
**Funding Defined Benefit Pension Plans:
Risk-Based Supervision in Ontario**

*Overview and Selected Findings
2004-2008*

Financial Services Commission of Ontario

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Overview and Selected Findings 2004-2008

1.0 Introduction

The Financial Services Commission of Ontario (FSCO) is an arm's length agency of the Ministry of Finance that regulates Ontario registered pension plans in accordance with the *Pension Benefits Act* (PBA) and regulations.

Risk-Based Monitoring

In July 2000, FSCO implemented a risk-based approach to monitor the funding of defined benefit (DB) pension plans.¹ This approach involves the collection of key actuarial and financial data from funding valuation reports filed with FSCO, using a standard form called the Actuarial Information Summary (AIS).² The collected data are entered into a database, and a selective risk-based review system identifies individual funding reports for detailed compliance reviews.

Between July 1, 2004 and January 31, 2009, AIS data for approximately 8,900 funding valuation reports were entered into FSCO's database and screened through the selective review system. Thirty-four per cent of these reports were selected for further review, and over 26% of the selected reports were identified as having material compliance concerns that required further follow up. With very few exceptions, FSCO has been able to resolve the identified concerns with the plans' actuaries and administrators.

In 2006, to broaden the risk-based approach to monitoring DB pension plans, FSCO implemented a risk-based monitoring of pension fund investments.³ This program involves the collection of key financial and investment data for DB plans on an annual basis, using a standard form called the Investment Information Summary (IIS). The collected data are entered into a database, and a selective risk-based review system identifies plans with potential investment concerns for further review. The annual monitoring cycle covers plans whose plan fiscal year end date is between July 1 of one year and June 30 of the next. Over 90% of the plans have a fiscal year end date of December 31.

In each of the first two years of implementation, 2005-2006 and 2006-2007, IIS data for approximately 4,000 plans were entered into the IIS database and assessed with the predetermined criteria. The number of IIS filings for reporting period 2007-2008 decreased to

¹ *Risk-based Supervision of the Funding of Ongoing Defined Benefit Pension Plans* (May 2000), an overview of the risk-based approach, is available at: <http://www.fSCO.gov.on.ca/english/pensions/riskbasedsupervision.pdf>.

² The AIS is a standardized form, developed jointly by FSCO, the Canada Revenue Agency and the federal Office of the Superintendent of Financial Institutions. It is prepared by an actuary and filed with FSCO in conjunction with a funding valuation report.

³ Further information on the risk-based approach for monitoring pension fund investments is available at: <https://www.fsrao.ca/industry/pensions>

1,919 as a result of the exclusion of designated plans.⁴ Of all the IIS filings that were assessed, approximately 27% were flagged for further review, and approximately 55% of those flagged were identified as having material concerns that were brought to the attention of the plans' administrators. With very few exceptions, the identified concerns were properly addressed or rectified.

Risk-Based Reporting

The AIS and IIS databases provide FSCO with the information it needs to compile the relevant pension plan funding and investment data and to identify certain DB pension plan trends in Ontario. This is FSCO's fifth report on DB funding, and the first to include information on pension fund investments.

Key Findings

Some of the key findings are:

Funding Data

- Overall, the funded positions of pension plans have improved since the last report. In particular, the median funded ratio on a going concern basis has improved from 103% to 106%, whereas the median funded ratio on a solvency basis has improved from 90% to 91%.
- Most plans were less than fully funded on a solvency basis at their last valuation date, while significantly fewer plans were less than fully funded on a going concern basis. Specifically:
 - Seventy-six per cent of the plans were less than fully funded on a solvency basis (unchanged from the March 2008 report).
 - Thirty-two per cent of the plans were less than fully funded on a going concern basis (versus 42% in the March 2008 report).
- Assumptions and methods for the going concern valuations are increasingly more uniform when compared to prior valuations. For example:
 - Over 98% of the plans used the unit credit cost method.
 - Over 99% of the plans used either a market or smoothed market value of assets.
 - The average interest rate assumption used for going concern valuations decreased from 6.51% to 6.17% over the 2004 to 2007 valuation period, and almost 96% of the 2007 valuations used an interest rate below 7%.
 - Almost 99% of the 2007 valuations used an up-to-date (1994 or later) mortality table, compared to 84% of the 2004 valuations.
- The minimum required contributions for 2008, including employer normal cost, member required contributions and special payments, were estimated to be \$6.4 billion,

⁴ Designated Plans are defined in section 8515 of the federal Income Tax Regulations. Generally, these are plans for connected persons and highly-paid executives.

approximately the same as the amount estimated for 2007 (\$6.5 billion).

- After several years of improvements, the funded position of pension plans is expected to decrease materially during 2008. Overall, the median solvency ratio for pension plans is projected to decrease from 93% to 77% between the 2007 and 2008 year ends. The key drivers of this reduction are the weak investment performance of financial markets during 2008 and the use of lower interest rates for determining commuted values. Special payments for less than fully funded plans are expected to lessen the extent of the decrease in solvency ratio for these plans.

Investment Data

- The asset mix of pension funds remained steady over time, and the typical 40/60 fixed income/non-fixed income split was predominant.
- Generally, plans with lower solvency ratios invested more in non-fixed income assets and had poorer performance on both absolute and relative bases than plans with higher solvency ratios.
- Larger plans invested a lower proportion of plan assets in pooled funds and had better absolute and relative investment performance.
- Over 75% of the plans did not outperform the market, when actual returns net of investment expenses were compared to market index returns.

2.0 Statistical Analysis – Funding

This section summarizes some of the funding data, including actuarial assumptions and methods, for DB pension plans with valuation dates between July 1, 2005 and June 30, 2008. The data were compiled from the AIS and funding valuation reports received by FSCO on or before January 31, 2009.

Generally, funding valuation reports must be filed once every three years on both a going concern and solvency basis. However, if solvency concerns are indicated,⁵ annual filing is required until these concerns are eliminated. Early filings may also be required when events such as plan mergers, partial windups, or sales of businesses occur. To avoid double counting, only the data from a plan's most recently filed report were included.

