Financial Services Commission of Ontario

Commission des services financiers de l'Ontario

2017 Report on the Funding of Defined Benefit Pension Plans in Ontario

Overview and Selected Findings

2014-2017

Financial Services Commission of Ontario

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Contents

1.0 INTRODUCTION

The Financial Services Commission of Ontario (FSCO) is an agency of the Ministry of Finance that regulates Ontario registered pension plans in accordance with the Pension Benefits Act (PBA) and Regulation 909 or any other regulations under the PBA (Regulation), as amended.

FSCO has prepared this report to provide pension stakeholders with up-to-date funding, investment and actuarial information related to defined benefit (DB) pension plans in Ontario. Information in the study is presented on an aggregate basis and there is no disclosure of plan-specific information. Except for the trends analysis in Section 4, this report is based on the latest filed valuation reports for DB pension plans that have valuation dates between July 1, 2014 and June 30, 2017, and financial statements for the fiscal year ending between July 1, 2016 and June 30, 2017. For the purposes of the trends analysis, data used was disclosed in the valuation reports filed for DB pension plans with valuation dates between July 1, 2013 and June 30, 2017.

1.1 RISK-BASED MONITORING

FSCO began its risk-based approach to monitor the funding and investment of DB pension plans by collecting key actuarial and financial data through the Actuarial Information Summary (AIS).[1] To broaden this approach, FSCO later implemented the collection of financial and investment data through the Investment Information Summary (IIS). The information available through these standardized forms is retained in a database. A selective risk-based review system is used to identify individual reports for compliance reviews.

In order to implement a more comprehensive and integrated approach towards assessing pension plan risks, FSCO initiated the Enhanced Risk-Based Regulation (RBR) Project. The first phase of the project was the development of the RBR framework so consistent principles could be applied to the development of FSCO's pension regulatory processes and activities. The framework was finalized in the fall of 2011.

As part of the framework, FSCO focused on five broad risk categories: Funding, Investment, Administration, Governance, and Sponsor/Industry. Within each of the risk categories, FSCO identifies certain risk indicators/factors in a system-based Risk Indicator Tool (RIT), to prioritize the plans selected for a more detailed risk assessment through a Tier 1 and/or Tier 2 review.

FSCO conducted several pilot projects to refine the RIT and Tier 1 review. These projects yielded valuable information on how FSCO could perform a more holistic risk review of pension plans. Driven

[1] The AIS is a standardized form that must be completed by an actuary and filed with FSCO in conjunction with each funding valuation report.

by the experience from the pilot projects, FSCO continues towards the full implementation of the RBR framework by adopting the appropriate structure, roles and responsibilities, processes and measures.

1.2 FUNDING RELIEF MEASURES

1. In August 2007, Ontario introduced changes to the funding rules in the Regulation for multi-employer pension plans (MEPPs). This Regulation provided temporary funding relief for Specified Ontario Multi-Employer Pension Plans (SOMEPPs) that filed reports with valuation dates on or after September 1, 2007 and before September 1, 2010. The end date for this temporary funding relief for MEPPs was most recently extended to the earlier of the date on which section 81.0.2 of the PBA comes into force and January 1, 2024. During this period, SOMEPPs are exempt from the requirement to fund on a solvency basis.

2. In June 2009, the Regulation was amended to provide temporary solvency funding relief for single employer, Ontario registered DB pension plans meeting certain eligibility conditions. These temporary solvency funding relief measures are effective with the first filed report with a valuation date on or after September 30, 2008 and before September 30, 2011. These measures provide for:

    - the deferral of the start of special payments required to liquidate any new going concern and/or new solvency deficiency by up to 12 months;
    - the consolidation of existing solvency special payments into a new five-year schedule; and
    - the extension of the period for liquidating a new solvency deficiency from five years to a maximum of 10 years, with member consent.

3. In November 2012, the Regulation was amended to extend the temporary solvency relief for eligible Ontario-registered DB pension plans. These temporary solvency funding relief measures apply to the first filed report with a valuation date between September 30, 2011 and September 30, 2014 and were similar to the options provided in June 2009. The temporary measures included the option of consolidating existing solvency special payments into a new five-year payment schedule, and allowing new solvency deficiencies to be amortized over ten years instead of five, with member consent. In addition, the Regulation was amended to allow pension plans to defer, for up to one year, the start of special payments required to liquidate any new going concern unfunded liability or solvency deficiency.

4. In May 2011, changes were implemented to provide solvency funding relief to certain pension plans in the public sector and broader public sector. Those pension plans that meet the criteria for temporary Stage 1 solvency funding relief were named in Schedule 1 of Ontario Regulation 178/11. Similarly, those pension plans that meet the criteria for temporary Stage 2 solvency funding relief were named in Schedule 2 of Regulation 178/11. The particulars of these relief

measures are contained in Regulation 178/11. The technical paper issued by the Ministry of Finance outlined the criteria, application process, and additional conditions for eligibility.[2]

5. In June 2016, O. Regulation 161/16 made under the PBA was filed and came into force on July 1, 2016, providing a further extension of the temporary solvency relief measures for private sector pension plans enacted in 2009 and in 2012. This extension of the temporary solvency funding relief measures applies to the first valuation report filed with a valuation date between December 31, 2015 and December 30, 2018.

6. O. Regulation 350/16 made under the PBA came into force on October 31, 2016 and amends O. Reg. 178/11 (Solvency Funding Relief for Certain Public Sector Pension Plans).

7. O. Reg. 225/17 made under the PBA came into force on July 1, 2017 and provides a transitional funding measure for DB pension plans by granting an additional year of deferral on the start of any new solvency deficiencies special payments revealed in the first valuation report filed with a valuation date between December 31, 2016 and December 30, 2017. It also extends the SOMEPP regulation to August 31, 2018.

8. On May 19, 2017, a new funding framework for DB pension plans was implemented which included:

   i. Shortening the amortization period from 15 years to 10 years for funding a going concern shortfall in the plan.
   ii. Consolidating going concern special payment requirements into a single schedule when a new report is filed.
   iii. Requiring the funding of a reserve within the plan, called a Provision for Adverse Deviations (PfAD).
   iv. Requiring funding on a solvency basis if needed to improve the plan's funded status to 85 per cent on a solvency basis.
   v. Increasing the guarantee provided by the Pension Benefits Guarantee Fund from $1,000 per month to $1,500 per month.
   vi. Providing funding rules for benefit improvements and restricting contribution holidays to improve benefit security.

   These changes would not apply to jointly sponsored pension plans that are listed in s. 1.3.1(3) of the Regulation. The changes would also not apply to SOMEPPs, but would apply to MEPPs providing defined benefits that are not SOMEPPs.

[2] Details of public sector solvency relief and the technical paper can also be found at: http://www.ontariocanada.com/registry/view.do?postingId=11343&language=en

1.3 KEY FINDINGS

The 2017 Report's key findings are summarized below. It is important to note that the analyses are based on actual information from reports filed with FSCO with valuation dates between July 1, 2014 and June 30, 2017. Therefore, the summary statistics drawn from the three-year period does not have a common valuation date. In contrast, the projected solvency ratios in Section 6.0 of this report are extrapolated to the common measurement date of December 31, 2017.

Funding Data

1. The distribution of the 1,378 pension plans analyzed based on their most recently filed valuation report are as follows:

	July 1, 2014 - June 30, 2015	July 1, 2015 - June 30, 2016	July 1, 2016 - June 30, 2017	Total
Number of Plans	236	171	971	**1,378**
Percentage of Plans	17%	12%	71%	**100%**

2. Overall, the funded position of pension plans improved slightly on a going concern basis but deteriorated slightly on a solvency basis compared to what was reported in the 2016 Report on the Funding of Defined Benefit Pension Plans in Ontario. In particular:

   - the median funded ratio on a *going concern* basis has increased from 107% to 111%, and,
   - the median funded ratio on a *solvency* basis has decreased from 93% to 91%.

3. There was a decrease in the percentage of plans that were less than fully funded on a going concern basis at their last valuation date. The percentage of pension plans that were less than fully funded on a solvency basis increased. Specifically:

   - 22% of the plans were less than fully funded on a going concern basis (versus 30% in the 2016 Report); and
   - 78% of the plans were less than fully funded on a solvency basis (versus 73% from the 2016 Report).

4. Assumptions and methods for the going concern valuations continue to be consistent compared to prior valuations. For example, the analysis shows that:

   - over 99% of the plans used the unit credit cost method (either with or without salary projections);

- over 99% of the plans used either a market or smoothed market value of assets (74.7% used a market value, 24.8% used a smoothed market value, 0.1% used a book value, and 0.4% used other methods); and

- the trend analysis in Table 4.5 shows the average interest rate assumption used for going concern valuations decreased from 5.37% to 4.74% over the four-year period. The reports included in our analysis with valuation dates between July 1, 2016 and June 30, 2017 showed 93% used an interest rate below 6.00% and 76% used an interest rate below 5.50%.

Projected Solvency Ratio as at December 31, 2017

In addition to summarizing the actual information contained in the filed valuation reports, FSCO also estimates the solvency ratio for all the plans as at a common measurement date of December 31, 2017, in order to provide the solvency funded status of pension plans at a more current date.

1. The median solvency ratio for pension plans was 91% based on valuation dates of the most recently filed reports (which cover a three-year period as previously noted). In comparison, the projected median solvency ratios as at December 31, 2016 and December 31, 2017 were estimated to be 91% and 96% respectively.

2. The projections use information contained in the most recently filed valuation reports and estimates the following elements to determine the projected solvency ratio:

   - the investment returns based on each plan's actual returns and asset mix;

   - the effect of changes in interest rates from the valuation date of each plan's report to the projection date; and

   - the required contributions specified in each plan's report.

3. The minimum required contributions for 2017, including employer normal cost, member required contributions and special payments, are estimated to decrease by 3% from $7.7 billion for 2016 to $7.5 billion for 2017.

Temporary Funding Relief Data

The statistics on the utilization of the temporary funding relief measures as of December 31, 2017 are as follows:

- Of the 74 MEPPs that contain a defined benefit provision, 56 have elected to be treated as a SOMEPP. These 56 SOMEPPs represent 95% of the total plan membership covered by the 74 MEPPs.

- The opportunity for private sector plans to elect temporary solvency funding relief introduced on June 23, 2009 has ended. FSCO's 2013 Report provides final statistics on the 2009 solvency relief.

- The opportunity for private sector plans to elect temporary solvency funding relief introduced on November 1, 2012 has also ended. FSCO's 2015 Report provides final statistics on the 2012 solvency relief.

- There were three windows of opportunity for pension plans in the public sector and broader public sector to apply for the temporary solvency funding relief introduced on May 2011. The third and final window closed on December 31, 2012. There are currently 25 pension plans named in Schedule 1 and 23 pension plans named in Schedule 2 of Ontario Regulation 178/11.

- The June 3, 2016 extension of the temporary solvency relief measures for private sector pension plans enacted in 2009 and in 2012 remains open, as the permissible options apply to the first valuation report filed with a valuation date between December 31, 2015 and December 30, 2018.

- The July 1, 2017 change to the Regulation provides a transitional funding measure for defined benefit pension plans by permitting an additional year of deferral (Option 8) on new solvency deficiencies for valuation reports filed with a valuation date between December 31, 2016 and December 30, 2017.

- The temporary exemption for solvency funding applicable to SOMEPPs is extended to the earlier of the date on which section 81.0.2 of the PBA comes into force and January 1, 2024.

Trends Analysis Data

The trend analysis shows an improvement in the solvency ratios for valuation dates in the 12-month period ending June 30, 2017, compared with the solvency ratio reported in the previous 12-month period. The median solvency ratio in reports with valuation dates in the 12-month period ending June 30, 2017 is 89%. In comparison, the median solvency ratio for reports with valuation dates in the 12-month period ending June 30, 2016 and June 30, 2015 are 85% and 88% respectively.

Of the 974 pension plans that filed a report with a valuation date between July 1, 2016 and June 30, 2017, 283 (29%) have a solvency ratio of less than 85%. In comparison, the percentage of plans with a solvency ratio of less than 85% in the two 12-month periods ending June 30, 2016 and June 30, 2015 are 48% and 45% respectively.

Investment Data

1. The typical asset allocation of pension funds between fixed income and non-fixed income did not change significantly, but the allocation to alternative investments is increasing over time.

2. Large plans have higher average returns and lower investment fees than smaller plans.

3. MEPPs generally invested more of their pension funds in non-fixed income.

4. There do not seem to be significant differences in asset mix, average return and average investment fees between plans of different benefit types.

2.0 FUNDING DATA ANALYSIS

This section provides an analysis and summary of the funding data, including actuarial assumptions and methods, for DB pension plans with valuation dates between July 1, 2014 and June 30, 2017. The data was compiled from the AIS and valuation reports that FSCO received on or before the data cutoff date of December 31, 2017.

Generally, valuation reports must be filed once every three years on both a going concern and solvency basis. However, solvency concerns revealed in a valuation report require annual filing until those concerns no longer exist. Early filings may be required when events such as plan mergers or sales of businesses occur, and may also be done on a voluntary basis. Unless otherwise noted, the analysis in this report is based on data from each plan's most recently filed valuation report in order to avoid double counting.[3]

For the purposes of this report, the following plans are excluded in order to focus on the plans that are of most interest to our stakeholders and to ensure that the results of our analysis are not skewed:

- designated plans,
- individual pension plans,
- seven large public sector plans, and
- plans that have been wound up or are in the process of winding up.

