

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

*Overview and Selected Findings  
2000-2004*

**Financial Services Commission of Ontario**

**September 2005**

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

## ***Overview and Selected Findings 2000-2004***

### **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.

There were more than 6,000 active pension plans registered with FSCO in 2004, covering approximately 3.3 million active members, retirees, and other beneficiaries. Of these plans, slightly over 2,800 were defined benefit plans with approximately 1.7 million active members and 1.3 million retirees and other beneficiaries. In other words, defined benefit plans accounted for less than half of these registered plans but covered over 90% of the members, retirees and other beneficiaries.

In July 2000, FSCO implemented a risk-based approach to monitor the funding of defined benefit pension plans.<sup>1</sup> A required filing called the Actuarial Information Summary (AIS) and a computerized database were developed to support this initiative.

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. The form enables FSCO to efficiently collect key actuarial and financial information presented in the report. FSCO uses this data, for example, to analyze the funded status of pension plans and determine trends. This is FSCO's first report presenting some of these findings.

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<sup>1</sup> "Risk-based Supervision of the Funding of Ongoing Defined Benefit Pension Plans" (May 2000), an overview of the risk-based approach, is available on FSCO's website at: [www.fSCO.gov.on.ca](http://www.fSCO.gov.on.ca).

## 2.0 Statistical Analysis

This section summarizes some of the funding and actuarial data for defined benefit pension plans with valuation dates between July 1, 2001 and June 30, 2004. The data was compiled from AIS and funding valuation reports filed between July 1, 2001 and January 31, 2005.

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<sup>2</sup>, annual filing is required until these concerns are eliminated. Early filings may also be required when events such as plan mergers, partial wind ups, or sales of businesses occur. To avoid double counting when compiling the information in this section, only the data from a plan's most recently filed report was included.

However, for the purposes of our analysis, the following have been excluded:

- 776 Designated Plans<sup>3</sup>
- 7 large public sector plans<sup>4</sup>
- 163 plans where members are no longer accruing future benefits
- 147 plans with outstanding funding valuation reports

Between July 1, 2001 and January 31, 2005, AIS data for over 6,000 funding valuation reports for defined benefit plans were entered into a database and screened through a selective review system. Forty-five percent of these reports were selected for further review, and almost 30% of these had material compliance concerns that required further follow up. With very few exceptions, the compliance concerns identified during the review were subsequently addressed by the plans' actuaries and administrators.

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<sup>2</sup> 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.

<sup>3</sup> Designated Plans are defined in section 8515 of the federal Income Tax Regulations. Generally, these are plans for connected persons and/or highly-paid executives.

<sup>4</sup> Given their size, these plans, if included, would skew the analysis of the defined benefit plans. Based on the most recently filed reports, these seven public sector plans had a total membership exceeding one million (611,000 actives, 303,000 retirees and 150,000 other beneficiaries) and total assets of \$146 billion at market value. The average age of their membership was 43.6 for active members and 68.9 for retired members.

**Table 1 – Summary of Plans Included**

<b>Plan/ Benefit Type</b>	<b># of Plans</b>	<b>Active Members</b>	<b>Retired Members</b>	<b>Other Beneficiaries</b>	<b>Total</b>	<b>Market Value of Assets (\$Million)</b>
Final Average	839	339,078	193,328	86,587	618,993	\$60,985
Career Average	292	62,171	38,755	18,928	119,854	\$6,938
Flat Benefit	422	146,727	111,490	40,161	298,378	\$21,241
Hybrid	86	41,159	29,936	15,730	86,825	\$5,638
Multi-Employer	79	341,978	85,169	214,058	641,205	\$13,922
<b>Total</b>	<b>1,718</b>	<b>931,113</b>	<b>458,678</b>	<b>375,464</b>	<b>1,765,255</b>	<b>\$108,723</b>

The average age of the membership was 41.7 for active members and 70.8 for retired members.