For the purpose of this report, designated plans, plans where members are no longer accruing future benefits, and plans with outstanding valuation reports have been excluded. In addition, seven (7) large public sector plans⁶ have been excluded in order not to skew the results of our analysis.

In total 1,564 plans were included in the statistical analysis. Table 1 presents a summary of these pension plans.

Table 1 – Summary of Plans Included

Plan/ Benefit Type	# of Plans	Active Members	Retired Members	Other Beneficiaries	Total	Market Value of Assets (\$Million)
Final Average	619	205,969	125,873	50,587	382,429	\$ 59,390
Career Average	220	42,448	25,595	14,586	82,629	\$ 6,612
Flat Benefit	338	112,767	111,796	37,643	262,206	\$ 28,677
Hybrid	315	156,407	124,250	67,986	348,643	\$ 32,695
Multi-Employer	72	368,450	94,446	328,850	791,746	\$ 18,888
Total	1,564	886,041	481,960	499,652	1,867,653	\$ 146,262

The average age of the membership for all included plans was 42.3 for active members and 71.5 for retired members.

⁵ A report is said to indicate solvency concerns if (i) the solvency ratio is less than 80%, or (ii) the solvency ratio is between 80% and 90% and the solvency liabilities exceed the market value of assets by more than \$5 million. A plan's solvency ratio is the ratio of the market value of the plan's assets to the plan's solvency liabilities.

⁶ Based on the most recently filed reports, these seven public sector plans had a total membership exceeding one million (681,000 actives, 349,000 retirees and 144,000 other beneficiaries) and total assets of \$229 billion at market value. The average age of their membership was 44.3 for active members and 69.9 for retired members.

Compared with the findings in FSCO's previous reports (June 2006, March 2007, March 2008⁷) there continues to be a decrease in the number of final average, career average and flat benefit plans, and an increase in the number of hybrid plans. Since the March 2008 report, 125 (7.7%) of the DB plans have become hybrid plans, have wound up or have frozen future accruals of defined benefits.

2.1 Summary of Funded Status

The main findings regarding the funded status of DB pension plans are as follows:

- For all plans analyzed, the median funded ratios were 106% on a going concern basis and 91% on a solvency basis. Thirty-two per cent of the plans were less than fully funded on a going concern basis, while 76% were less than fully funded on a solvency basis.
- Of the 619 final average earnings plans, 255 (41%) were less than fully funded on a going concern basis and 406 (66%) were less than fully funded on a solvency basis.
- Of the 220 career average earnings plans, 50 (23%) were less than fully funded on a going concern basis and 190 (86%) were less than fully funded on a solvency basis.
- Of the 338 flat benefit plans, 73 (22%) were less than fully funded on a going concern basis. On a solvency basis, flat benefit plans were the least well funded – 309 (91%) of these plans were less than fully funded, and 85 (25%) had a solvency ratio of less than 80%.
- Of the 315 hybrid plans, 103 (33%) were less than fully funded on a going concern basis and 229 (73%) were less than fully funded on a solvency basis.
- Of the 72 multi-employer pension plans (MEPPs), 20 (28%) were less than fully funded on a going concern basis and 53 (74%) were less than fully funded on a solvency basis. Sixteen plans (22%) had a solvency ratio of less than 80%. These 16 plans have approximately 544,000 members and former members, representing almost 69% of the total MEPP membership.

⁷ These reports are available at: http://www.fSCO.gov.on.ca/english/pensions/DB_Funding_Report_2006.pdf, http://www.fSCO.gov.on.ca/english/pensions/DB_Funding_2007.pdf and http://www.fSCO.gov.on.ca/english/pensions/DB_Funding_2008.pdf.

Tables 2 and 3 below provide a more detailed breakdown of the going concern and solvency funded ratios in respect of different types of DB pension plans.

Table 2 – Going Concern Funded Ratios

Funded Ratio (FR)	Final Average	Career Average	Flat Benefit	Hybrid	MEPP	All Plans
FR < 0.60	6	2	5	1	1	15
0.60 ≤ FR < 0.80	12	5	6	3	1	27
0.80 ≤ FR < 0.90	80	8	19	23	5	135
0.90 ≤ FR < 1.00	157	35	43	76	13	324
1.00 ≤ FR < 1.20	283	133	171	157	44	788
FR ≥ 1.20	81	37	94	55	8	275
Total	619	220	338	315	72	1,564
Median Ratio	1.03	1.08	1.11	1.05	1.05	1.06

Table 3 – Solvency Funded Ratios

Solvency Ratio (SR)	Final Average	Career Average	Flat Benefit	Hybrid	MEPP	All Plans
SR < 0.60	11	4	8	2	4	29
0.60 ≤ SR < 0.80	39	44	77	21	12	193
0.80 ≤ SR < 0.90	173	82	144	100	11	510
0.90 ≤ SR < 1.00	183	60	80	106	26	455
1.00 ≤ SR < 1.20	152	22	27	65	17	283
SR ≥ 1.20	61	8	2	21	2	94
Total	619	220	338	315	72	1,564
Median Ratio	0.93	0.87	0.85	0.93	0.92	0.91

2.2 Summary of Actuarial Assumptions and Methods

The key actuarial assumptions and methods used in going concern valuations are as follows:

- Over 98% of the plans used the unit credit cost method (with salary projection for final average plans) to calculate the going concern liabilities.

Table 4 – Liability Valuation Method

Liability Valuation Method	# of Plans	% of Plans
Unit Credit	1,541	98.5%
Entry Age Normal	17	1.1%
Aggregate	3	0.2%
Other	3	0.2%
Total	1,564	100.0%

- Assets were most frequently valued using a market or market-related approach, with over 99% of the plans using either a market or smoothed market value.