Table 2.1 presents a profile of the 1,378 pension plans that have been included in the database used for the funding data analysis. Additional details on the plans that were analyzed are in Section 8.0 of this report.

Table 2.1 - Summary of Plans Included

Plan/Benefit Type	# of Plans	Active Members	Retired Members	Other Participants	Total Participants	Market Value of Assets (in Million)
Final Average	356	118,993	96,603	33,066	248,662	$63,511
Career Average	95	15,146	15,131	6,797	37,074	$3,879
Flat Benefit	162	23,176	34,087	12,566	69,829	$9,781
Hybrid	385	160,519	212,827	84,541	457,887	$81,910
Frozen	306	26,056	66,124	25,156	117,336	$16,121
MEPP	74	388,596	132,075	419,156	939,827	$32,797
Totals	**1,378**	**732,486**	**556,847**	**581,282**	**1,870,615**	**$207,999**

[3] The Trends Analysis in Section 4 uses data from reports with valuation dates in the different periods and therefore may include more than one valuation report from any given pension plan.

Table 2.2 summarizes the profiles of the seven large public sector plans that were excluded from the analysis.

Table 2.2 - Excluded Plans

Plan Type	# of Plans	Active Members	Retired Members	Other Participants	Total Participants	Market Value Of Assets ($ Millions)
Public Sector Pension Plan	7	788,092	477,224	149,006	1,424,322	$389,472
Average Age (years)		45.03	71.68	54.34	**57.38**	

2.1 SUMMARY OF FUNDING DATA

Of the 1,378 plans that were analyzed, which together cover 1,870,615 plan members, 304 plans (22%) were less than fully funded on a going concern basis. These 304 underfunded plans cover 961,965 (51%) of the total plan members.

On a solvency basis, 1,081 plans (78%) of the 1,378 plans were less than fully funded. These 1,081 plans cover 1,699,452 plan members (91% of total members).

Tables 2.3, 2.4, 2.5, and 2.6 show the distribution of underfunded plans by plan/benefit type and by membership.

Table 2.3 – Distribution of Underfunded Plans on a Going Concern Basis by Plan Type

Plan/Benefit Type	By Plan		
	Total Number of Plans	Number of Underfunded Plans	% of Total Plans by Plan/Benefit Type
Final Average	356	76	21%
Career Average	95	15	16%
Flat Benefit	162	18	11%
Hybrid	385	86	22%
Frozen	306	81	26%
MEPP	74	28	38%
Total	**1,378**	**304**	**22%**

Table 2.4 – Distribution of Underfunded Plans on a Going Concern Basis by Membership

Plan/Benefit Type	By Membership		
	Total Number of Members	Number of Members in Underfunded Plans	% of Total Membership in Underfunded Plans by Plan/Benefit Type
Final Average	248,662	93,864	38%
Career Average	37,704	8,033	22%
Flat Benefit	69,829	7,206	10%
Hybrid	457,887	123,763	27%
Frozen	117,336	39,912	34%
MEPP	939,827	689,187	73%
Total	**1,870,615**	**961,965**	**51%**

Table 2.5 - Distribution of Underfunded Plans on a Solvency Basis by Plan Type

Plan/Benefit Type	By Plan		
	Total Number of Plans	Number of Underfunded Plans	% of Total Plans by Plan/Benefit Type
Final Average	356	273	77%
Career Average	95	81	85%
Flat Benefit	162	130	80%
Hybrid	385	306	79%
Frozen	306	226	74%
MEPP	74	65	88%
Total	**1,378**	**1,081**	**78%**

Table 2.6 - Distribution of Underfunded Plans on a Solvency Basis by Membership

Plan/Benefit Type	By Membership		
	Total Number of Members	Number of Members in Underfunded Plans	% of Total Membership by Plan/Benefit Type
Final Average	248,662	189,240	76%
Career Average	37,704	35,406	96%
Flat Benefit	69,829	58,546	84%
Hybrid	457,887	403,426	88%
Frozen	117,336	100,229	85%
MEPP	939,827	912,605	97%
Total	**1,870,615**	**1,699,452**	**91%**

Table 2.7 provides summary information grouped by plan maturity (as measured by the proportion of solvency liabilities relating to pensioners versus the plan's total solvency liabilities).

Table 2.7 – Funding Information Grouped By Maturity

Proportion of Solvency Liabilities relating to Pensioners	# of Plans	Total Membership*	Solvency Assets ($ Millions)	Solvency Liabilities ($ Millions)	Ratio of Solvency Assets to Solvency Liabilities	Ratio of Active Members to Pensioners
Less than 25%	217	274,518	$15,224	$19,016	80%	3.9 : 1
25%≤ ratio <50%	571	1,052,085	$80,187	$100,178	80%	2.2 : 1
50%≤ ratio <75%	415	388,343	$81,964	$88,948	92%	0.6 : 1
75% and over	175	155,669	$30,597	$33,567	91%	0.1 : 1
Total	**1,378**	**1,870,615**	**$207,971**	**$241,708**	**86%**	**1.3 : 1**

**Includes active and inactive members*

Tables 2.8 and 2.9 provide a more detailed breakdown of the going concern and solvency funded ratios with respect to different types of DB pension plans. For all plans that were analyzed, the median funded ratio was 111% on a going concern basis and 91% on a solvency basis. Fifty-four (73.0%) of the 74 MEPPs had a solvency ratio of less than 85%. These 54 plans have approximately 94% of the total MEPP membership.

Table 2.8 - Going Concern Funded Ratio

Ratio (GCR)	Final Average	Career Average	Flat Benefit	Hybrid	Frozen	MEPP	All Plans
GCR < 0.60	2	0	0	0	1	0	3
0.60 ≤ GCR < 0.80	5	0	0	10	5	1	21
0.80 ≤ GCR < 0.90	18	3	3	15	29	4	72
0.90 ≤ GCR < 1.00	51	12	15	61	46	23	208
1.00 ≤ GCR < 1.20	184	50	66	201	130	34	665
1.20 ≤ GCR	96	30	78	98	95	12	409
Total	**356**	**95**	**162**	**385**	**306**	**74**	**1,378**
Median Ratio	**1.10**	**1.09**	**1.16**	**1.10**	**1.03**	**1.03**	**1.11**

Table 2.9 - Solvency Funded Ratio

Ratio (SR)	Final Average	Career Average	Flat Benefit	Hybrid	Frozen	MEPP	All Plans
SR < 0.60	3	1	0	0	2	19	25
0.60 ≤ SR < 0.80	34	16	27	28	20	30	155
0.80 ≤ SR < 0.85	43	12	30	46	38	5	174
0.85 ≤ SR < 0.90	79	28	31	91	57	7	293
0.90 ≤ SR < 1.00	114	24	42	141	109	4	434
1.00 ≤ SR < 1.20	68	12	25	72	57	7	241
1.20 ≤ SR	15	2	7	7	23	2	56
Total	**356**	**95**	**162**	**385**	**306**	**74**	**1,378**
Median Ratio	**0.91**	**0.88**	**0.86**	**0.92**	**0.93**	**0.71**	**0.91**

2.2 SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

The key actuarial assumptions and methods used in going concern valuations are outlined below:

- Over 99% of the plans used the unit credit cost method (with salary projections for final average plans and hybrid plans with final average benefits) to calculate going concern liabilities.

Table 2.10 - Liability Valuation Method

Liability Valuation Method	# of Plans	% of Plans
Unit Credit (with salary projection)	856	58.9%
Unit Credit (with no salary projection)	518	40.9%
Entry Age Normal	2	0.1%
Aggregate	2	0.1%
Total	**1,378**	**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 2.11 - Asset Valuation Method

Asset Valuation Method	# of Plans	% of Plans
Market	1030	74.7%
Smoothed Market	342	24.8%
Book	1	0.1%
Other	5	0.4%
Total	**1,378**	**100.0%**

For going concern valuations, all plans used a mortality table with a base year of 1994 or later. Over 95% of the plans have used mortality rates based on the Canadian Pensioners' Mortality tables (CPM-RPP2014) and improvement scales published in the Final Report, Canadian Pensioners' Mortality on February 13, 2014 by the Canadian Institute of Actuaries (CIA) (the 2014 CIA CPM Study). The 2014 CIA CPM Study includes three new sets of mortality tables as well as two sets of improvement scales. The three mortality tables are:

1. 2014 Mortality Table (CPM2014) - developed from the combined experience exhibited under the public and private sector plans included in the RPP Study;
2. 2014 Public Sector Mortality Table (CPM2014Publ) - based on the separate experience exhibited under the public sector plans included in the RPP Study; and
3. 2014 Private Sector Mortality Table (CPM2014Priv) - based on the separate experience exhibited under the private sector plans included in the RPP Study.

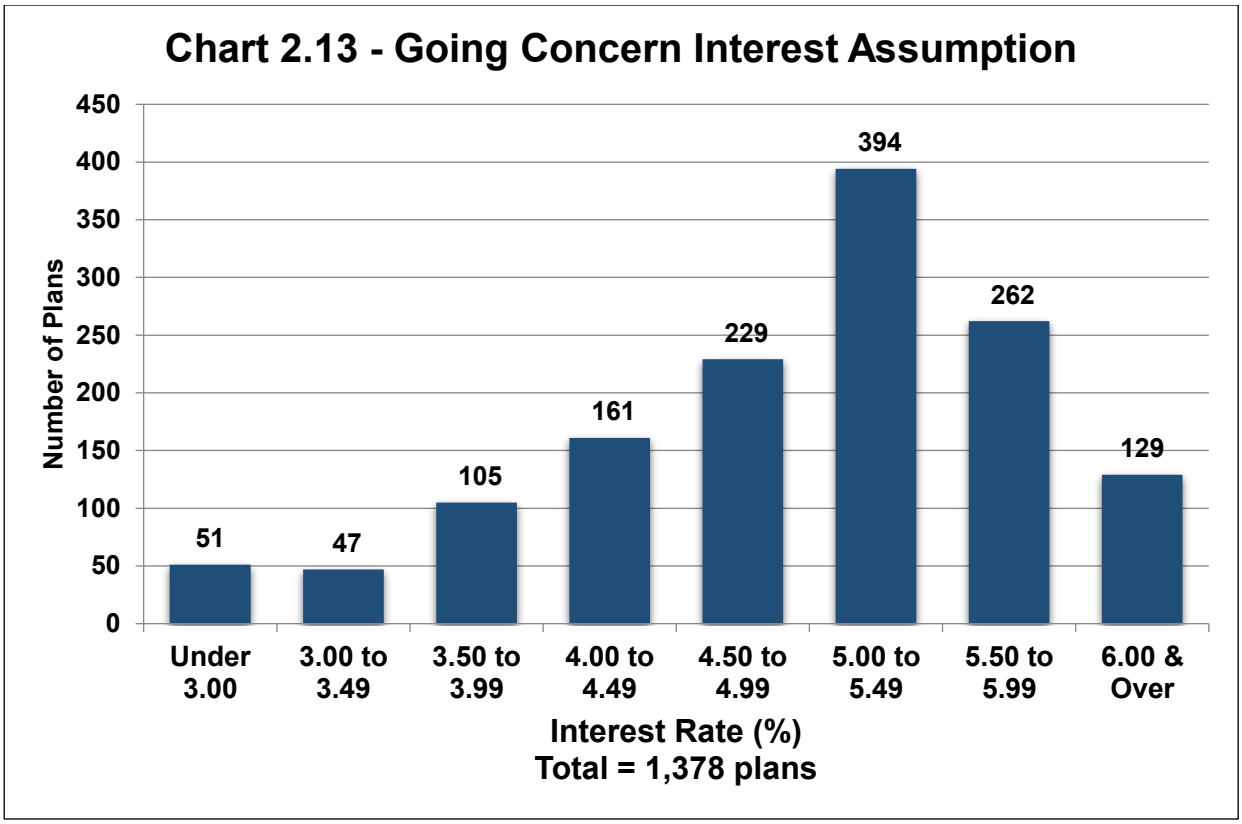
The AIS is amended to identify the actual mortality table and projection scales used as well as any modifications thereof.

Table 2.12 - Mortality Assumption

Mortality Assumption	# of Plans	% of Plans
1994 GAM Static	1	0.1%
1994 UP	27	2.0%
CPM-RPP2014	1,350	97.9%
Total	**1,378**	**100.0%**

- Interest rate assumptions used to value the going concern liabilities were generally lower than in prior years, with approximately 91% of plans using a rate below 6.00% and 72% of plans using a rate below 5.50%.

- Of the 129 plans that used a going concern interest rate assumption of 6.00% or over, 92 plans used an interest rate of exactly 6.00%. Of the 394 plans that used a going concern interest rate assumption in the range of 5.00% to 5.49%, 166 plans used an interest rate of exactly 5.00%.



- 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% inclusive. This accounts for 65% of all plans providing final average benefits. The average spread between the interest assumption and the salary increase assumption was 2.11%.

- Of the 29 final average plans with an interest-salary differential in the range of 3.00% to 3.49%, 12 plans had an interest-salary differential of exactly 3.00%. Of the 58 final average plans with an interest-salary differential in the range of 2.50% to 2.99%, 26 plans had an interest-salary differential of exactly 2.50%. Of the 85 final average plans with an interest-salary differential in the range of 2.00% to 2.49%, 33 plans had an interest-salary differential of exactly 2.00%.