## 2.1 Summary of Funding Data

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

- For all plans analyzed, the median funded ratios were 98% on a going concern basis and 88% on a solvency basis.
- Of the 839 final average plans, 402 (48%) were fully funded on a going concern basis and 393 (47%) were fully funded on a solvency basis.
- Career average plans were better funded on a going concern basis than on a solvency basis. Of the 292 career average plans, 120 (41%) were fully funded on a going concern basis and 60 (21%) were fully funded on a solvency basis.
- Of the 86 hybrid plans, 43 (50%) were fully funded on a going concern basis and 36 (42%) on a solvency basis.
- Flat benefit plans were the least well funded.<sup>5</sup> Of the 422 flat benefit plans, 169 (40%) were fully funded on a going concern basis and 384 (91%) were less than fully funded on a solvency basis. In fact, 233 plans (55%) had a solvency ratio of less than 80%. The median solvency ratio of flat benefit plans was 79%.
- Of the 79 multi-employer pension plans (MEPPs), 55 (70%) were fully funded on a going concern basis and 24 (30%) on a solvency basis. Fourteen plans (18%) had a solvency ratio of less than 80%. These 14 plans accounted for approximately 400,000 members and former members, 63% of the total MEPP membership.

Tables 2 and 3 below provide a more detailed breakdown of the funded and solvency ratios of the different types of defined benefit pension plans.

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<sup>5</sup> The funded status of flat benefit plans may be partly attributable to the fact that many of these plans provide for periodic benefit improvements that are rarely pre-funded. Instead, once a benefit improvement becomes effective, the cost is amortized over a period of either five (solvency) or 15 (going concern) years, as the case may be.

**Table 2 – Going Concern Funded Ratios**

<b>Funded Ratio<sup>6</sup></b>	<b>Final Average</b>	<b>Career Average</b>	<b>Flat Benefit</b>	<b>Hybrid</b>	<b>MEPP</b>	<b>All Plans</b>
<.60	15	6	5	3	1	30
[.60,.80)	78	22	56	10	2	168
[.80,.90)	158	58	88	10	10	324
[.90,1.00)	186	86	104	20	11	407
[1.00,1.20)	257	89	118	27	49	540
>=1.20	145	31	51	16	6	249
<b>Total</b>	<b>839</b>	<b>292</b>	<b>422</b>	<b>86</b>	<b>79</b>	<b>1,718</b>
<b>Median Ratio</b>	<b>0.99</b>	<b>0.96</b>	<b>0.96</b>	<b>1.00</b>	<b>1.03</b>	<b>0.98</b>

**Table 3 – Solvency Funded Ratios**

<b>Solvency Ratio</b>	<b>Final Average</b>	<b>Career Average</b>	<b>Flat Benefit</b>	<b>Hybrid</b>	<b>MEPP</b>	<b>All Plans</b>
<.60	17	9	23	3	2	54
[.60,.80)	121	87	210	16	12	446
[.80,.90)	155	96	111	20	15	397
[.90,1.00)	153	40	40	11	26	270
[1.00,1.20)	219	39	25	18	21	322
>=1.20	174	21	13	18	3	229
<b>Total</b>	<b>839</b>	<b>292</b>	<b>422</b>	<b>86</b>	<b>79</b>	<b>1,718</b>
<b>Median Ratio</b>	<b>0.98</b>	<b>0.84</b>	<b>0.79</b>	<b>0.91</b>	<b>0.94</b>	<b>0.88</b>

<sup>6</sup> In Table 2 and those that follow, the funded ratio ranges in the first column are to be read as follows: the range <.60 means the funded ratio of a plan is less than 0.60; the range of [.60,.80) means the funded ratio of a plan is greater than or equal to the lower limit of 0.60 but less than the upper limit of 0.80; and so on for the other ranges.