Table 5 – Asset Valuation Method

Asset Valuation Method	# of Plans	% of Plans
Market	1,046	66.9%
Smoothed Market	506	32.3%
Book	6	0.4%
Book & Market Combined	5	0.3%
Other	1	0.1%
Total	1,564	100.0%

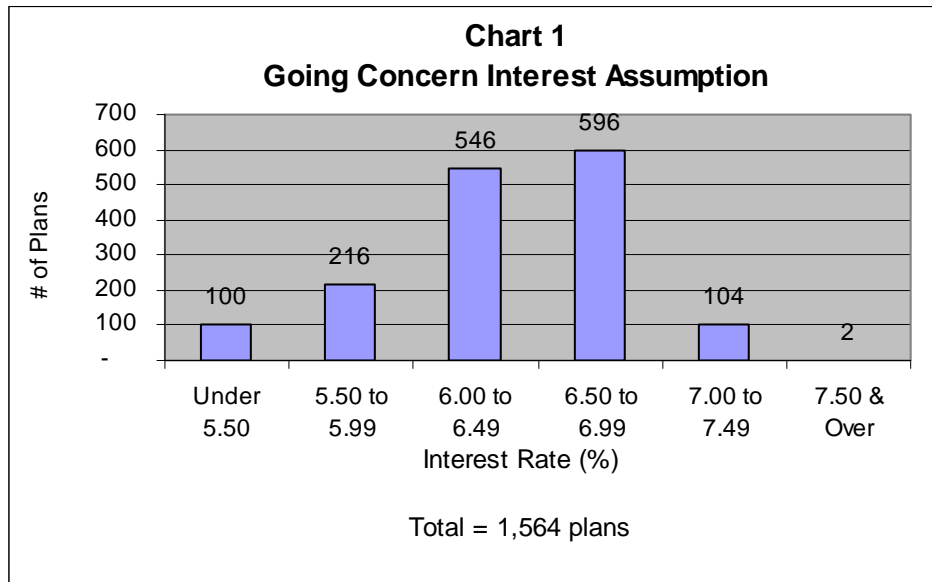
- For going concern valuations, only 1% of the plans used a mortality assumption based on the 1983 Group Annuity Mortality (GAM) table developed by the Society of Actuaries, while 99% used a more up-to-date table (e.g., 1994 GAM Static, 1994 Group Annuity Reserving (GAR), 1994 Uninsured Pensioner (UP), and RP-2000). The 1994 UP (with or without projection of mortality improvement) mortality assumption was used by more than 91% of the plans.⁸

Table 6 – Mortality Assumption

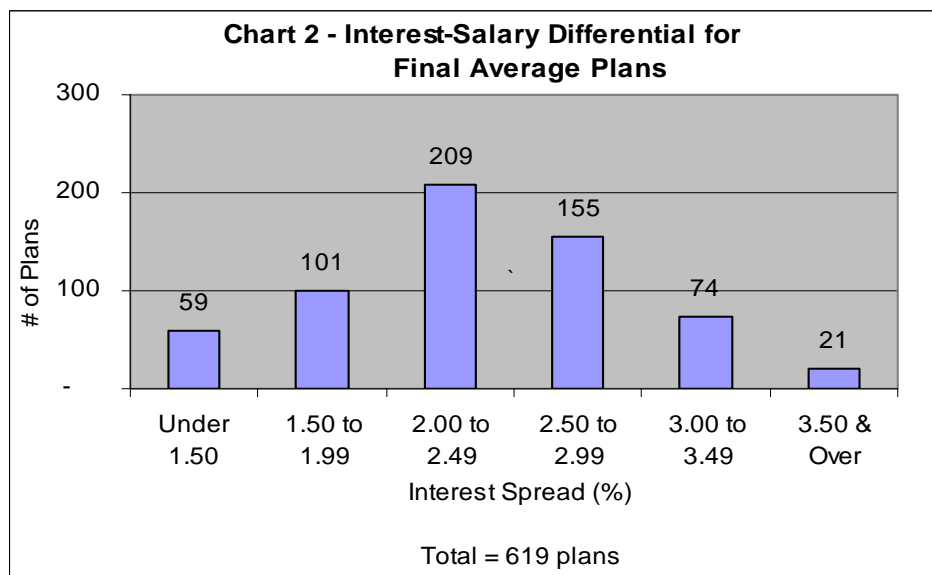
Mortality Assumption	# of Plans	% of Plans
1983 GAM	17	1.1%
1994 GAM Static	61	3.9%
1994 GAR	21	1.3%
1994 UP	1,433	91.6%
Other (2000RP, 1995 Buck)	32	2.1%
Total	1,564	100.0%

⁸ Also see commentary on mortality assumptions that accompanies Table 16 in this report.

- Interest rate assumptions used to value the going concern liabilities were generally lower than in prior years, with approximately 88% of the plans using a rate at or below 6.5%. Rates continued to fall within a relatively tight range, with two-thirds (67%) of the plans using a rate between 6.0% and 6.5%.⁹



- For final average earnings plans, the difference between the interest assumption and the salary increase assumption used in going concern valuations typically fell within a range of 1.5% to 3.0% (accounting for 84% of all final average plans).¹⁰



⁹ Of the 596 plans that used a going concern interest rate assumption in the range of 6.50% to 6.99%, 508 plans used an interest rate of 6.50%.

¹⁰ Of the 74 final average plans with interest-salary differential in the range of 3.00% to 3.49%, 58 plans had an interest-salary differential of 3.00%.

- Table 7 shows the total wind up expense allowance made in solvency valuations by plan membership size, including members, former members and other beneficiaries.¹¹ The expense allowance is also expressed in average dollar amounts per plan and per plan member. The allowance for wind up expenses is generally higher than the amounts previously reported. The average expense allowance per member generally decreases as plan membership size increases. The reverse pattern appears for plans with 10,000 or more members. Because there is only a small number of plans in the last two size categories (i.e., more than 5,000 members), greater caution should be exercised when interpreting the results for plans of this size.

Table 7 – Provision for Wind Up Expenses

Plan Membership	# of Plans	Total Membership	Total Wind Up Expenses	Average Wind Up Expenses	
				Per Plan	Per Member
<100	500	23,378	\$ 21,622,855	\$ 43,246	\$ 925
100-499	573	138,846	\$ 58,932,200	\$ 102,849	\$ 424
500-999	182	126,276	\$ 37,984,880	\$ 208,708	\$ 301
1,000-4,999	209	420,227	\$ 96,097,150	\$ 459,795	\$ 229
5,000-9,999	36	239,726	\$ 46,344,000	\$1,287,333	\$ 193
10,000-49,999	25	442,582	\$149,008,000	\$5,960,320	\$ 337
Total	1,525	1,391,035	\$409,989,085	\$ 268,845	\$ 295

¹¹ For confidentiality reasons, the two plans with more than 50,000 members and other beneficiaries were excluded from this analysis.