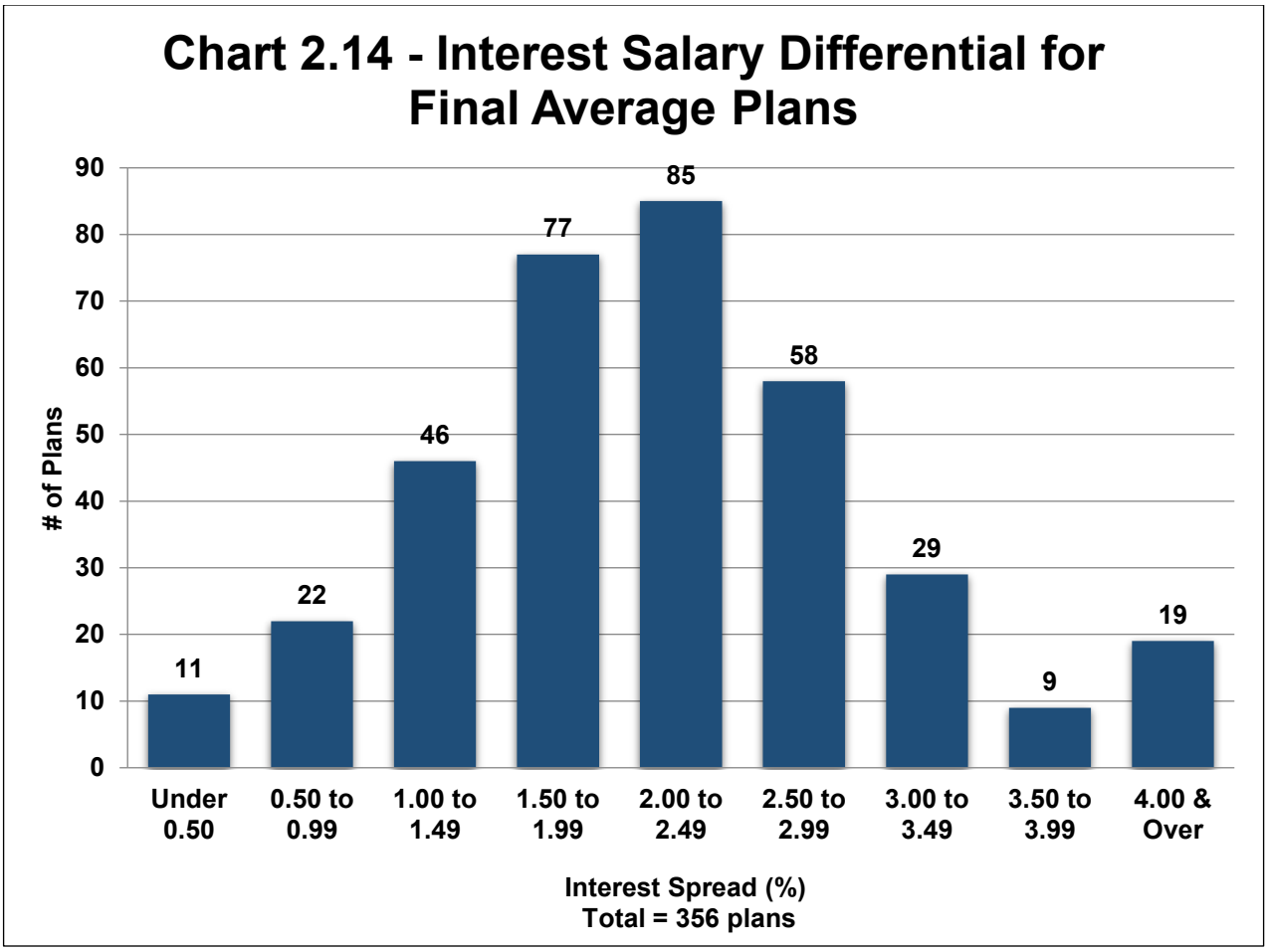


Chart 2.14 - Interest Salary Differential for Final Average Plans
# of Plans
90
80
70
60
50
40
30
20
10
0
11
22
46
77
85
58
29
9
19
Under 0.50
0.50 to 0.99
1.00 to 1.49
1.50 to 1.99
2.00 to 2.49
2.50 to 2.99
3.00 to 3.49
3.50 to 3.99
4.00 & Over
Interest Spread (%)
Total = 356 plans

Table 2.15 - Provision for Wind Up Expenses

Plan Membership*	Total Plans	Total Membership	Wind Up Expenses		
			Total Wind Up Expenses	Average Per Plan	Average Per Member
<100	480	21,650	30,319,050	63,165	1,400
100-499	496	118,166	69,355,140	139,829	587
500-999	151	105,250	40,910,625	270,931	389
1,000-4,999	191	410,436	117,790,825	616,706	287
5,000-9,999	33	240,387	45,776,000	1,387,152	190
10,000-49,999	24	407,549	162,723,000	6,780,125	399
All Plans	**1,375**	**1,303,438**	**466,874,640**	**339,545**	**358**

**Includes active and inactive members*

- Table 2.15 shows the provision for wind up expenses used in solvency valuations, grouped by plan membership size, including active members, former members and other plan beneficiaries. To preserve confidentiality, three plans were excluded from this analysis.
- The expense allowance is also expressed as average dollar amounts per plan and per plan member. 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. Since there are 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.

  The average per member wind up expense allowances are generally comparable to those reported in the 2016 Report, with slight increases for plans with less than 100 members.

3.0 TEMPORARY FUNDING RELIEF

This section provides membership and funding statistics, as well as the impact on funding costs for plans that used the temporary funding relief measures available under the PBA and Regulation.

3.1 SPECIFIED ONTARIO MULTI-EMPLOYER PENSION PLANS (SOMEPPS)

In August 2007, a temporary funding framework applicable to Specified Ontario Multi-Employer Pension Plans (SOMEPPs) was implemented. A MEPP that meets the definition and satisfies the eligibility criteria described in the PBA is eligible to elect SOMEPP status. Any MEPPs that do not meet the prescribed definition and eligibility criteria for SOMEPP status remain required to fund on a solvency basis.

SOMEPPs are temporarily exempt from solvency funding; however, the SOMEPPs' contributions to the plan during the period covered by the valuation report must not be less than the sum of:

- the normal cost;
- the remaining special payments for any previously established going concern unfunded liability; and
- the special payments for any new going concern unfunded liability determined in the valuation report.

Any new going concern unfunded liability must be liquidated over a period of 12 years instead of the usual 15 years. Furthermore, there are accelerated funding requirements for benefit improvements, requiring any increase in the going concern unfunded liability as a result of the improvements to be liquidated over a period of eight years under prescribed conditions. There is no requirement to fund on a solvency basis during the period of temporary funding relief, although solvency valuations are still required to be performed and their results must be set out in the valuation report.[4]

This temporary exemption for solvency funding was extended to the earlier of the date on which section 81.0.2 of the PBA comes into force and January 1, 2024.

[4] More information on SOMEPPs is available at:
https://www.fsrao.ca/media/22316/download

The following tables provide selected statistics on the MEPPs that contain a defined benefit provision. Up to December 31, 2017, 56 of the 74 MEPPs have elected to become SOMEPPs.

Table 3.1 - Membership Information

	# of Plans	Total (*Median*) Membership Count			
		Active Members	Retired Members	Other Participants	Total
SOMEPPs	56	370,933 *(947)*	114,276 *(633)*	399,265 *(1,091)*	884,474 *(3,093)*
Non-SOMEPPs	18	17,117 *(556)*	14,461 *(327)*	15,717 *(583)*	47,295 *(1,972)*
Total (All DB MEPPs)	**74**	**388,050 *(907)***	**128,737 *(588)***	**414,982 *(810)***	**931,769 *(2,678)***

Table 3.2 - Funding Information

	Total (*Median*) Value			
	Market Value of Assets	Solvency Assets ‡	Solvency Liabilities	Ratio of Solvency Assets to Solvency Liabilities
	($ Millions)			
SOMEPPs	27,975 *(144.1)*	27,788 *(143.6)*	45,138 *(238.1)*	61.6% *(67.5%)*
Non-SOMEPPs	4,497 *(101.2)*	4,410 *(86.0)*	4,718 *(100.8)*	93.5% *(99.6%)*
Total (All DB MEPPs)	**32,472 *(139.2)***	**32,198 *(138.7)***	**49,856 *(184.8)***	**64.6% *(70.7%)***

‡ *Market value of assets less provision for wind up expenses*

The plans that qualify as SOMEPPs tend to be significantly larger than non-SOMEPPs, when measured by the size of their assets, liabilities or plan membership. For example, the median solvency liabilities for SOMEPPs is over two times that of the non-SOMEPPs.

In terms of funding levels, SOMEPPs are significantly less well funded than non-SOMEPPs. The median solvency ratio for SOMEPPs is 67.5% compared to 99.6% for non-SOMEPPs.

3.2 2009 SOLVENCY FUNDING RELIEF

Effective June 23, 2009 the administrator of a plan that had met certain criteria could choose one or more of the following three funding relief options in the first filed report with a valuation date on or after September 30, 2008 and before September 30, 2011 (referred to herein as the 2009 solvency relief report):[5]

[5] More information on temporary solvency funding measures is available at: https://www.fsrao.ca/temporary-solvency-funding-relief-measures

Option 1 - Defer, up to one year, the start of special payments required to liquidate any new going concern unfunded liability or new solvency deficiency determined in the 2009 solvency relief report.

Option 2 - Consolidate special payments for pre-existing solvency deficiencies into a new five-year payment schedule that starts on the valuation date of the 2009 solvency relief report.

Option 3 - With the consent of active and former members if the plan is not jointly governed, extend the period for liquidating the new solvency deficiency from five years to a maximum of 10 years.

The opportunity to elect temporary solvency funding relief introduced on June 23, 2009, has ended. FSCO's 2013 Report provides final statistics on the 2009 solvency relief.

3.3 2012 SOLVENCY FUNDING RELIEF

Effective November 1, 2012, the Regulation was amended to provide additional temporary solvency relief for private sector pension plans. The temporary solvency funding relief measures being provided in this amendment were similar to the measures introduced in 2009, and applied to the first filed report with a valuation date on or after September 30, 2011 and before September 30, 2014 (referred to herein as the 2012 solvency relief report). The measures included:

Option 4 - Consolidate existing special payments for solvency deficiencies into a new five-year payment schedule that starts on the valuation date of the 2012 solvency relief report; and

Option 5 - Extending the period for liquidating a new solvency deficiency determined in the report from a maximum of five years to a maximum of ten years, subject to the consent of the plan members.

There is no option corresponding to Option 1 from the 2009 funding relief measures, as the Regulation has been amended to permit all plans to defer, for up to one year, the start of special payments required to liquidate a new going concern unfunded liability or new solvency deficiency.

The opportunity to elect temporary solvency funding relief introduced in 2012 has ended. FSCO's 2015 Report provides final statistics on the 2012 solvency relief.

3.4 2016/2017 SOLVENCY FUNDING RELIEF

On June 3, 2016, O. Regulation 161/16 made under the PBA was filed. It came into force on July 1, 2016. The regulation provides an extension of the temporary solvency relief measures for private sector pension plans enacted by the government in 2009 and in 2012. This extension of the

temporary solvency funding relief measures applies to the first valuation report filed with a valuation date on or after Dec. 31, 2015 and before Dec. 31, 2018.

On June 29, 2017, O. Regulation 225/17 made under the PBA was filed. It came into force on July 1, 2017. This Regulation provides a transitional funding measure for defined benefit pension plans by granting an additional year of deferral on the start of any new solvency deficiencies special payments revealed in the first valuation report filed with a valuation date between December 31, 2016 and December 30, 2017.

Together, the measures in these two regulations include:

Option 6 - Consolidate existing special payments for solvency deficiencies into a new five-year payment schedule that starts on the valuation date of the 2016 solvency relief report; and

Option 7 - Extending the period for liquidating a new solvency deficiency determined in the report from a maximum of five years to a maximum of ten years, subject to the consent of the plan members.

On June 29, 2017, O. Reg. 225/17 made under the PBA provides a transitional funding measure (Option 8) for DB pension plans applicable to the first valuation report filed with a valuation date between December 31, 2016 and December 30, 2017.

Option 8 - If there is a new solvency deficiency, the deferral for up to 24 months of the start of the period during which special payments are required to be made to liquidate the new solvency deficiency.

A pension plan that elects the Option 8 deferral is not permitted to also elect the extension of solvency funding period (Option 7) from five to a maximum of ten years in the same valuation report. Option 7 was made available for pension plans that filed the first valuation report with a valuation date between December 31, 2015 and December 30, 2018. The Option 6, 7, and 8 solvency relief elections are not available to SOMEPPs and certain other named pension plans.

Based on the information collected to date, FSCO received a total of 383 elections under the 2016/2017 funding relief options. These plans are referred to as the ‘2016/2017 Electing Plans’ in this report.

As noted above, the opportunity for pension plans to elect under the 2016 solvency funding relief measures is available for pension plans that have not filed their first valuation report between December 31, 2015 and December 30, 2018. However, since the new funding framework will apply to reports with a valuation date on or after December 31, 2017, eligibility for the 2016 solvency funding relief will not be available for reports which determine funding requirements under the new rules. The number of 2016 Electing Plans may increase for plans that have not filed a valuation report within the applicable election period. The opportunity for pension plans to elect under the 2017 solvency funding relief measure is available for certain pension plan that have not filed their first valuation report between December 31, 2016 and December 30, 2017.

Table 3.3 shows the distribution of options chosen by the 2016/2017 Electing Plans. As shown below, the use of only Option 8 was the most prevalent choice, accounting for 44% of all plan elections.