## 2.2 Summary of Actuarial Data

The key actuarial assumptions and methods used in the funding valuation reports are as follows:

- Ninety-eight per cent of the plans used the unit credit cost method (with salary projection for final average plans) to calculate going concern liabilities.
- Assets were most frequently valued using a market value approach, with 98% of the plans using either a market or smoothed market value.
- For going concern valuations, approximately 47% of the plans used a mortality assumption based on the 1983 Group Annuity Mortality (GAM) table developed by the Society of Actuaries, while 52% used a more up-to-date 1994 table (GAM, Group Annuity Reserving (GAR), Uninsured Pensioner (UP)).<sup>7</sup>

**Table 4 – Liability Valuation Method**

<b>Liability Valuation Method</b>	<b># of Plans</b>	<b>% of Plans</b>
Unit Credit	1,683	98.0%
Entry Age Normal	24	1.4%
Aggregate	5	0.3%
Other	6	0.3%
<b>Total</b>	<b>1,718</b>	<b>100.0%</b>

**Table 5 – Asset Valuation Method**

<b>Asset Valuation Method</b>	<b># of Plans</b>	<b>% of Plans</b>
Market	1,026	59.7%
Smoothed Market	655	38.1%
Book	15	0.9%
Book & Market Combined	18	1.0%
Other	4	0.2%
<b>Total</b>	<b>1,718</b>	<b>100.0%</b>

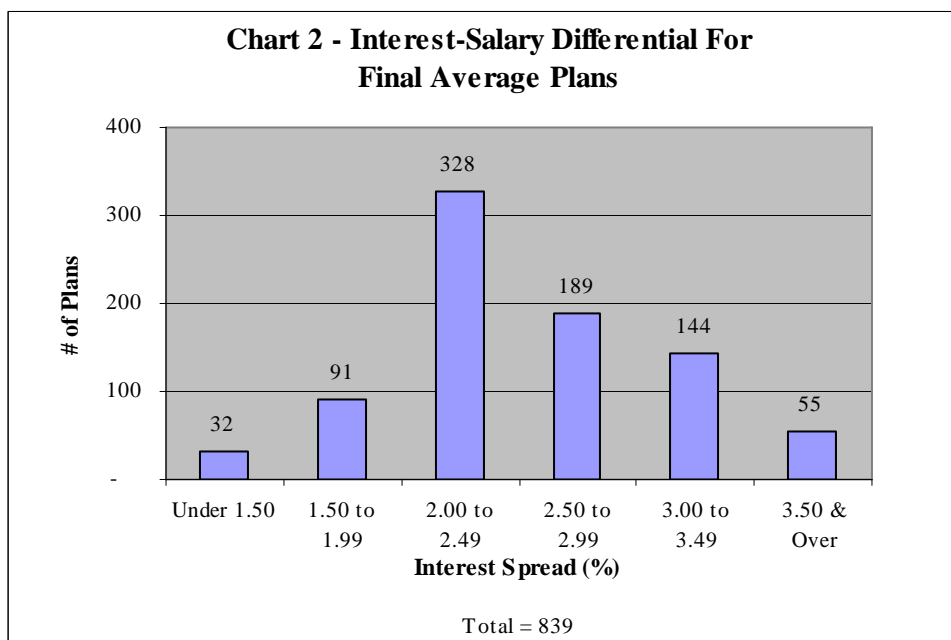
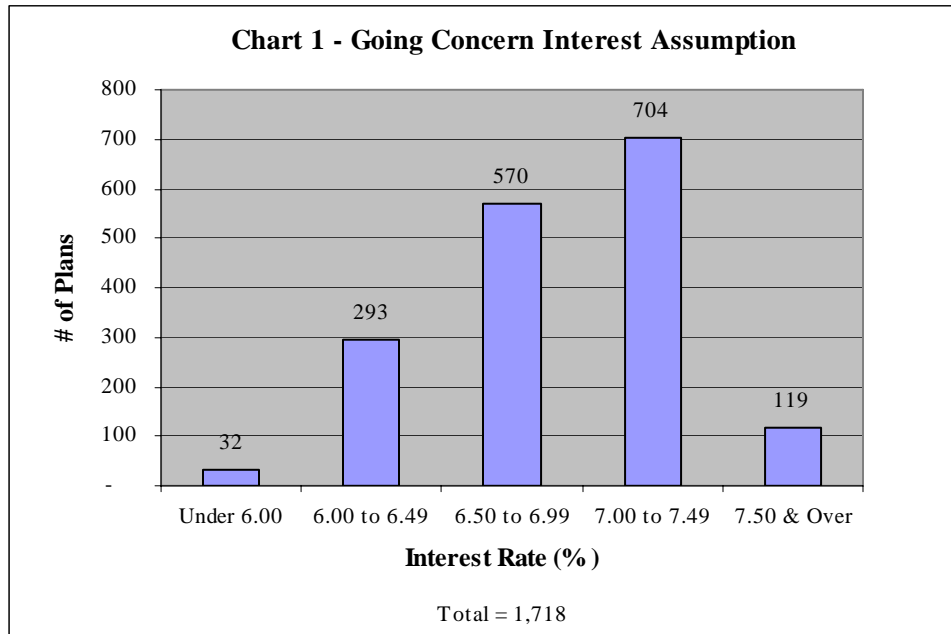
**Table 6 – Mortality Assumption**