3.0 Statistical Analysis – Investment

The plans included in the investment statistical analysis were those of the 1,564 plans summarized in Table 1 whose latest IIS (for plan years ending between July 1, 2007 and June 30, 2008) was received by FSCO on or before January 31, 2009. There are 1,477 plans in this subset, representing 94% of the total.¹²

For hybrid plans, only the defined benefit component of the pension fund is included in the data.

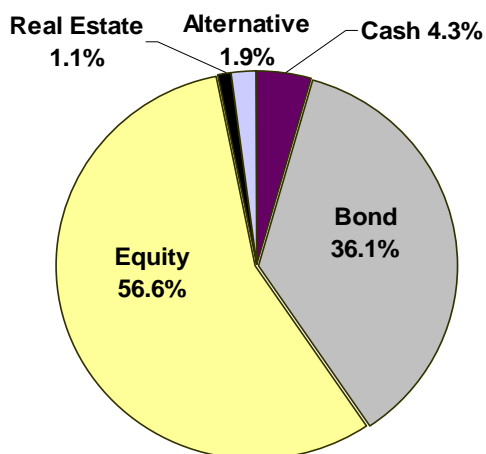
3.1 Pension Funds Profile

The asset mix of the 1,477 pension funds, as a whole, for the latest monitoring cycle is described in Table 8 and depicted in Chart 3.

Table 8 – Asset Mix of All Plans as a Whole

	Asset Class ¹³	Market Value (\$Millions)	% of Total Investments
Asset Mix	Cash	\$6,375	4.3%
	Bond	\$53,004	36.1%
	Equity	\$83,052	56.6%
	Real Estate	\$1,606	1.1%
	Alternative Investments ¹⁴	\$2,754	1.9%
	Total	\$146,791	100.0%

Chart 3: Asset Mix of All Plans as a Single Portfolio



¹² Plans included in the funding analysis that are not in the investment analysis are primarily new plans, plans with outstanding IIS filings, and plans that were no longer required to file an IIS after the date of the last filed valuation.

¹³ Plan assets invested in pooled funds totaling \$58,494 million or 39.8% of total investments. Pooled funds are included in the asset mix of all plans based on their underlying asset classes.

¹⁴ Alternative Investments include hedge funds, private equity, infrastructure, resource properties, etc.

On a broad basis, fixed income assets include cash and bonds and constitute 40% of total investments, whereas non-fixed income assets include equity, real estate and alternative investments and constitute 60% of total investments.

3.2 Summary of Fund Performance

This section provides statistics on asset mix and investment performance by various categories for the latest monitoring cycle.

The 1,477 plans included in the analysis are very diverse. To illustrate the investment results for pension plans that have different characteristics, the asset mix and performance data are presented by different plan type, benefit type, plan size, solvency ratio and percentage invested in pooled funds.

In the “Asset Mix” section, the weight of each asset class is shown for all plans in each subgroup and for all plans as a whole.

In the “Performance” section, all performance numbers are determined at the individual plan level. “Return” means the rate of return, net of all investment expenses, while “Outperformance” measures how a pension fund performs relative to the market. Outperformance relative to market performance for an individual fund is determined as the fund’s actual rate of return (net of expenses) minus the weighted average of market index returns, given the individual pension fund’s asset mix.

By Plan Type

The investment overview of single employer pension plans (SEPPs) and multi-employer pension plans (MEPPs) is given below. The asset mix and average performance returns are shown in Table 9A, while the percentile performance returns appear in Table 9B.

Table 9A – Investment Results by Plan Type

Plan Type		SEPP	MEPP	Total
# of Plans		1,406	71	1,477
Asset Mix	Fixed Income	40.8%	38.1%	40.4%
	Non-Fixed Income	59.2%	61.9%	59.6%
Performance	Average Return ¹⁵	1.77%	1.66%	1.76%
	Average Outperformance	-1.99%	-2.12%	-1.99%

¹⁵ This and those in Tables 10-13 are the arithmetic (equally-weighted) average of investment returns of pension funds in each subgroup. The average of investment returns weighted by the sizes of all pension funds is 2.41%, compared to 1.76% on an equally-weighted basis shown herein.

Table 9B – Performance Result Percentiles by Plan Type

Plan Type	SEPP	MEPP	Total
Investment Returns			
90 th Percentile	5.08%	4.29%	5.07%
75 th Percentile	3.14%	2.66%	3.11%
Median	1.46%	1.51%	1.47%
25 th Percentile	0.12%	0.52%	0.12%
10 th Percentile	-1.24%	-0.97%	-1.24%
Investment Outperformance			
90 th Percentile	1.40%	0.34%	1.35%
75 th Percentile	-0.31%	-1.06%	-0.36%
Median	-2.30%	-2.38%	-2.31%
25 th Percentile	-3.83%	-3.36%	-3.81%
10 th Percentile	-5.19%	-4.30%	-5.17%

By Benefit Type

The investment overview of pension plans with various benefit types is given in Table 10.

Table 10 – Investment Results by Benefit Type

Benefit Type		FAE	CAE	FB	Hybrid	Total
# of Plans		586	224	364	303	1,477
Asset Mix	Fixed Income	39.8%	40.4%	37.6%	44.8%	40.4%
	Non-Fixed Income	60.2%	59.6%	62.4%	55.2%	59.6%
Performance	Average Return	1.75%	1.84%	1.90%	1.58%	1.76%
	Average Outperformance	-2.05%	-2.10%	-1.74%	-2.12%	-1.99%

By Plan Size

The investment overview of pension funds of various sizes is given in Table 11.