Table 3.3 - Distribution of 2017 Solvency Relief Options Elected

Election	Number of Plans	% of Plans
Option 6 only	75	20%
Option 7 only	17	4%
Option 8 only	170	44%
Option 6 & 7	11	3%
Option 6 & 8	110	29%
Total	383	100%

Since plan sponsors could elect multiple options in various valuation reports within the prescribed valuation periods, the 383 elections shown in Table 3.3 represents 366 unique plans in our database. Tables 3.4 and 3.5 present information on the profile of these unique 2016/2017 Electing Plans compiled as at December 31, 2017 based on their most recently filed valuation reports.

Table 3.4 Membership Information for the 2016/2017 Electing Plans

	Number of Plans	Membership Count			
		Active Members	Retired Members	Other Participants	Total
Plans in database	366	107,430	130,545	51,787	289,762
Median		72.0	90.0	40.5	194.5

Table 3.5 Funding Information for the 2016/2017 Electing Plans

	Number of Plans	Solvency Assets	Solvency Liabilities	Ratio of Solvency Assets to Solvency Liabilities
		($ Millions)		
Plans in database	366	42,625	48,285	87.1%
Median Value		30.8	34.5	87.3%

3.5 SOLVENCY FUNDING RELIEF FOR PUBLIC SECTOR PENSION PLANS

In May 2011, Ontario Regulation 178/11 implemented changes that provide solvency funding relief to certain pension plans in the public sector and broader public sector.

The funding relief is to be provided in three stages (referred in the Regulation as Stage 1, Stage 2, and Subsequent Solvency Funding):

- Stage 1 relief commences from the plan's Stage 1 valuation date as set out in Schedule 1 of O. Regulation 178/11. Contributions during the three-year period covered by the Stage 1 valuation report are lower than the contributions determined under the General Regulation.
- At the end of Stage 1, each plan would be assessed by the Minister of Finance, based on technical measures, to determine whether sufficient progress was made in meeting the plan's sustainability commitments. Those plans would be eligible to enter Stage 2 of the process.
- Stage 2 would provide the plan sponsor with up to 10 years to implement negotiated plan changes and to liquidate solvency deficiencies.
- Plans that fail to enter Stage 2 or which choose not to enter Stage 2 would be transitioned back to the normal PBA funding rules.
- Contribution holidays (Stage 2) and benefit improvements (Stage 1 and 2) would be restricted while under the funding relief. These restrictions would remain in place for a period of time after exiting the process.
- Pension plans in Stage 2 of the broader public sector solvency funding relief program are able to make interest only payments for the first three years in Stage 2, and amortize the balance of their Stage 2 solvency deficit over the remaining seven years.

The substantive relief measures are outlined in O. Regulation 178/11. The relief measures were extended by several amendments to Regulation 178/11 between 2013 and 2017. Eligibility criteria, the application process and additional conditions as well as examples of steps that eligible pension plans could take and the measurement of financial impacts are not part of the Regulation.

O. Regulation 350/16 made under the PBA came into force on October 31, 2016. This Regulation provides a continuation of the Stage 2 temporary solvency relief measures for the Broader Public Sector (BPS) Pension Plans enacted by the government. This extension of the temporary solvency funding relief measures applies to the first subsequent valuation report filed after the Stage 2 valuation report for pension plans listed in Schedule 2. The valuation date of the first subsequent report must be on or before December 31, 2018. A Notice of the Election for temporary solvency relief must also be filed with the Superintendent no later than the day on which the first subsequent report is filed.

Generally, the solvency relief measures (Subsequent Solvency Funding Relief re Stage 2) that apply to these listed plans are as follows:

- Any special payments from the Stage 2 valuation report are no longer required on and after the day that is 12 months after the valuation date of the first subsequent report.

- The minimum required solvency special payments would be determined based on a point between the solvency ratio (i.e. solvency assets ÷ solvency liabilities) and 100%

- The modified solvency deficiency (i.e. modified solvency liabilities – solvency assets – solvency asset adjustment) would be liquidated by equal monthly instalments over a period not more than seven years, starting no later than 12 months after the valuation date of the first subsequent report.

- The minimum required special payments commencing no later than 12 months after the first subsequent report valuation date would be determined as the sum of:

    - The going concern special payments;
    - The special payments to liquidate the modified solvency deficiency; and
    - The interest payments on the remaining solvency deficiency not being liquidated.

O. Regulation 350/16 also granted extended Stage 1 solvency funding relief for one named BPS pension plan.

There are 25 pension plans listed in Schedule 1 but one plan has exited from coverage leaving 24 plans covered by Schedule 1 of Ontario Regulation 178/11. As of March 2018, 23 pension plans are listed in Schedule 2 of Ontario Regulation 178/11.

Table 3.6 presents the profile of the 24 remaining plans based on their most current valuation report.

Table 3.6 – Plans covered by Schedule 1 of Reg. 178/11 based on the most current filed valuation report

	# of Plans	Active Members	Retired Members	Other Participants	Total Participants	Market Value Of Assets	Going Concern Liabilities	Solvency Liabilities
						($ Millions)		
Total Plans	24	87,836	63,051	17,937	168,824	41,415	42,857	46,543
Average Age		46.72	74.84	50.15	57.59			

4.0 TRENDS ANALYSIS

The following trends analysis incorporates data from all filed reports with valuation dates between July 1, 2013 and June 30, 2017.

4.1 SOLVENCY FUNDED STATUS

Table 4.1 shows a breakdown of plans by solvency ratios for the following valuation periods:[6]

- 2013 Valuation Period denotes valuation dates between July 1, 2013 and June 30, 2014
- 2014 Valuation Period denotes valuation dates between July 1, 2014 and June 30, 2015
- 2015 Valuation Period denotes valuation dates between July 1, 2015 and June 30, 2016
- 2016 Valuation Period denotes valuation dates between July 1, 2016 and June 30, 2017

The majority of plans have a valuation date of either December 31 or January 1. Plans that have solvency concerns are required to file valuation reports annually. Having filed a report in more than one of the valuation periods noted above, they would be represented in more than one valuation period.

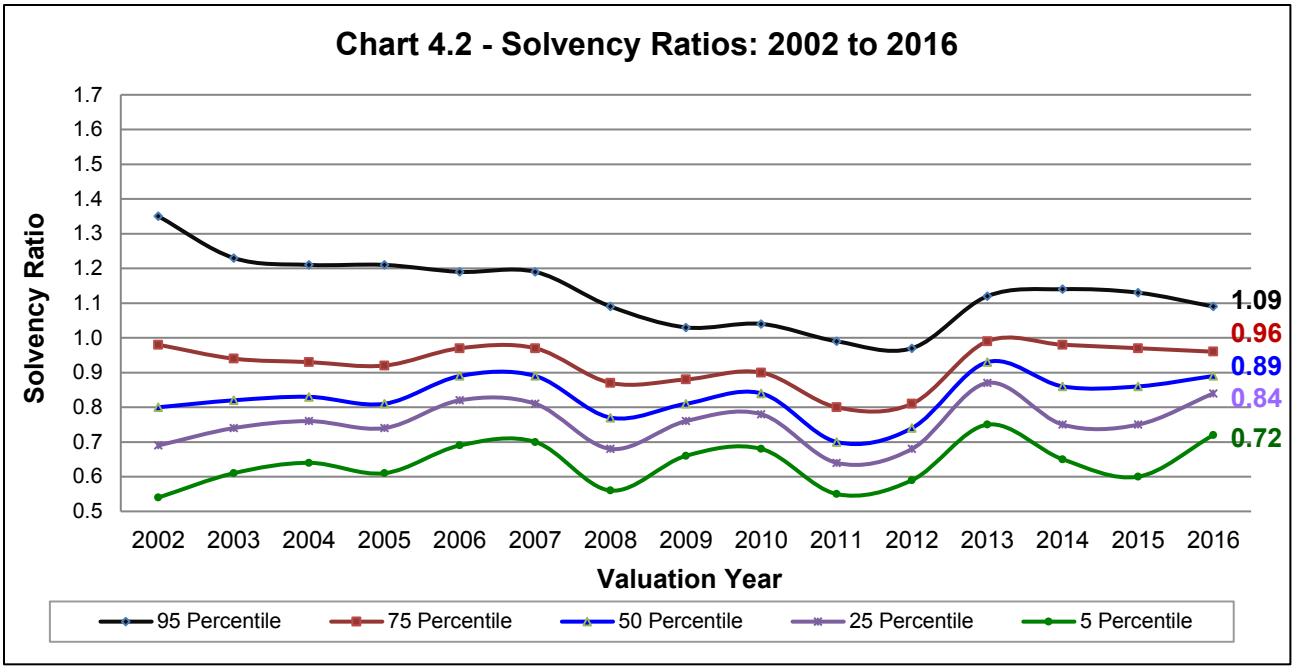
[6] The number of plans for 2013-2016 inclusive may differ from those reported in the 2016 Report due to (a) reports filed after last year's cut-off date of Dec. 31, 2016, and (b) plans that have been wound up, converted to a DC arrangement, or became a frozen DB plan with no DB/DC accruals.

Table 4.1 – Breakdown of Plans by Solvency Ratios

Solvency Ratio (SR)	2013		2014		2015		2016	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
SR < 0.60	11	0.9%	10	2.9%	17	4.7%	16	1.6%
0.60 ≤ SR < 0.80	98	8.3%	106	31.2%	110	30.6%	131	13.4%
Sub-Total < 0.8	**109**	**9.2%**	**116**	**34.1%**	**127**	**35.3%**	**147**	**15.1%**
0.80 ≤ SR < 0.85	113	9.6%	36	10.6%	47	13.1%	136	14.0%
0.85 ≤ SR < 0.90	217	18.3%	32	9.4%	45	12.5%	236	24.2%
0.90 ≤ SR < 1.00	449	38.0%	65	19.1%	70	19.4%	315	32.3%
Sub-Total < 1.00	**888**	**75.1%**	**249**	**73.2%**	**289**	**80.3%**	**834**	**85.6%**
1.00 ≤ SR < 1.20	261	22.1%	72	21.2%	57	15.8%	117	12.0%
SR ≥1.20	34	2.9%	19	5.6%	14	3.9%	23	2.4%
Total	**1,183**	**100.0%**	**340**	**100.0%**	**360**	**100.0%**	**974**	**100.0%**
Median Ratio	0.93		0.88		0.85		0.89	

Table 4.1 shows that the solvency ratios have decreased during the 2015 valuation period and increased during the 2016 valuation period. The percentage of plans with a solvency ratio less than 0.85 has decreased from 48.4% in 2015 to 29.1% in 2016. The proportion of underfunded plans on a solvency basis (i.e., a solvency ratio less than 1.0) also increased from 80.3% in 2015 to 85.6% in 2016.

Chart 4.2 shows the distribution of solvency ratios at different percentiles from 2002 to 2016. Since the 2007 valuation period, the solvency ratios of pension plans have been volatile.



Charts 4.3 and 4.4 compare plans with a solvency excess to those with a solvency deficit for each of the four valuation periods from 2013 to 2016, as well as for the three-year valuation period of 2014 to 2016.[7] Chart 4.3 compares the number of plans and Chart 4.4 compares the amount of solvency excess or deficit. The number of plans with solvency excesses has remained well below the number of plans with solvency deficits.

[7] Individual valuation periods include those plans that filed a report with a valuation date that fell during that individual period. The 2013-16 period includes only the last funding valuation report filed for a plan with a valuation date falling between July 1, 2013 and June 30, 2017. The total number of plans included in each of the 2013, 2014, 2015 and 2016 valuation periods is therefore higher than the number of plans included in the combined period 2013-2016.

