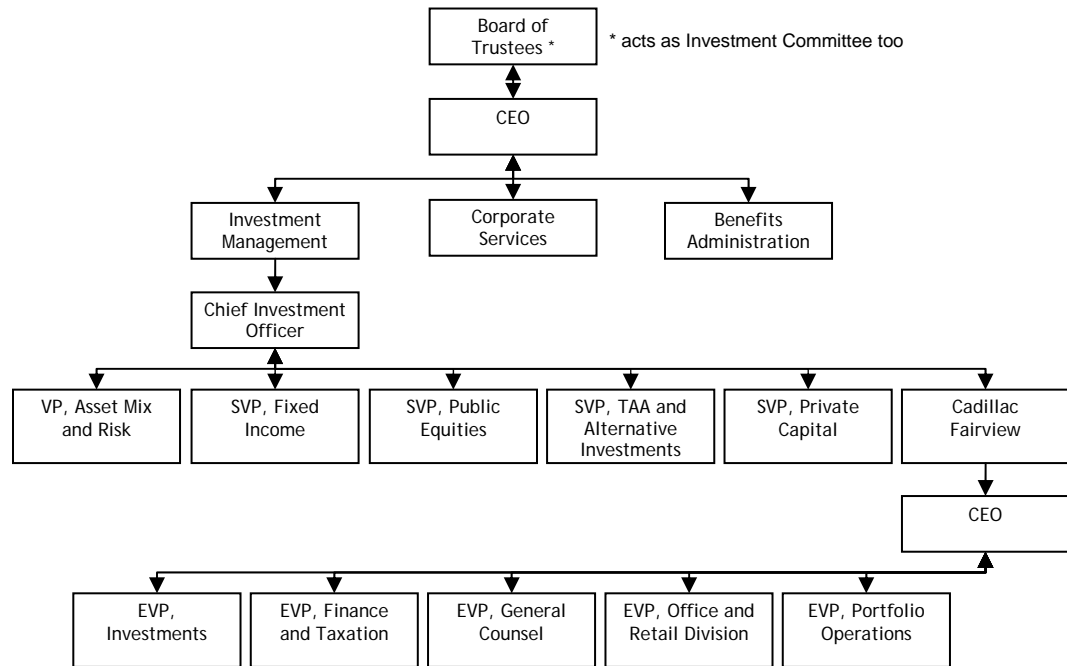
Source: CEM Benchmarking Inc.

Figure 5:
5-yr Net Implementation Value Added vs Implementation Risk for PERS (2001-2005)



Source: CEM Benchmarking Inc.

Figure 6:
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Total Number of External Investment Managers: 246

Source: Created from 2005 Ontario Teachers' Pension Plan Annual Report

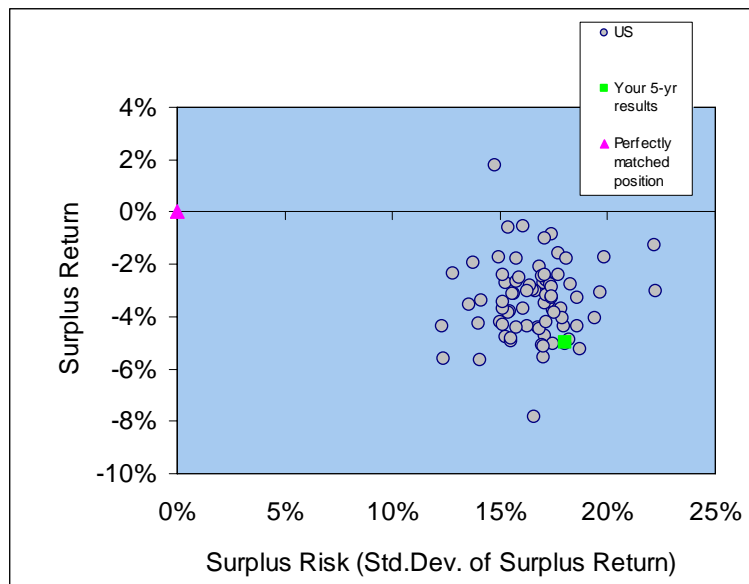
Figure 7:
2005 Compensation: OTPP vs. PERS

		Base Salary	Additional * Compensation	Total Compensation
OTPP	CIO	\$ 365K	\$ 4,773K	\$ 5,138K
	SVP, TAA and Alternative Investments	\$ 241K	\$ 2,941K	\$ 3,182K
	SVP, Public Equities	\$ 240K	\$ 2,792K	\$ 3,032K
PERS	CIO	\$ 140K	\$ 35K	\$175K
	Director, Alternative Investments	\$ 125K	\$25K	\$150K
	Director, Equities	\$ 115K	\$22K	\$137K

* Additional compensation includes incentive compensation and benefits packages, excluding pensions and medical.

Source: For OTPP data: 2005 Ontario Teachers' Pension Plan Annual Report

Figure 8:
5-yr Surplus Return vs Surplus Risk for PERS and the U.S. Fund Universe



Source: CEM Benchmarking Inc.