Table 11 – Investment Results by Plan Size

Size		Small (<\$25 Million)	Medium (>\$25M, <\$250M)	Large (>\$250 Million)	Total
# of Plans		931	439	107	1,477
Asset Mix	Fixed Income	42.6%	42.1%	39.7%	40.4%
	Non-Fixed Income	57.4%	57.9%	60.3%	59.6%
Performance	Average Return	1.68%	1.91%	1.94%	1.76%
	Average Outperformance	-2.19%	-1.75%	-1.26%	-1.99%

By Solvency Ratio

The investment overview of pension plans with various solvency ratios is given in Table 12.

Table 12 – Investment Results by Solvency Ratio (SR)

Solvency Ratio (SR)		SR < 0.8	0.8 ≤ SR < 1	SR ≥ 1.0	Total
# of Plans		134	962	381	1,477
Asset Mix	Fixed Income	35.4%	40.9%	42.0%	40.4%
	Non-Fixed Income	64.6%	59.1%	58.0%	59.6%
Performance	Average Return	0.93%	1.81%	1.94%	1.76%
	Average Outperformance	-2.67%	-1.95%	-1.86%	-1.99%

By Percentages Invested in Pooled Funds

The results for plans with various percentages invested in pooled funds are given in Table 13.

Table 13 – Investment Results by Percentage Invested in Pooled Funds

Percentage Invested in Pooled Funds		< 20%	20% to 80%	> 80%	Total
# of Plans		229	239	1,009	1,477
Asset Mix	Fixed Income	40.7%	40.1%	40.4%	40.4%
	Non-Fixed Income	59.3%	59.9%	59.6%	59.6%
Performance	Average Return	2.63%	2.00%	1.51%	1.76%
	Average Outperformance	0.19%	-2.19%	-2.44%	-1.99%

3.3 Investment Observations

This section presents some main observations of the analyses set out in sections 3.1 and 3.2. The focus is on those findings that are both sufficiently recognizable for 2007 and commonly evident for the previous two monitoring cycles. These observations are as follows:

- The asset mix of pension funds remained steady over time and the typical 40/60 fixed income/equity split was predominant.
- Pension funds of MEPPs generally invested more in non-fixed income assets than SEPPs.
- Flat benefit plans invested more in non-fixed income assets than other plans, while hybrid plans invested more in fixed income assets.
- Plans with lower solvency ratios invested more in non-fixed income assets and had poorer performance on both absolute and relative bases than plans with higher solvency ratios.
- Larger plans invested a lower proportion of plan assets in pooled funds and performed better on both absolute and relative bases than smaller plans.
- Pension funds that invested less in pooled funds generally performed better on both absolute and relative bases than those that invested more in pooled funds. This could be explained in large part by the higher investment management fees charged to pooled funds.
- Over 75% of the plans did not outperform the market, when actual returns net of investment expenses were compared to market index returns.

4.0 Trends Analysis

The following trends analysis incorporates data from all filed reports with valuation dates between July 1, 2004 and June 30, 2008.¹⁶

4.1 Solvency Funded Status

Table 14 shows a breakdown of plans by solvency ratios for the following valuation years:

- 2004 valuation year: July 1, 2004 to June 30, 2005
- 2005 valuation year: July 1, 2005 to June 30, 2006
- 2006 valuation year: July 1, 2006 to June 30, 2007
- 2007 valuation year: July 1, 2007 to June 30, 2008

The majority of plans have a valuation date of either December 31 or January 1. Plans having solvency concerns are required to file valuation reports annually and, therefore, would appear in our database for more than one valuation year.

Table 14 - Solvency Ratios by Valuation Year

Solvency Ratio (SR)	2004		2005		2006		2007	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
SR < 0.60	34	3.6%	37	4.4%	24	2.6%	12	1.8%
0.60 ≤ SR < 0.80	315	33.0%	338	40.8%	164	17.6%	125	18.5%
Sub-Total < 0.8	349	36.6%	375	45.2%	188	20.2%	137	20.3%
0.80 ≤ SR < 0.90	289	30.3%	203	24.5%	303	32.5%	231	34.2%
0.90 ≤ SR < 1.00	148	15.5%	119	14.4%	256	27.5%	174	25.7%
Sub-Total < 1.00	786	82.4%	697	84.1%	747	80.2%	542	80.2%
1.00 ≤ SR < 1.20	117	12.3%	90	10.8%	143	15.4%	103	15.2%
SR ≥ 1.20	51	5.3%	42	5.1%	41	4.4%	31	4.6%
Total	954	100.0%	829	100.0%	931	100.0%	676	100.0%
Median Ratio	0.83		0.81		0.89		0.88	

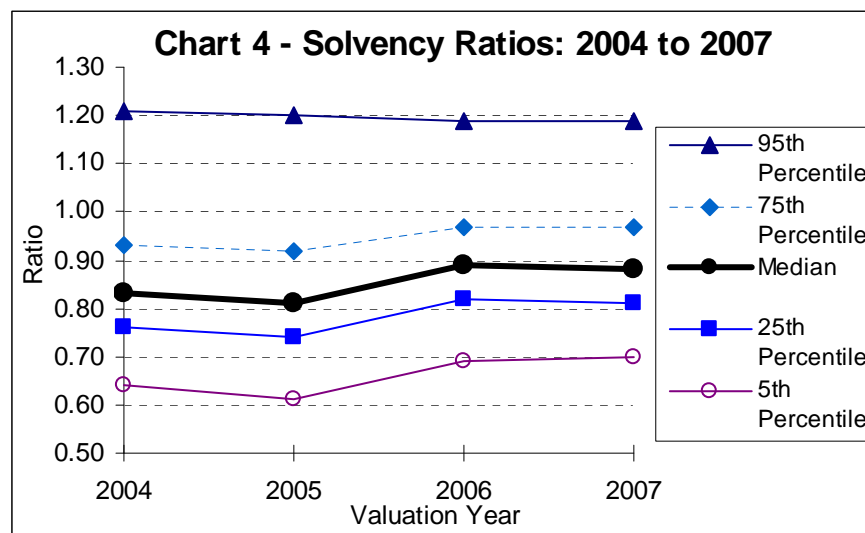
Table 14 shows the distribution of solvency ratios was relatively unchanged between the 2006 and 2007 valuations, and the ratios for these two years were generally higher than those for 2004 and 2005. Underfunded plans accounted for 80.2% of the plans that filed a 2006 or 2007 valuation, compared with 82.4% and 84.1% of those plans that filed a 2004 or 2005 valuation. The proportion of reports showing a solvency ratio of less than 80% was 20.3% in 2007, less than half of the 45.2% reported in 2005 valuation.