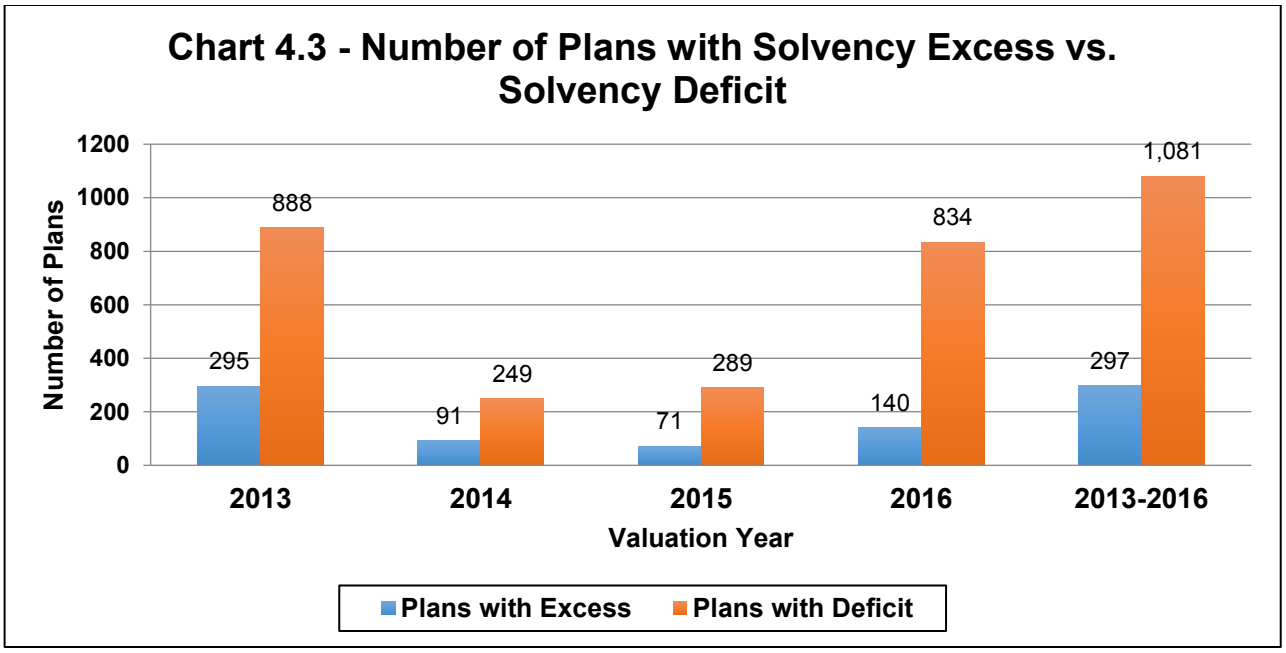


Chart 4.3 - Number of Plans with Solvency Excess vs. Solvency Deficit
Number of Plans
1200
1000
800
600
400
200
0
295
888
91
249
71
289
140
834
297
1,081
2013
2014
2015
2016
2013-2016
Valuation Year
Plans with Excess
Plans with Deficit

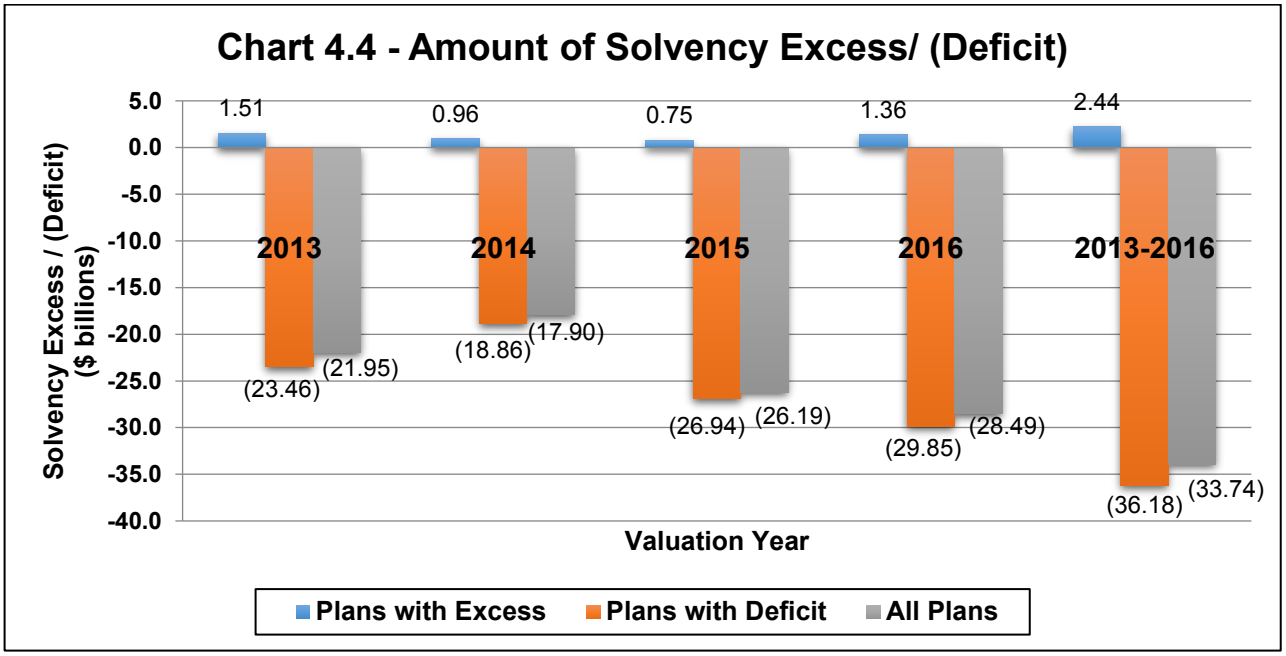


Chart 4.4 - Amount of Solvency Excess/ (Deficit)
Solvency Excess / (Deficit) ($ billions)
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
1.51
(23.46)
(21.95)
0.96
(18.86)
(17.90)
0.75
(26.94)
(26.19)
1.36
(29.85)
(28.49)
2.44
(36.18)
(33.74)
2013
2014
2015
2016
2013-2016
Valuation Year
Plans with Excess
Plans with Deficit
All Plans

On a dollar amount basis, the latest filed reports during 2013-2016 valuation periods (i.e., July 1, 2014 to June 30, 2017) revealed a *net* solvency deficit of $33.74 billion (after allowance for expenses) on solvency liabilities of $241.71 billion. This represents the total level of under-funding for the 1,378 DB plans analyzed in the 2017 Report, exclusive of the seven large public sector plans and the other excluded plans previously described. In contrast, the *net* solvency deficit shown in the 2016 Report was $31.3 billion for the prior valuation periods.

Under the Regulation, for the period covered by this report, where a valuation report filed with FSCO discloses that a solvency deficiency exists, the employer is required to make special payments to eliminate the deficiency within five years. These rules are modified for plans that availed themselves of applicable solvency relief measures. Ontario has changed its funding rules for defined benefit plans so that special payments will be required if needed to increase a plan's solvency funded ratio to 85%.

Ontario's legislation allows certain benefits (e.g., post-retirement indexation, consent benefits, excluded plant closure and excluded permanent layoff benefits) to be excluded in the determination of solvency liabilities. There were 269 plans that excluded one or more of these benefits, resulting in a reduction of liabilities totaling $24.4 billion. Thus, the total *wind up* funding shortfall for those plans that filed a report with valuation dates between July 1, 2013 and June 30, 2017 is $60.6 billion ($36.2 billion plus $24.4 billion), after making allowances for expenses, on wind up liabilities of $225.1 billion. This measures the funding shortfall of all the plans in the database if they were to have wound up at their last valuation dates. Of course, this only depicts a hypothetical scenario as the majority of pension plans continue operating on a going concern basis.

4.2 ACTUARIAL ASSUMPTIONS

Going Concern Interest Rate

Table 4.5 shows the interest rate assumptions used in the going concern valuations. Since 2013, there has been a trend to use lower interest rate assumptions. This downward trend has been reported since FSCO started publishing trend statistics.

Table 4.5 – Going Concern Interest Rate Assumption by Valuation Period

Rate (%)	2013		2014		2015		2016	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
Rate < 3.50	13	1.1%	13	3.8%	25	6.9%	83	8.5%
3.50 ≤ Rate < 4.00	31	2.6%	24	7.1%	27	7.5%	75	7.7%
4.00 ≤ Rate < 4.50	55	4.6%	27	7.9%	35	9.7%	122	12.5%
4.50 ≤ Rate < 5.00	122	10.3%	41	12.1%	47	13.1%	176	18.1%
5.00 ≤ Rate < 5.50	274	23.2%	92	27.1%	113	31.4%	283	29.1%
5.50 ≤ Rate < 6.00	435	36.8%	83	24.4%	70	19.4%	166	17.0%
6.00 ≤ Rate < 6.50	221	18.7%	53	15.6%	39	10.8%	63	6.5%
Rate ≥ 6.50	32	2.7%	7	2.1%	4	1.1%	6	0.6%
Total	**1,183**	**100.0%**	**340**	**100.0%**	**360**	**100.0%**	**974**	**100.0%**
Average (%)	5.37%		5.09%		4.89%		4.74%	

The average of the assumed interest rates declined from 5.37% to 4.74% over the period July 1, 2013 to June 30, 2017. Since last year, the most prevalent assumed interest rates have changed to be within the 4.50% to 5.50% range.

The proportion of plans using an interest rate assumption of 6.00% or higher has decreased each period, from 21.4% of plans in the 2013 valuation period to 7.1% in the 2016 valuation period. Of the 2016 valuations filed, 96.4% of them used an assumed interest rate at or below 6.00%.

Solvency Interest Rates

Chart 4.6 shows the non-indexed commuted value basis over the preceding eight-year period based on the CIA Standards of Practice – Practice Specific Standards for Pension Plans.

The CIA frequently updates its guidance to actuaries for estimating the cost of purchasing a group annuity. The most recent guidance was issued on March 5, 2018 from the Committee on Pension Plan Financial Reporting. The guidance concluded that for valuations with effective dates between December 31, 2017 and December 30, 2018, an appropriate discount rate for estimating the cost of purchasing a non-indexed group annuity, prior to any adjustment for sub- or super-standard mortality, would be determined based on the interpolation method, applicable durations and spreads outlined in the CIA Educational Note.

The current guidance indicates that an appropriate spread above unadjusted CANSIM V39062 is as follows:

Illustrative Block	Duration	Spread above unadjusted CANSIM V39062
Low Duration	8.6	70 bps
Medium Duration	11.1	80 bps
High Duration	13.6	90 bps

Chart 4.7 graphs the non-indexed interest rates for annuity purchases since 2009 as set out in the CIA Educational Notes which provide guidance for Assumptions for Hypothetical Wind up and Solvency Valuations. Effective June 30, 2013, the CIA began issuing guidance based on the duration of the liabilities expected to be settled through the annuity purchase. The chart shows estimated interest rates based on liabilities with a medium duration, where applicable.

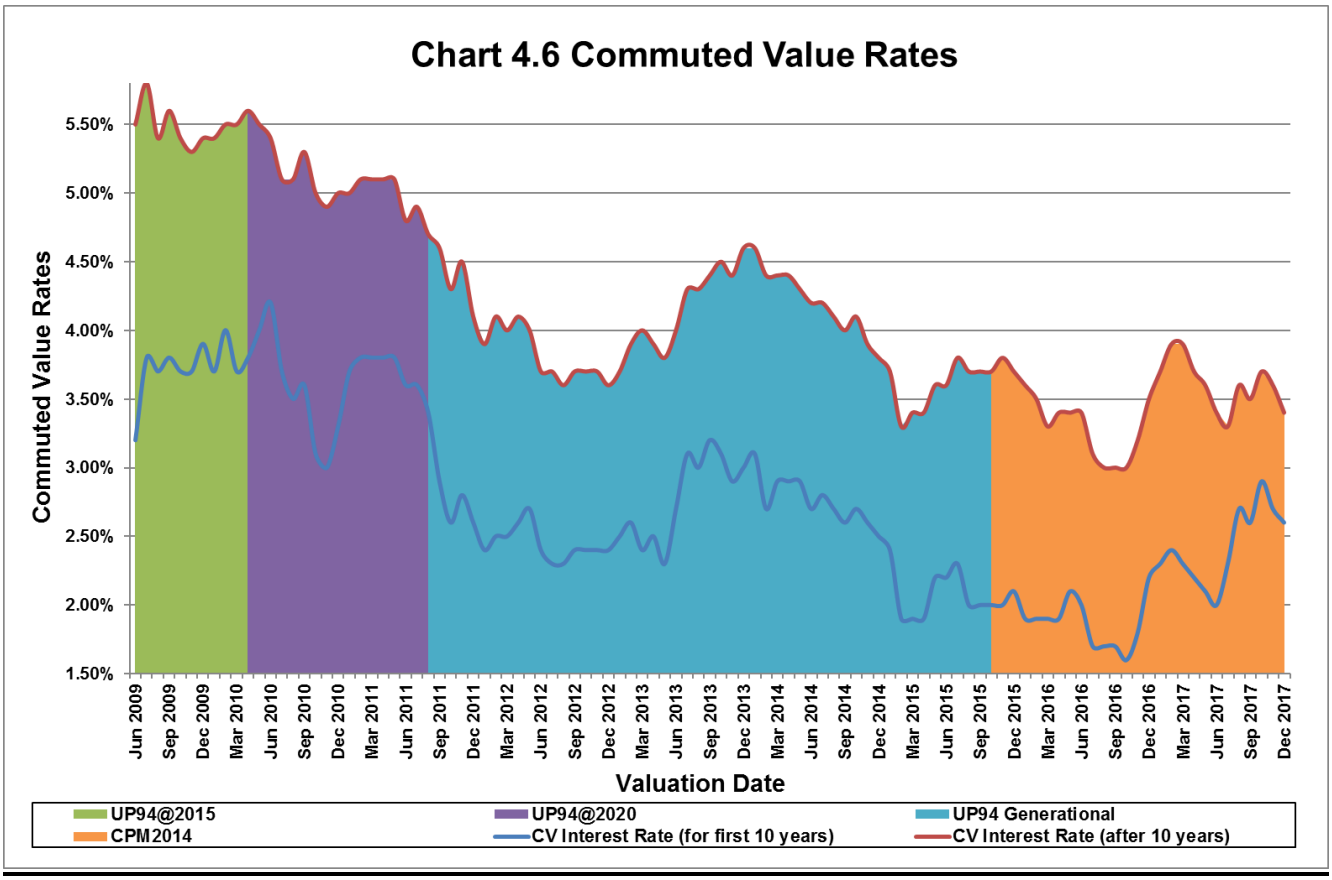


Chart 4.6 Commuted Value Rates
Commuted Value Rates
5.50%
5.00%
4.50%
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
Jun 2009
Sep 2009
Dec 2009
Mar 2010
Jun 2010
Sep 2010
Dec 2010
Mar 2011
Jun 2011
Sep 2011
Dec 2011
Mar 2012
Jun 2012
Sep 2012
Dec 2012
Mar 2013
Jun 2013
Sep 2013
Dec 2013
Mar 2014
Jun 2014
Sep 2014
Dec 2014
Mar 2015
Jun 2015
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Valuation Date
UP94@2015
UP94@2020
UP94 Generational
CPM2014
CV Interest Rate (for first 10 years)
CV Interest Rate (after 10 years)