<b>Mortality Assumption</b>	<b># of Plans</b>	<b>% of Plans</b>
1983 GAM	802	46.6%
1994 GAM Static	360	21.0%
1994 GAR	32	1.9%
1994 UP	502	29.2%
Other	22	1.3%
<b>Total</b>	<b>1,718</b>	<b>100.0%</b>

<sup>7</sup> Also see commentary on mortality assumptions that accompany Table 9 in this paper.



- Interest rate assumptions used to value the going concern liabilities fell within a relatively tight range, with over 90% of the plans using a rate between 6.0% and 7.0%.
- For final average 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 approximately 90% of all final average plans).



### 3.0 Trends Analysis

The following trends analysis incorporates data from all filed reports with a valuation date between July 1, 2000 and June 30, 2004.

#### 3.1 Solvency Funded Status

Table 7 shows a breakdown of plans by solvency funded positions for the following valuation years:

- 2000 valuation year: July 1, 2000 to June 30, 2001
- 2001 valuation year: July 1, 2001 to June 30, 2002
- 2002 valuation year: July 1, 2002 to June 30, 2003
- 2003 valuation year: July 1, 2003 to June 30, 2004

The majority of plans have a valuation date of either December 31 or January 1. Plans with solvency concerns filed valuations annually and, therefore, appear in the database for more than one valuation year.

**Table 7 - Solvency Ratios By Valuation Year**

Solvency Ratio	2000		2001		2002		2003	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
<.60	33	4.1%	23	3.3%	66	7.4%	32	3.7%
[.60,.80)	100	12.4%	141	20.3%	383	43.1%	345	39.7%
Sub-total <0.80	133	16.5%	164	23.7%	449	50.5%	377	43.4%
[.80,.90)	89	11.1%	123	17.7%	143	16.1%	219	25.2%
[.90,1.00)	113	14.1%	117	16.9%	84	9.4%	117	13.5%
Sub-total <1.00	335	41.7%	404	58.3%	676	76.0%	713	82.1%
[1.00,1.20)	238	29.6%	161	23.2%	118	13.3%	103	11.9%
>=1.20	231	28.7%	128	18.5%	95	10.7%	52	6.0%
Total	804	100.0%	693	100.0%	889	100.0%	868	100.0%
Median Ratio	1.03		0.95		0.80		0.82	

As a result of steep stock market losses and lower bond yields, there was a significant deterioration in pension plan funded positions between 2001 and 2002.