¹⁶ Plans that had outstanding funding valuation reports were excluded from the analysis in FSCO's previous report (March 2008). Some of those outstanding reports have since been filed. Therefore, the number of plans in each of the 2004, 2005 and 2006 valuation years is somewhat higher than in the previous report.

The overall solvency funding position of pension plans remained relatively unchanged from the 2006 level. In particular, the solvency funding position of pension plans in 2007 was affected by:

- Pension fund returns, with a median return of 1.5%,¹⁷ were lower than the liability interest rates assumed in the 2006 valuation.
- Deficit reduction special payments were made or contribution holidays were taken during 2007, which had positive and negative effects, respectively.
- Solvency valuation assumptions remained relatively stable, in comparison with those used in the 2006 valuation:
 - The interest rate assumption for calculating transfer values changed from 4.75% for all years (effective at the end of 2006) to 4.75% for the first 10 years and 5.0% thereafter (effective at the end of 2007).
 - The interest rate assumption used to value immediate pensions decreased from 4.6% (effective at the end of 2006) to 4.5% (effective at the end of 2007).
 - The mortality assumption remained unchanged as 1994 UP with projection for mortality improvement to year 2015.

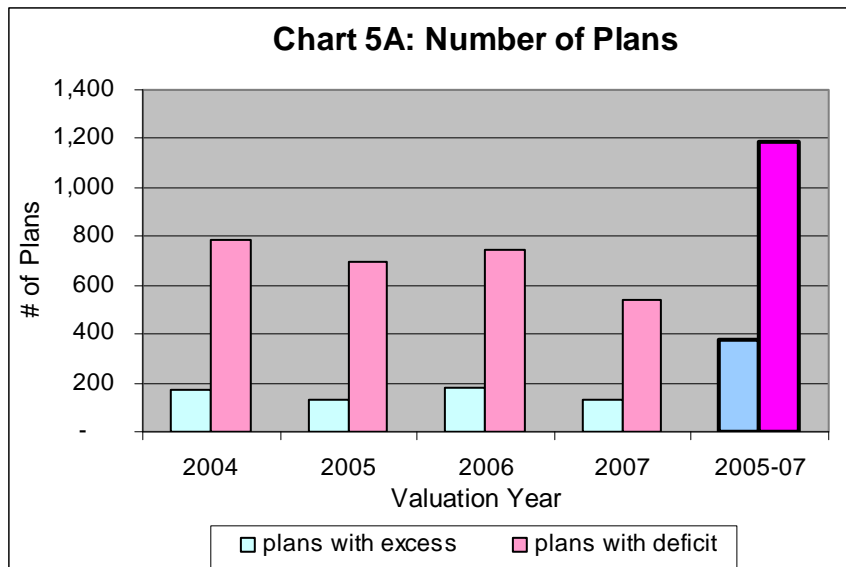
Chart 4 shows the distribution of solvency ratios at different percentiles. The solvency ratios at the 95th percentile have been relatively stable in recent years. All other percentiles experienced an increase from the 2005 valuation year to the 2006 valuation year, and remained relatively stable for the 2007 valuation year.



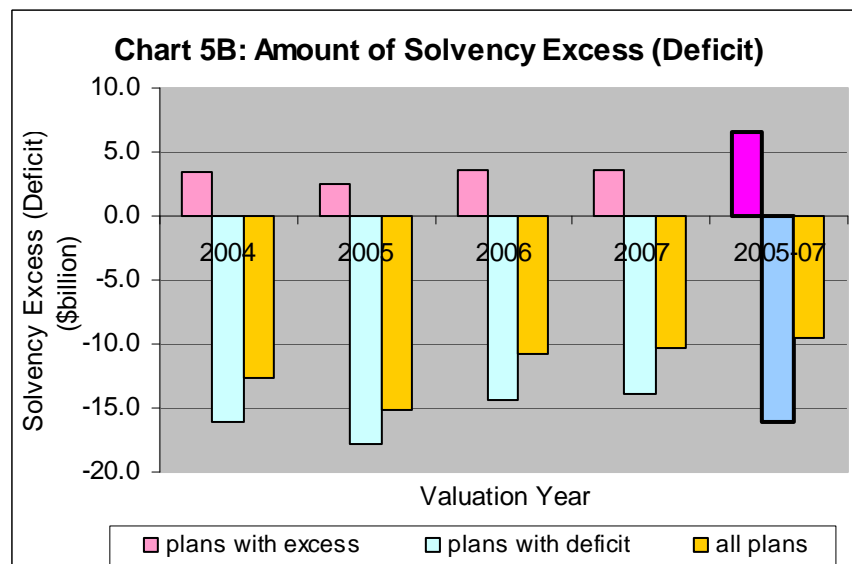
¹⁷ Canadian Institute of Actuaries, *Report on Canadian Economic Statistics 1924-2007*, April 2008.

Chart 5 compares plans with a solvency excess to those with a solvency deficit for each of the four valuation years from 2004 to 2007, as well as for the three-year valuation period of 2005 to 2007.¹⁸ Chart 5A compares the number of plans and Chart 5B compares the amount of solvency excess (deficit).

Chart 5 - Solvency Funding Positions of Ontario Defined Benefit Plans



The number of plans with solvency excesses has remained well below the number of plans with solvency deficits.



¹⁸ Individual valuation years include those plans that filed a report with a valuation date that fell during that individual year. The 2005-07 period includes only the last funding valuation report filed for a plan with a valuation date falling in the period July 1, 2005 to June 30, 2008. The sum of the number of plans included in each of the 2005, 2006 and 2007 valuation years is higher than the number of plans included in the combined period 2005-2007.