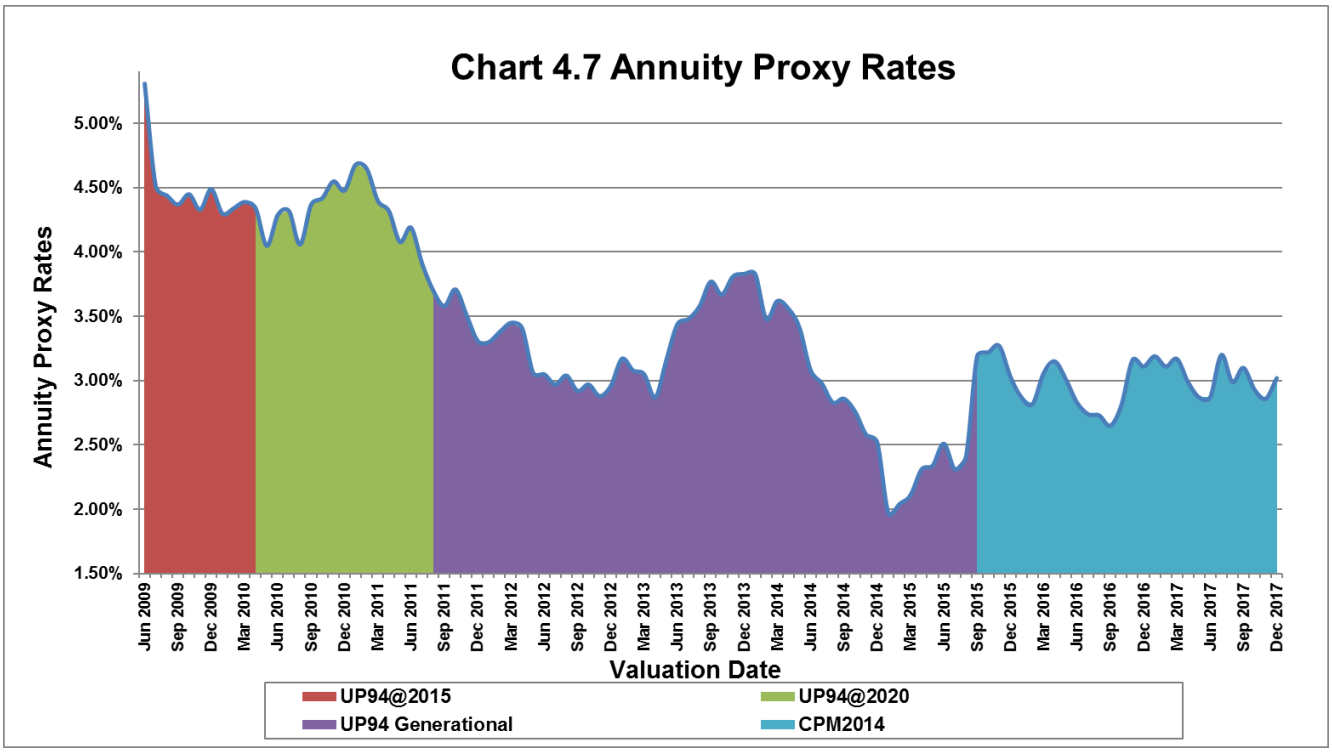


Chart 4.7 Annuity Proxy Rates
Annuity Proxy Rates
5.00%
4.50%
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
Jun 2009
Sep 2009
Dec 2009
Mar 2010
Jun 2010
Sep 2010
Dec 2010
Mar 2011
Jun 2011
Sep 2011
Dec 2011
Mar 2012
Jun 2012
Sep 2012
Dec 2012
Mar 2013
Jun 2013
Sep 2013
Dec 2013
Mar 2014
Jun 2014
Sep 2014
Dec 2014
Mar 2015
Jun 2015
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Valuation Date
UP94@2015
UP94@2020
UP94 Generational
CPM2014

Table 4.8 - Mortality Assumption by Valuation Period

Mortality Assumption	2013		2014		2015		2016	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
1994 GAM Static	2	0.2%	0	0.0%	1	0.3%	0	0.0%
1994 UP	74	6.8%	15	4.4%	4	1.1%	3	0.3%
CPM-RPP2014	1,107	93.0%	325	95.6%	355	98.6%	971	99.7%
Total	**1,183**	**100.0%**	**340**	**100.0%**	**360**	**100.0%**	**974**	**100.0%**

Mortality Basis

Table 4.8 shows the distribution of the mortality tables used in going concern valuations. Starting in the 2013 valuation period, all plans used a mortality table with a base year of 1994 or later, i.e., the 1994 tables (GAM and UP). The majority of plans have begun using the Canadian pensioners' mortality tables (CPM-RPP2014) and improvement scales published in the 2014 CIA CPM Study.

Data used in the preparation of this report does not contain information to distinguish between the three CPM mortality tables or projection scales used nor any possible variations of these tables. The AIS will be amended to identify the actual mortality table and projection scales used, as well as any modifications thereof.

5.0 INVESTMENT DATA ANALYSIS

The plans included in the investment data analysis are a subset of the 1,378 plans identified in section 2 of this report. This subset consists of plans that have filed an Investment Information Summary (IIS) for the most recent monitoring cycle (fiscal year-ends between July 1, 2016 and June 30, 2017). There are 1,306 plans included in the investment data analysis, representing 95% of the plans included in the funding data analysis.[8] For hybrid plans, only the defined benefit assets are included in the data.

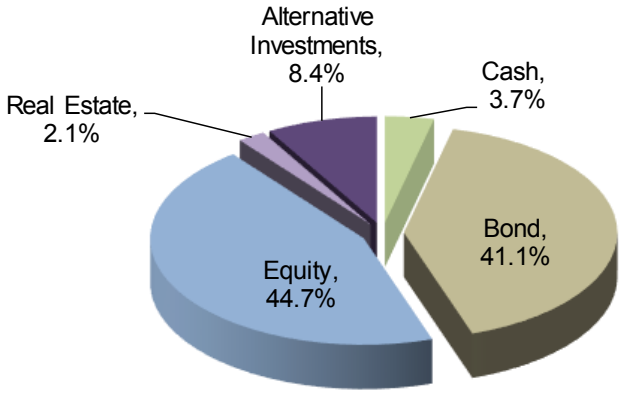
5.1 SUMMARY OF PENSION FUND PROFILES

In aggregate, the asset mix of the 1,306 pension funds for the most recent monitoring cycle is described in Table 5.1 and depicted in Chart 5.2.

Table 5.1 – Investment Profile of All Plans (combined)

Asset Class	Market Value ($ Millions)	% of Total Investments
Cash	7,746	3.7%
Bond	86,650	41.1%
Equity	94,144	44.7%
Real Estate	4,473	2.1%
Alternative Investments[9]	17,649	8.4%
Total	**210,662**	**100.0%**

Chart 5.2: Asset Allocation of All Plans



[8] Plans not included here are primarily plans with outstanding IIS filings.
[9] Alternative Investments include hedge funds, private equity, infrastructure, currency hedging, resource properties, commodities, etc.

On a broad basis, traditional fixed income assets (consisting of cash and bonds) constitute 45% of total investments. Non-fixed income assets (consisting of equity, real estate and alternative investments) constitute 55% of total investments, although we note that the nature of alternative investments means that they cannot always be classified as purely fixed or non-fixed income.

By comparison, the seven large public sector plans excluded from the analysis have a very different aggregate asset mix, as shown in Table 5.3.

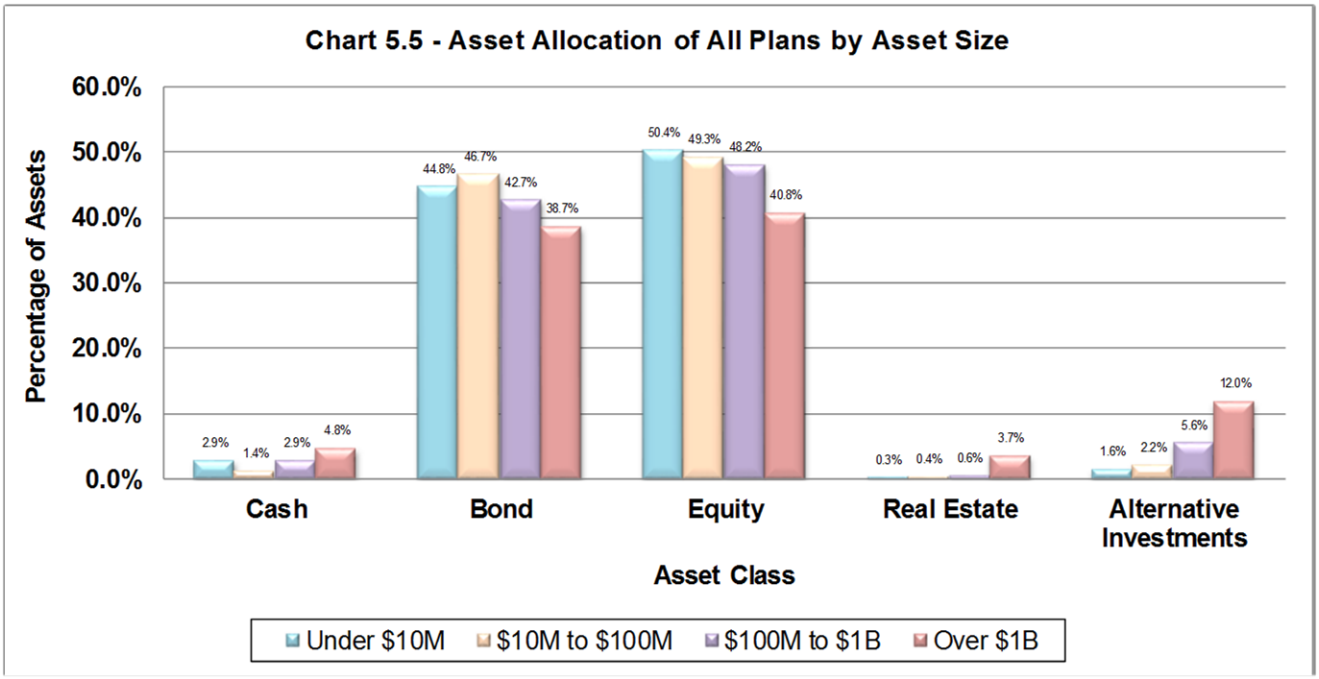
Table 5.3 – Investment Profile of Excluded Plans
(Public Sector Pension Plans)

Asset Class	Market Value ($ Millions)	% of Total Investments
Cash	40,157	9.9%
Bond	199,028	49.1%
Equity	64,010	15.8%
Real Estate	42,247	10.4%
Alternative Investments	60,194	14.8%
Total	**405,636**	**100.0%**

Allocations to various asset classes vary among pension plans, based on the total value of their assets. The larger the pension fund, the more assets are allocated in real estate and alternative investments and the less in bond and equity. Notably, pension funds with over $1 billion in assets invest, on average, 15.7% in real estate and alternative investments (combined). The asset allocation of all plans by asset size is shown in Table 5.4 and depicted in Chart 5.5.

Table 5.4 - Asset Allocation of All Plans by Asset Size

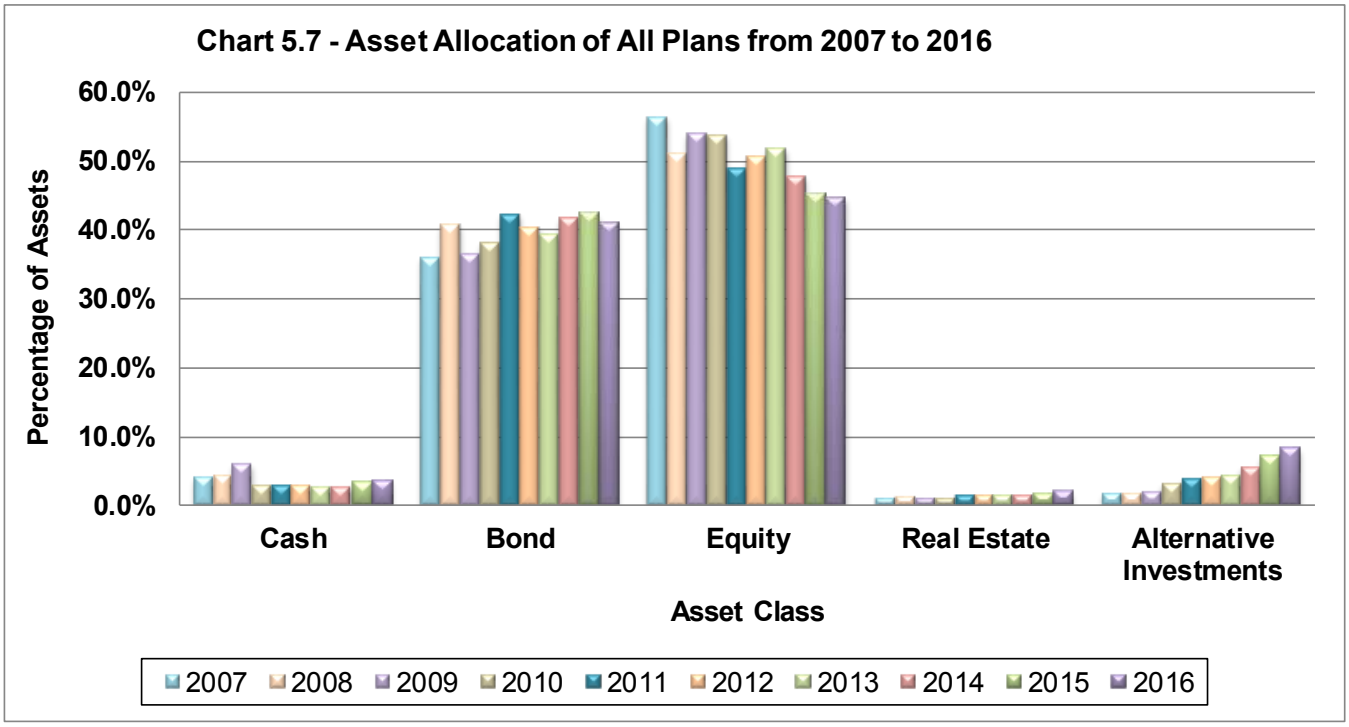
Size of Plan Asset		Under $10M	$10M to $100M	$100M to $1B	Over $1B	All Plans
# of Plans		406	590	270	40	1,306
Asset Class	Cash	2.9%	1.4%	2.9%	4.8%	3.7%
	Bond	44.8%	46.7%	42.7%	38.7%	41.1%
	Equity	50.4%	49.3%	48.2%	40.8%	44.7%
	Real Estate	0.3%	0.4%	0.6%	3.7%	2.1%
	Alternative Investments	1.6%	2.2%	5.6%	12.0%	8.4%
	Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**



Investment data reported in FSCO's previous annual reports on the funding and investment of DB pension plans in Ontario from 2007 to 2016 demonstrate a general trend in pension fund asset allocation to increase investments in bonds and decrease investments in equity. Allocation in alternative investments increased consistently over this period. The asset allocation of all plans over this period is shown in Table 5.6 and depicted in Chart 5.7.