On a dollar amount basis, plans that filed a report within the three valuation years 2005 to 2007 reported a *net* solvency deficit of \$9.6 billion (after allowance for expenses) on solvency liabilities of \$155.4 billion. This represents the aggregate level of under-funding for the DB plans registered in Ontario, exclusive of the seven public sector plans and the other excluded plans previously described.

Ontario's legislation allows certain benefits (e.g., post-retirement indexation, consent benefits, plant closure and permanent layoff benefits) to be excluded in the calculation of solvency liabilities. There were 221 plans that excluded one or more of these benefits, resulting in a reduction of liabilities in the amount of \$12.5 billion. Thus, the aggregate *wind up* funding shortfall for those plans that filed a report within the three valuation years 2005 to 2007 would have exceeded their *net* solvency deficit by the same amount. This translates into a wind up funding deficit of \$22.1 billion (\$9.6 plus \$12.5), after allowance for expenses, on wind up liabilities of \$167.9 billion.

4.2 Actuarial Assumptions

Table 15 shows the interest rate assumptions used in the going concern valuations. There is a clear trend of using a lower interest rate assumption since 2004. This downward trend has been reported since we started publishing trend statistics for valuation years after 2000.

Table 15 - Interest Rate Assumption by Valuation Year

Rate (%)	2004		2005		2006		2007	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
Rate < 5.50	7	0.7%	30	3.6%	55	5.9%	40	5.9%
5.50 ≤ Rate < 6.00	53	5.6%	86	10.4%	132	14.2%	83	12.3%
6.00 ≤ Rate < 6.50	239	25.1%	235	28.3%	290	31.1%	280	41.4%
6.50 ≤ Rate < 7.00	378	39.6%	360	43.4%	374	40.2%	245	36.3%
7.00 ≤ Rate < 7.50	257	26.9%	110	13.3%	79	8.5%	27	4.0%
Rate ≥ 7.50	20	2.1%	8	1.0%	1	0.1%	1	0.1%
Total	954	100.0%	829	100.0%	931	100.0%	676	100.0%
Average (%)	6.51%		6.34%		6.22%		6.17%	

The average of the assumed interest rates declined from 6.51% to 6.17% over the four valuation years 2004 to 2007 and, for the first time, the interest rate range most often used dropped from the 6.50-6.99% range to the 6.0-6.49% range.

The proportion of plans using an interest rate assumption of 7% or more has decreased each year. Almost 96% of the plans with a 2007 valuation used an assumed interest rate below 7%.

As a comparison, the Canadian Institute of Actuaries recommended the following select-period interest rates for computing minimum transfer values: 5.5% (2004), 4.5% (2005) and 4.75% (2006 and 2007).

Table 16 shows the relative frequency of the mortality tables used in going concern valuations. Almost all plans are now using more up-to-date mortality tables, i.e., the 1994 tables (GAM, GAR, UP).

Table 16 - Mortality Assumption by Valuation Year

Mortality Assumption	2004		2005		2006		2007	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
1983 GAM	138	14.5%	24	2.9%	14	1.5%	8	1.2%
1994 GAM static	174	18.3%	79	9.5%	54	5.8%	10	1.5%
1994 GAR	7	0.7%	9	1.1%	14	1.5%	8	1.2%
1994 UP	625	65.5%	709	85.5%	826	88.7%	626	92.6%
Other	10	1.0%	8	1.0%	23	2.5%	24	3.5%
Total	954	100.0%	829	100.0%	931	100.0%	676	100.0%

In the 2004 valuation year, 84% of the plans used a 1994 table. This percentage was above 96% for the 2005 and 2006 valuation years. In the 2007 valuation year, all but 8 plans (99%) used a mortality table of 1994 or later.¹⁹

The trend towards using more up-to-date mortality tables is particularly evident with the 1994 UP table. The proportion of plans using that table (with or without projection for mortality improvement) has increased each year since 2004 (and earlier), from 65.5% in 2004 to 92.6% in 2007.

¹⁹ All of the plans using “Other” mortality assumptions (24 of them) used other post-1994 mortality tables – e.g., RP2000.

5.0 2008 Projections

5.1 Estimated Funding Contributions in 2008

Table 17 presents the estimated funding contributions – comprising normal costs and special payments – that are expected to be made in respect of defined benefits in 2008, including those related to defined benefit provisions under hybrid plans. The estimates are based on information from the most recently filed funding valuation reports with valuation dates between July 1, 2005 and June 30, 2008.²⁰

Table 17 – Estimated Funding (\$Million) of Defined Benefits in 2008

	Plans with Solvency Excess	Plans with Solvency Deficit	All Plans
Number of Plans	377	1,187	1,564
Employer Normal Cost Contributions	\$ 1,322	\$ 2,007	\$ 3,329
Member Required Contributions	\$ 357	\$ 179	\$ 536
Sub-total	\$ 1,679	\$ 2,186	\$ 3,865
Special Payments	\$ 84	\$ 2,421	\$ 2,505
Total	\$ 1,763	\$ 4,607	\$ 6,370

The total estimated funding contributions for 2008 are estimated to be \$6.4 billion, which is very close to the 2007 estimate of \$6.5 billion. A \$157 million decrease in special payments (primarily from solvency valuations) was partially offset by a \$63 million increase in normal cost and member contributions (from going-concern valuations). The special payments of \$2.5 billion represent 39% of the total estimated 2008 funding contributions of \$6.4 billion.

The table also provides a breakdown of the estimated funding contributions between plans that had a solvency excess and plans that had a solvency deficit. The aggregate special payments for plans with a solvency excess (\$84 million) represent 5% of the total contributions (\$1.8 billion) for these plans. This compares with the aggregate special payments for plans with a solvency deficit (\$2.4 billion), which represent 53% of the total contributions (\$4.6 billion) for these plans.

The estimated 2008 funding contributions are determined without consideration of prior year credit balances, which can be used to reduce required contributions during the valuation period. A total of \$853.3 million of prior year credit balances were reported for 121 plans that had a non-zero prior year credit balance.

²⁰ For plans where AIS reported contributions did not extend to the end of 2008, the 2008 estimated contributions were determined assuming contributions would continue at the same rate as that reported for the valuation period.

5.2 Projected Solvency Position as at December 31, 2008

This section presents a projection of the solvency funding position of DB plans to the end of 2008 by capturing the impact of investment returns, changes in solvency interest rates and the special payments expected to be made during 2008. The methodology and assumptions used are described below.

Methodology and Assumptions

The results reported in the last filed funding valuations (i.e., assets and liabilities) were first adjusted, where appropriate, to reflect the financial conditions as at December 31, 2007. The adjusted results were then projected to the end of 2008, using the following assumptions:

- Sponsors would use all available funding surplus and prior year credit balance, subject to any statutory restrictions, for contribution holidays;
- Sponsors would make the normal cost contributions and special payments, if required, at the statutory minimum level;²¹ and
- Amounts of cash outflow would be the same as the pension amounts payable to retired members as reported in the last filed funding valuation.

The median investment returns of pension funds (shown in Table 18 below) were used to project the market value of assets. The actual investment performance of individual plans was not reflected.

Table 18 – Median Pension Fund Returns

<u>Year</u>	<u>Annual Rate of Return</u> ²²
2004	10.1%
2005	11.8%
2006	12.3%
2007	1.5%
2008	-14.1%

The projected liabilities as at December 31, 2007 and December 31, 2008 were determined by extrapolating the solvency liabilities from the last valuation, and then adjusting them to reflect any changes in the solvency valuation basis, as provided in Table 19.

²¹ If the valuation period did not extend to the end of the projection period, contributions were assumed to continue at the same rate as that reported for the valuation period.

²² For years 2004 to 2007, the rates are the median investment returns of pension funds provided in the Canadian Institute of Actuaries' *A Report on Canadian Economic Statistics 1924-2007*, dated April 2008. The rate for 2008 is the Canadian pooled balanced pension fund median return in accordance with the Mercer Investment Consulting's Pooled Fund Survey for the period ending December 31, 2008.

Table 19 – Solvency Liability Projection Basis

<u>Valuation Date</u>	<u>Commuted Value Basis</u>	<u>Annuity Purchase Basis</u>
December 31, 2007	Interest: 4.75% for 10 years, 5.00% thereafter Mortality: 1994 UP projected to 2015	Interest: 4.5% Mortality: 1994 UP projected to 2015
December 31, 2008 ²³	Interest: 3.75% for 10 years, 5.25% thereafter Mortality: 1994 UP projected to 2015	Interest: 4.55% Mortality: 1994 UP projected to 2015

Projection Results

Table 20 presents the distribution of solvency ratios that were reported in the filed funding valuations and the distribution of projected solvency ratios (PSRs) derived from the projected assets and liabilities.

Table 20 – Distribution of Solvency Ratios

<u>Distribution of Solvency Ratio</u>	<u>As at Last Filed Valuation</u>	<u>PSR as at December 31, 2007</u>	<u>PSR as at December 31, 2008</u>
10 th Percentile	79%	81%	69%
25 th Percentile	84%	87%	73%
50 th Percentile	91%	93%	77%
75 th Percentile	100%	100%	81%
90 th Percentile	112%	110%	88%

After several years of improved solvency funding ratios, the projected solvency ratios at December 31, 2008 would drop substantially as a result of the market turmoil in 2008.

Table 20 shows that the median PSR is estimated to drop from 93% to 77% between December 31, 2007 and December 31, 2008. The decrease in PSR was due mainly to the losses from negative investment returns for pension funds and a decrease in the interest rates for commuted values, partially offset by the funding improvements due to special payments expected to be made during 2008. Plans with solvency ratios less than median (and often with higher proportional special payments) are expected to see a smaller decrease in PSRs in 2008, while the PSRs for plans with solvency ratios above median (and often with lower proportional or zero special payments) are estimated to have a larger decrease during the same period.

²³ The commuted value basis for the December 31, 2008 solvency projections is based on the Canadian Institute of Actuaries' Standards of Practice for Pension Commuted Values, section 3800, effective February 1, 2005.

6.0 Glossary

The following terms are explained for the purpose of this report:

Defined Benefit Pension Plan: In a DB pension plan, the amount of the pension benefit is determined by a defined formula, usually based on years of service. There are several types of DB plans, including:

- **Final Average** – the benefit is normally based on the member’s average earnings over the member’s last several years (typically 3 or 5) of employment and years of service;
- **Career Average** – the benefit is normally based on the member’s earnings over the member’s entire period of service; and
- **Flat Benefit** – the benefit is normally based on a fixed dollar amount for each year of service.

Defined Contribution Pension Plan: In a defined contribution plan, the amount of the pension benefit is based solely on the amount contributed to the member’s individual account together with any expenses and investment returns allocated to that account.

Funded Ratio: The funded ratio of a plan is the ratio of the plan’s assets to the plan’s liabilities.

Funding Valuation: This is a valuation of a DB pension plan prepared for funding purposes. Two types of valuations are required by the PBA: a *going concern* valuation, which assumes the pension plan will continue indefinitely; and a *solvency* valuation, which assumes the plan would be fully wound up as at the effective date of the valuation. Under Ontario’s legislation, a solvency valuation may exclude the value of specified benefits, for example, indexation, prospective benefit increases, or plant closure/layoff benefits.

Hybrid Pension Plan: A hybrid pension plan contains both defined benefit and defined contribution provisions.

Investment Return: Rate of return on the pension fund for the reporting year, net of all investment expenses.

Investment Outperformance: The amount by which the pension fund’s investment return for the reporting year exceeds (or falls short of) the corresponding market return determined for the same reporting period, using a weighted average of the benchmark market indices for the different asset classes of the pension fund’s asset mix.

Liability and Asset Valuation Methods: These are the actuarial methods used by actuaries to value the liabilities and assets of a pension plan.

Multi-Employer Pension Plan: A multi-employer pension plan covers the employees of two or more employers and is specifically defined in the legislation. Typically, these plans provide defined benefits but the required contributions are negotiated through collective bargaining.

Smoothed Market Value: The smoothed market value is determined by using an averaging method that stabilizes short-term fluctuations in the market value of plan assets, normally calculated over a period of not more than five years.