Table 5.6 - Asset Allocation of All Plans from 2007 to 2016

	% of Total Investments									
Asset Class	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Cash	4.3%	4.6%	6.1%	3.1%	3.1%	3.1%	2.7%	2.9%	3.3%	3.7%
Bond	36.1%	41.0%	36.5%	38.4%	42.3%	40.4%	39.4%	41.8%	42.4%	41.1%
Equity	56.6%	51.3%	54.1%	53.9%	49.1%	50.8%	52.0%	48.0%	45.3%	44.7%
Real Estate	1.1%	1.3%	1.2%	1.2%	1.5%	1.5%	1.5%	1.7%	1.8%	2.1%
Alternative Investments	1.9%	1.8%	2.1%	3.4%	4.0%	4.2%	4.4%	5.6%	7.2%	8.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**



5.2 SUMMARY OF FUND PERFORMANCE

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

The 1,306 plans included in the analysis are very diverse. To illustrate 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 investment 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. "Average Return" means the average rate of return, net of all investment expenses. "Average investment fees" mean the average expenses paid from the pension plan related to managing the pension plan's investments, expressed as a percentage of average assets during the reporting year.

By Plan Type

The investment profile of SEPPs and MEPPs is given below. Table 5.8 shows the asset mix and average performance returns, while Table 5.9 provides the percentile performance returns.

Table 5.8 – Investment Results by Plan Type

Plan Type		SEPP	MEPP	All Plans
# of Plans		1,232	74	1,306
Asset Mix	Fixed Income	46.8%	34.3%	44.8%
	Non-Fixed Income	53.2%	65.7%	55.2%
Performance	Average Return[10]	6.28%	7.95%	6.40%
	Average Investment Fees	0.45%	0.44%	0.45%

Table 5.9 – Performance Result Percentiles by Plan Type

Plan Type	SEPP	MEPP	All Plans
Investment Returns			
90th Percentile	10.11%	10.76%	10.18%
75th Percentile	7.79%	9.38%	7.90%
Median	5.92%	7.66%	6.03%
25th Percentile	4.29%	6.54%	4.40%
10th Percentile	2.86%	5.61%	2.97%
Investment Fees			
90th Percentile	0.82%	0.59%	0.82%
75th Percentile	0.58%	0.49%	0.58%
Median	0.39%	0.41%	0.39%
25th Percentile	0.23%	0.36%	0.24%
10th Percentile	0.11%	0.27%	0.11%

[10] The average return in this table and those in Tables 5.10-5.13 are the arithmetic (equally-weighted) average of investment returns of the pension funds in each subgroup. The average of investment returns weighted by the sizes of all pension funds is 6.45%, compared to 6.40% on an equally-weighted basis as shown in this table.

By Benefit Type

Table 5.10 provides the investment profile of pension plans with various benefit types.

Table 5.10 – Investment Results by Benefit Type[11]

Benefit Type		FAE	CAE	FB	Hybrid	Other	All Plans
# of Plans		341	103	206	547	109	1,306
Asset Mix	Fixed Income	38.1%	39.6%	38.1%	51.8%	55.4%	44.8%
	Non-Fixed Income	61.9%	60.4%	61.9%	48.2%	44.6%	55.2%
Performance	Average Return	6.72%	6.35%	6.81%	6.06%	6.07%	6.40%
	Average Investment Fees	0.45%	0.47%	0.48%	0.43%	0.43%	0.45%

By Plan Size

Table 5.11 shows the investment profile of pension funds of various sizes.

Table 5.11 - Investment Results by Asset Size

Size of Plan Assets		Under $10M	$10M to $100M	$100M to $1B	Over $1B	All Plans
# of Plans		406	590	270	40	1,306
Asset Mix	Fixed Income	47.7%	48.2%	45.6%	43.5%	44.8%
	Non-Fixed Income	52.3%	51.8%	54.4%	56.5%	55.2%
Performance	Average Return	6.14%	6.46%	6.41%	7.08%	6.40%
	Average Investment Fees	0.65%	0.39%	0.30%	0.34%	0.45%

By Solvency Ratio

Table 5.12 provides the investment profile of pension plans with various solvency ratios.

Table 5.12 – Investment Results by Solvency Ratio (SR)

Solvency Ratio (SR)		SR < 0.85	0.85 ≤ SR < 1.0	SR ≥ 1.0	All Plans
# of Plans		363	680	263	1,306
Asset Mix	Fixed Income	37.7%	49.0%	43.0%	44.8%
	Non-Fixed Income	62.3%	51.0%	57.0%	55.2%
Performance	Average Return	6.32%	6.56%	5.94%	6.40%
	Average Investment Fees	0.49%	0.42%	0.45%	0.45%

[11] MEPPs are included in the various benefit type categories to which they belong.

By Percentages Invested in Investment Funds

Table 5.13 shows the investment profile of pension plans with various percentage ranges of assets invested in investment funds.

Table 5.13 – Investment Results by Percentage Invested in Investment Funds

Percentage Invested in Investment Funds		< 20%	20% to 80%	> 80%	All Plans
# of Plans		166	217	923	1,306
Asset Mix	Fixed Income	51.2%	37.9%	45.6%	44.8%
	Non-Fixed Income	48.8%	62.1%	54.4%	55.2%
Performance	Average Return	6.26%	6.82%	6.29%	6.40%
	Average Investment Fees	0.37%	0.33%	0.49%	0.45%

5.3 INVESTMENT OBSERVATIONS

This section presents some key observations about the analyses set out in sections 5.1 and 5.2. The focus is on findings that are relatively common or show some kind of trend over time:

- Larger plans often have higher average return and lower investment fees than small plans.
- Pension funds of MEPPs generally invested more in non-fixed income assets.
- While the typical asset allocation of pension funds between fixed income and non-fixed income did not change significantly, the allocation in alternative investments increased consistently.
- There do not seem to be significant differences in asset mix, average return and average investment fees between FAE, CAE, and FB plans.

6.0 2017 PROJECTIONS

6.1 ESTIMATED DB FUNDING CONTRIBUTIONS IN 2017

Table 6.1 presents the estimated funding contributions – comprising normal costs and special payments – expected for DB plans in 2017, including those related to defined benefit provisions under hybrid plans. Estimates are based on information from the most recently filed reports with valuation dates between July 1, 2014 and June 30, 2017.[12]

Table 6.1 - Estimated DB Funding in 2017

	Plans with Solvency Excess	Plans with Solvency Deficit	All Plans
Number of Plans	297	1,081	1,378
	($ Millions)	**($ Millions)**	**($ Millions)**
Employer Normal Cost Contributions	567	2,936	3,503
Member Required Contributions	207	604	811
Sub-total	**774**	**3,540**	**4,314**
Special Payments	48	3,134	3,182
Total	**822**	**6,674**	**7,496**

The total DB funding contributions in 2017 are estimated to be $7.5 billion, which is 3% lower than the estimated contributions of $7.7 billion for 2016, as set out in the 2016 Report. The $251 million decrease consists of:

- a $312 million decrease in the required special payments; and
- a $61 million increase in the required employer normal cost and member contributions.

The $3.2 billion in special payments represents 42% of the total estimated 2017 funding contributions of $7.5 billion.

The table also provides a breakdown of the estimated funding contributions between plans with a solvency excess and plans with a solvency deficit The total special payments of $48 million for plans with a solvency excess represent 5.8% of the total contributions of $822 million for these plans. This compares with the total special payments of $3.1 billion for plans with a solvency deficit, representing about 47.0% of the total contributions of $6.7 billion for these plans.

[12] For plans where the AIS reported contributions did not extend to the end of 2017, the 2017 estimated contributions were determined assuming contributions would continue at the same rate as that reported for the valuation period.

The estimated 2017 funding contributions are determined without considering the existence of a prior-year credit balance or funding excess, which can be used to reduce required contributions during the valuation period. A total of $1.0 billion of prior-year credit balances were reported for 197 plans with a non-zero prior-year credit balance.

6.2 PROJECTED SOLVENCY POSITION AS AT DECEMBER 31, 2017

This section presents a projection of the solvency funding position of DB plans to the end of 2017. The projection reflects the impact of investment returns, changes in the solvency interest rates and the special payments expected to be made during 2017. The methodology and assumptions used are described below.

Methodology and Assumptions

The results reported in the last filed valuation reports (i.e., assets and liabilities) were projected to December 31, 2017 to reflect investment returns and the changes in the solvency valuation bases. These projections were based on the following assumptions:

- Sponsors would use all available funding excess 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.
- Amounts of cash outflow would equal the pension amounts payable to retired members as reported in the last filed valuation report. Plan administration costs were not directly reflected but were indirectly offset through the use of net after expense investment returns.

Unlike projections in last year's report, each plan's unique projection period investment returns were determined based on its IIS fillings. For 2014, 2015 and 2016, each plan's unique IIS-reported annual rates of return were used. For 2017, each plan's returns were estimated based on its 2016 IIS asset allocation information in conjunction with 2017 market index returns, offset by a 25 basis point quarterly expense allowance.

Table 6.2 A - Individual plan 2014, 2015 and 2016 Rate of Return Statistics

	1st Quartile	2nd Quartile	3rd Quartile
2014 Gross Return	13.8%	11.7%	10.1%
Net After Investment Expense Return	13.5%	11.3%	9.7%
Net After All Expense Return	12.9%	10.7%	8.9%
2015 Gross Return	7.0%	5.5%	4.1%
Net After Investment Expense Return	6.6%	5.1%	3.7%
Net After All Expense Return	6.2%	4.7%	3.1%
2016 Gross Return	8.1%	6.4%	4.7%
Net After Investment Expense Return	7.6%	5.9%	4.3%
Net After All Expense Return	7.2%	5.4%	3.7%

Table 6.2 B - Estimated Individual Plan Gross and Net after Expense Return Statistics for 2017

	1st Quartile	2nd Quartile	3rd Quartile
2017 Gross Return	9.5%	9.1%	8.3%
2017 Net After All Expense Return	8.4%	8.0%	7.2%

Table 6.3 – Actuarial Basis for Projected Solvency Liabilities

Valuation Date	Commuted Value Basis[13]	Annuity Purchase Basis[14]
December 31, 2016	Interest: 2.20% for 10 years, 3.50% thereafter Mortality: CPM2014 generational	Interest: 3.11% Mortality: CPM2014 generational
December 31, 2017	Interest: 2.60% for 10 years, 3.40% thereafter Mortality: CPM2014 generational	Interest: 3.02% Mortality: CPM2014 generational

[13] The commuted value basis used for the December 31, 2016 and December 31, 2017 solvency projections is based on the Canadian Institute of Actuaries' Standards of Practice – Practice-Specific Standards for Pension Plans, Section 3500 on Pension Commuted Values, dated June 2010.
[14] The interest rates for annuity purchases as at December 31, 2016 and December 31, 2017 are based on the recommendations set out in the Canadian Institute of Actuaries' Educational Notes (EN) providing guidance for Assumptions for Hypothetical Wind Up and Solvency Valuations.

Projection Results

Table 6.4 presents the distribution of solvency ratios reported in the last filed valuation reports and the distribution of projected solvency ratios (PSRs) derived from the projected assets and liabilities.

Table 6.4 - Distribution of Solvency Ratios

Distribution of Solvency Ratio	As at Last Filed Valuation	PSR as at December 31, 2016	PSR as at December 31, 2017
10th percentile	78%	78%	82%
25th percentile	85%	85%	90%
50th percentile	**91%**	**91%**	**96%**
75th percentile	99%	97%	103%
90th percentile	107%	104%	112%

As shown in Table 6.4, the median PSR is projected to increase from 91% to 96% between December 31, 2016 and December 31, 2017. In general, the change in the median PSR is the net effect of the following factors:

- estimated pension fund returns in 2017 being higher than the solvency valuation discount rates used at December 31, 2016;
- the extent by which expected contributions made during 2017 were different than the increase in solvency liabilities and benefit accruals in 2017; and
- the change in solvency valuation interest rates used to calculate solvency liabilities as at December 31, 2017 (reflecting most recent CIA annuity purchase proxy guidance).

7.0 GLOSSARY

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

Actuarial Information Summary (AIS): The AIS is a standardized form, developed jointly by FSCO, the Canada Revenue Agency, Financial and Consumer Affairs Authority of Saskatchewan, and Retraite Québec. It is required to be completed by an actuary and filed with FSCO in conjunction with a funding valuation report.

Defined Benefit Pension Plan: In a defined benefit 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 defined benefit plans, including:

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

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

Frozen Hybrid: Pension plans in which members have a frozen defined benefit entitlement, but are accruing future defined contribution benefits.

Frozen DB Plans: Pension plans in which members have a frozen defined benefit entitlement and do not accrue any future service in that pension plan.

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 defined benefit 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 (e.g., indexation, prospective benefit increases, or plant closure/layoff benefits).

Hybrid Pension Plan: A hybrid pension plan contains both defined benefit and defined contribution provisions. A member's pension benefit may be a combination of the defined benefit plus the defined contribution entitlement or a pension benefit which is the greater of the defined benefit entitlement or the defined contribution entitlement.

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

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 (MEPP): A multi-employer pension plan covers the employees of two or more unrelated employers. These plans may provide defined benefits but, in most MEPPs, the required contributions are negotiated and fixed through collective bargaining.

Solvency Concerns: A valuation report indicates solvency concerns if any of the following circumstances exist, except for certain plans exempted by the Regulation:

- The employer has elected under subsection 5(18) of the Regulation to exclude plant closure benefits or permanent layoff benefits from the determination of solvency liabilities.
- The solvency ratio is less than 85%.

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.

Solvency Ratio or Solvency Funded Ratio: The ratio of the solvency assets to the solvency liabilities of the pension plan.

Acronyms

AIS	Actuarial Information Summary
CAE	Career Average Earnings
DB	Defined Benefit
DC	Defined Contribution
FAE	Final Average Earnings
FB	Flat Benefit
FSCO	Financial Services Commission of Ontario
FR	Funded Ratio
IIS	Investment Information Summary (Form 8)
MEPP	Multi-Employer Pension Plan
PBA	Pension Benefits Act (Ontario)
PSR	Projected Solvency Ratio
SEPP	Single Employer Pension Plan
SR	Solvency Ratio
SOMEPP	Specified Ontario Multi-Employer Pension Plan

8.0 APPENDIX – ADDITIONAL INFORMATION FOR PLANS IN FUNDING DATA ANALYSIS

This appendix provides additional details of the profile of the plans that have been included in the funding data analysis. The data consists of DB pension plans that have filed valuation reports with valuation dates between July 1, 2013 and June 30, 2017. Please refer to **Section 2.0 – Funding Data Analysis** of this report for details of how the data was compiled.

Table 8.1 shows a reconciliation of the 1,333 plans analyzed in the 2016 Report to the 1,378 plans analyzed in the 2017 Report.

Table 8.1 – Reconciliation of Plans from the 2016 Report to the 2017 Report

Plan Type:	Final Average	Career Average	Flat Benefit	Hybrid	Frozen Hybrid	Frozen DB Plans	MEPP	TOTAL
2016 Report	352	94	166	384	159	105	73	1,333
New plans / Spin-offs	1			1				2
Previously excluded	16	6	12	5	8	5		52
Change in Benefit Type								
• FAE	(11)		(2)	5	3	5		
• CAE		(4)		3		1		
• FB			(11)	6	1	4		
• Hybrid				(15)	14	1		
Outstanding report*							1	1
Data Correction(s)					(1)	1		
Closed / Wind up	(2)	(1)	(3)	(4)				(10)
2017 Report	**356**	**95**	**162**	**385**	**184**	**122**	**74**	**1,378**

** These are plans that were not included in last year's analysis because they did not file a funding valuation report with a valuation date between July 1, 2013 and June 30, 2016. They have since filed a funding valuation report with a valuation date between July 1, 2014 and June 30, 2017.*

Table 8.2 compares the number of plans analyzed in the current report with the plans analyzed in previous reports.

Table 8.2 – Plans Included in Current and Previous Reports by Plan/Benefit Type

Year	Final Average	Career Average	Flat Benefit	Hybrid	Frozen Hybrid	Frozen DB Plans	MEPP	Total	Total Membership
2017	**356**	**95**	**162**	**385**	**184**	**122**	**74**	**1,378**	**1,870,615**
2016	352	94	166	384	159	105	73	1,333	1,866,565
2015	366	104	174	397	170	n/a	72	1,283	1,835,156
2014	384	112	188	386	168	n/a	73	1,311	1,833,773
2013	425	132	202	391	135	n/a	76	1,361	1,860,156
2012	455	140	216	387	113	n/a	76	1,387	1,832,800
2011	491	152	234	381	110	n/a	70	1,438	1,828,604
2010	548	172	262	371	83	n/a	70	1,506	1,866,444
2009	640	197	322	310	n/a	n/a	70	1,539	1,899,155
2008	619	220	338	315	n/a	n/a	72	1,564	1,867,653
2007	663	236	362	292	n/a	n/a	79	1,632	1,880,563
2006	730	271	394	224	n/a	n/a	79	1,698	1,863,433
2005	805	293	424	127	n/a	n/a	73	1,722	1,801,895
2004	839	292	422	86	n/a	n/a	79	1,718	1,765,255

Table 8.3 shows a breakdown of the number of plans by size of plan membership.

Table 8.3 – Number of Plans by Size of Membership in Plan

Number of Members in Plan	Non-MEPP	MEPP	Total
0-49	284	0	284
50-99	194	2	196
100-249	295	3	298
250-499	195	3	198
500-999	139	12	151
1000-4999	163	28	191
5000-9999	23	10	33
10000 +	11	16	27
Total	**1,304**	**74**	**1,378**

Table 8.4 shows a breakdown of the total members covered by size of plan membership.

Table 8.4 – Total Membership by Size of Membership in Plan

Number of Members in Plan	Non-MEPP	MEPP	Total
0-49	6,982	0	6,982
50-99	14,495	173	14,668
100-249	47,705	529	48,234
250-499	68,802	1,130	69,932
500-999	96,498	8,752	105,250
1000-4999	340,114	70,322	410,436
5000-9999	162,119	78,628	240,387
10000 +	194,073	780,653	974,726
Total	**930,788**	**939,827**	**1,870,615**

Table 8.5 – Non-Indexed Commuted Values Rates (CIA Basis)

Year 2017												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	2.30%	2.40%	2.30%	2.20%	2.10%	2.00%	2.30%	2.70%	2.60%	2.90%	2.70%	2.60%
Ultimate 10 Years	3.70%	3.90%	3.90%	3.70%	3.60%	3.40%	3.30%	3.60%	3.50%	3.70%	3.60%	3.40%
Year 2016												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	1.90%	1.90%	1.90%	1.90%	2.10%	2.00%	1.70%	1.70%	1.70%	1.60%	1.80%	2.20%
Ultimate 10 Years	3.60%	3.50%	3.30%	3.40%	3.40%	3.40%	3.10%	3.00%	3.00%	3.00%	3.20%	3.50%
Year 2015												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	2.40%	1.90%	1.90%	1.90%	2.20%	2.20%	2.30%	2.00%	2.00%	2.00%	2.00%	2.10%
Ultimate 10 Years	3.70%	3.30%	3.40%	3.40%	3.60%	3.60%	3.80%	3.70%	3.70%	3.70%	3.80%	3.70%
Year 2014												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	3.10%	2.70%	2.90%	2.90%	2.90%	2.70%	2.80%	2.70%	2.60%	2.70%	2.60%	2.50%
Ultimate 10 Years	4.60%	4.40%	4.40%	4.40%	4.30%	4.20%	4.20%	4.10%	4.00%	4.10%	3.90%	3.80%
Year 2013												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	2.50%	2.60%	2.40%	2.50%	2.30%	2.70%	3.10%	3.00%	3.20%	3.10%	2.90%	3.00%
Ultimate 10 Years	3.70%	3.90%	4.00%	3.90%	3.80%	4.00%	4.30%	4.30%	4.40%	4.50%	4.40%	4.60%
Year 2012												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	2.40%	2.50%	2.50%	2.60%	2.70%	2.40%	2.30%	2.30%	2.40%	2.40%	2.40%	2.40%
Ultimate 10 Years	3.90%	4.10%	4.00%	4.10%	4.00%	3.70%	3.70%	3.60%	3.70%	3.70%	3.70%	3.60%
Year 2011												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	3.70%	3.80%	3.80%	3.80%	3.80%	3.60%	3.60%	3.40%	2.90%	2.60%	2.80%	2.60%
Ultimate 10 Years	5.00%	5.10%	5.10%	5.10%	5.10%	4.80%	4.90%	4.70%	4.60%	4.30%	4.50%	4.10%
Year 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Select 10 Years	3.70%	4.00%	3.70%	3.80%	4.00%	4.20%	3.70%	3.50%	3.60%	3.10%	3.00%	3.30%
Ultimate 10 Years	5.40%	5.50%	5.50%	5.60%	5.50%	5.40%	5.10%	5.10%	5.30%	5.00%	4.90%	5.00%

Table 8.6 – Non-Indexed Annuity Proxy Rates (CIA Basis)

Year 2017												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	2.99%	2.91%	2.77%	2.59%	2.77%	2.97%	3.30%	3.09%	3.20%	3.04%	2.96%	2.92%
Medium Duration	3.19%	3.11%	3.17%	2.99%	2.87%	2.87%	3.20%	2.99%	3.10%	2.93%	1.86%	3.02%
High Duration	2.91%	2.99%	2.91%	2.77%	2.59%	2.77%	2.97%	3.30%	3.09%	3.20%	3.04%	2.96%
Year 2016												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	2.47%	2.42%	2.76%	2.85%	2.71%	2.53%	2.44%	2.43%	2.35%	2.51%	2.86%	2.91%
Medium Duration	2.87%	2.82%	3.06%	3.15%	3.01%	2.83%	2.74%	2.73%	2.65%	2.81%	3.16%	3.11%
High Duration	2.63%	2.47%	2.42%	2.76%	2.85%	2.71%	2.53%	2.44%	2.43%	2.35%	2.51%	2.86%
Year 2015												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	1.67%	1.74%	1.81%	2.01%	2.04%	2.01%	1.81%	1.91%	2.89%	2.98%	2.97%	2.63%
Medium Duration	1.97%	2.04%	2.11%	2.31%	2.34%	2.51%	2.31%	2.41%	3.19%	3.22%	3.27%	3.03%
High Duration	1.67%	1.67%	1.74%	1.81%	2.01%	2.04%	2.01%	1.81%	1.91%	2.89%	2.98%	2.97%
Year 2014												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	3.61%	3.63%	3.28%	3.32%	3.26%	3.11%	2.68%	2.58%	2.43%	2.56%	2.46%	2.28%
Medium Duration	3.83%	3.48%	3.62%	3.56%	3.41%	3.08%	2.98%	2.83%	2.86%	2.76%	2.58%	2.52%
High Duration	3.63%	3.63%	3.28%	3.32%	3.26%	3.11%	2.68%	2.58%	2.43%	2.56%	2.46%	2.28%
Year 2013												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	3.17%	3.08%	3.05%	2.87%	3.16%	2.87%	3.16%	3.24%	3.28%	3.38%	3.57%	3.47%
Medium Duration	3.17%	3.08%	3.05%	2.87%	3.16%	3.44%	3.48%	3.58%	3.77%	3.67%	3.81%	3.83%
High Duration	3.17%	3.08%	3.05%	2.87%	3.16%	3.54%	3.58%	3.68%	3.87%	3.77%	3.91%	3.93%
Year 2012												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	3.30%	3.38%	3.45%	3.41%	3.06%	3.05%	2.97%	3.04%	2.92%	2.97%	2.88%	2.96%
Medium Duration	3.30%	3.38%	3.45%	3.41%	3.06%	3.05%	2.97%	3.04%	2.92%	2.97%	2.88%	2.96%
High Duration	3.30%	3.38%	3.45%	3.41%	3.06%	3.05%	2.97%	3.04%	2.92%	2.97%	2.88%	2.96%
Year 2011												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	4.68%	4.65%	4.40%	4.32%	4.08%	4.19%	3.91%	3.70%	3.58%	3.71%	3.51%	3.31%
Medium Duration	4.68%	4.65%	4.40%	4.32%	4.08%	4.19%	3.91%	3.70%	3.58%	3.71%	3.51%	3.31%
High Duration	4.68%	4.65%	4.40%	4.32%	4.08%	4.19%	3.91%	3.70%	3.58%	3.71%	3.51%	3.31%
Year 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low Duration	4.30%	4.34%	4.39%	4.34%	4.05%	4.29%	4.32%	4.06%	4.37%	4.42%	4.55%	4.48%
Medium Duration	4.30%	4.34%	4.39%	4.34%	4.05%	4.29%	4.32%	4.06%	4.37%	4.42%	4.55%	4.48%
High Duration	4.30%	4.34%	4.39%	4.34%	4.05%	4.29%	4.32%	4.06%	4.37%	4.42%	4.55%	4.48%