The table above shows the median solvency ratio of pension plans declined substantially from 95% for the 2001 valuation year to 80% the following year, improving slightly (to 82%) in the 2003 valuation year. Underfunded plans accounted for 82% of the plans that filed a 2003 valuation, compared with 76% in the 2002 valuation year. However, the number of reports which showed a solvency ratio of less than 80% decreased from 449 (51%) to 377 (43%) during that period.

It seems likely that the change in the solvency funded position in the 2003 valuation year was primarily the net result of three factors:

- strong pension fund returns, with a median return of 13.5%;
- decrease in solvency interest rates, from 6.25% to 6%; and
- deficit reduction payments made or contribution holidays taken, which had positive and negative effects, respectively.

Chart 3 shows the distribution of solvency ratios at different percentiles. The solvency ratios at the 75<sup>th</sup> and 95<sup>th</sup> percentiles decreased in 2003, mainly because contribution holidays taken by employers in plans with surplus more than offset the effect of strong fund returns. On the other hand, the solvency ratios at the 5<sup>th</sup>, 25<sup>th</sup> and 50<sup>th</sup> percentiles all increased modestly, due primarily to the combined effect of strong fund returns and deficit reduction payments.

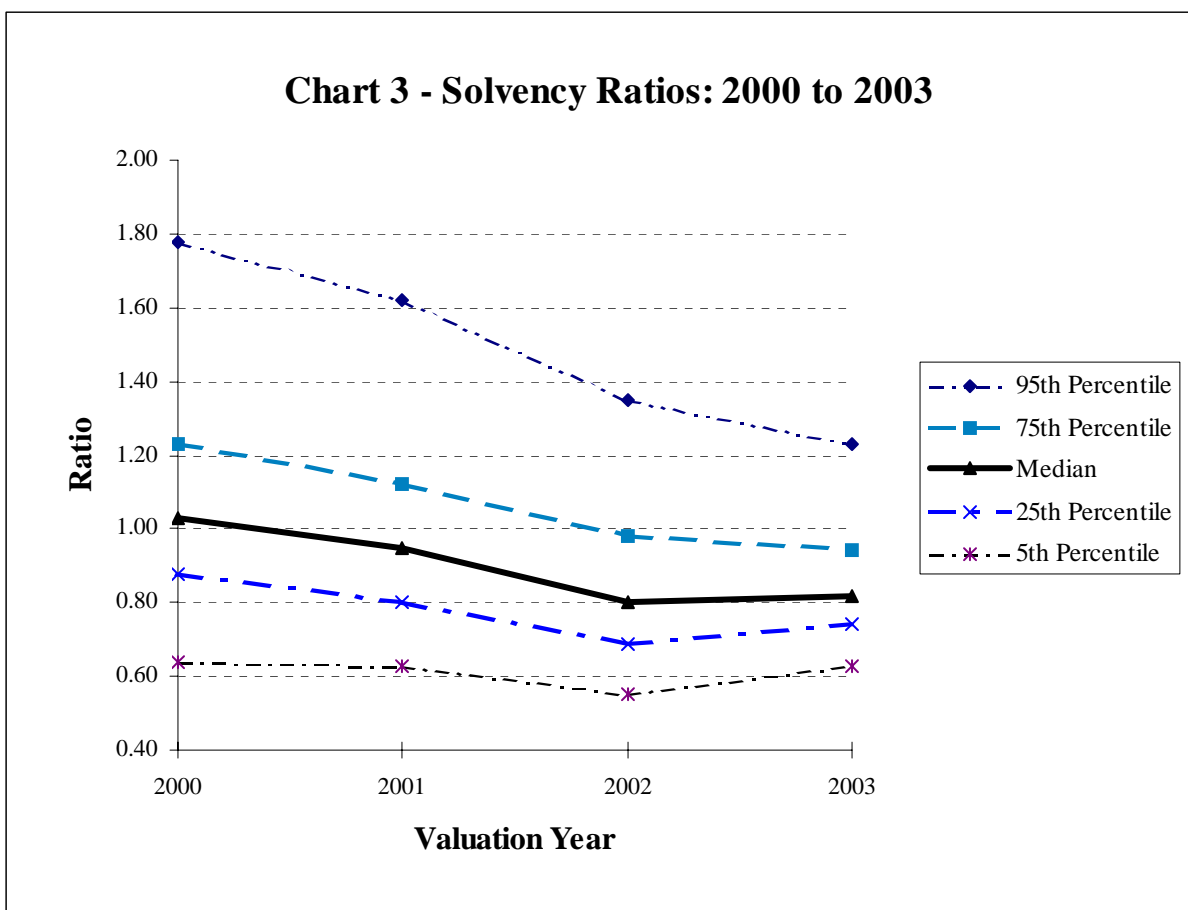


Chart 4 compares plans with a solvency funding excess to those with a solvency funding deficit for each of the four valuation years from 2000 to 2003, as well as the three-year valuation period from 2001 to 2003.<sup>8</sup>

In 2000, more plans reported a solvency excess than reported a deficit. This relationship reversed, starting with the 2001 valuation year. In 2003, 713 (82%) plans reported a deficit.

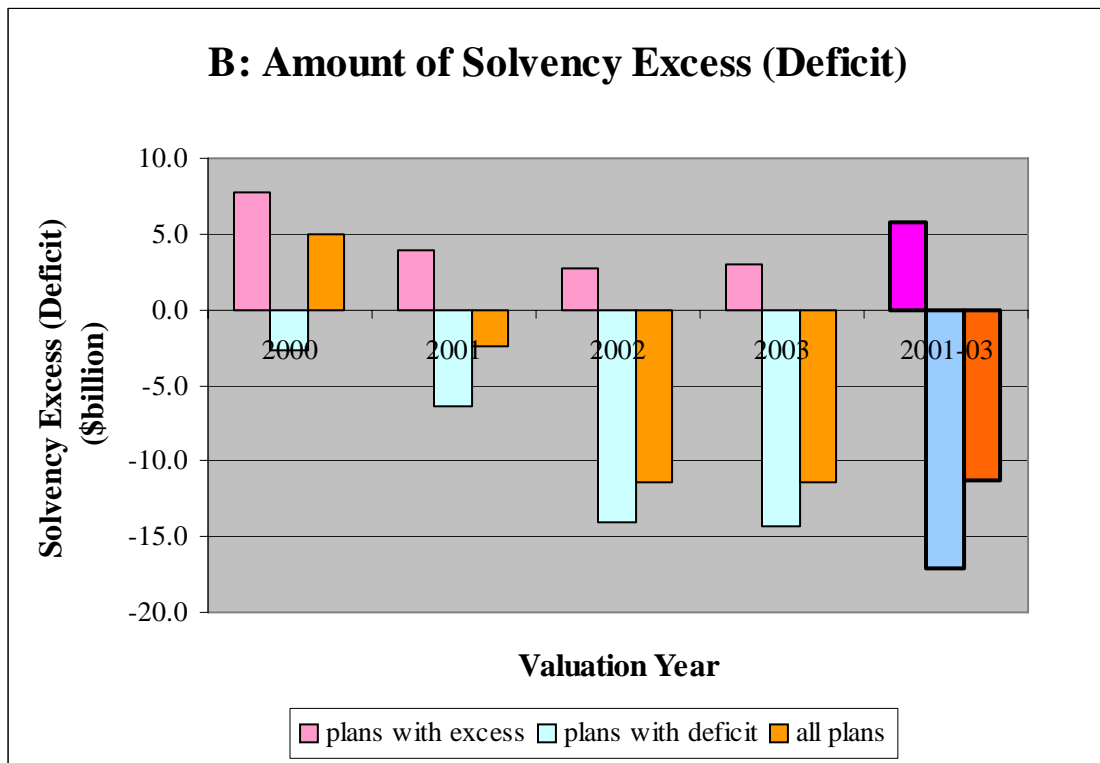
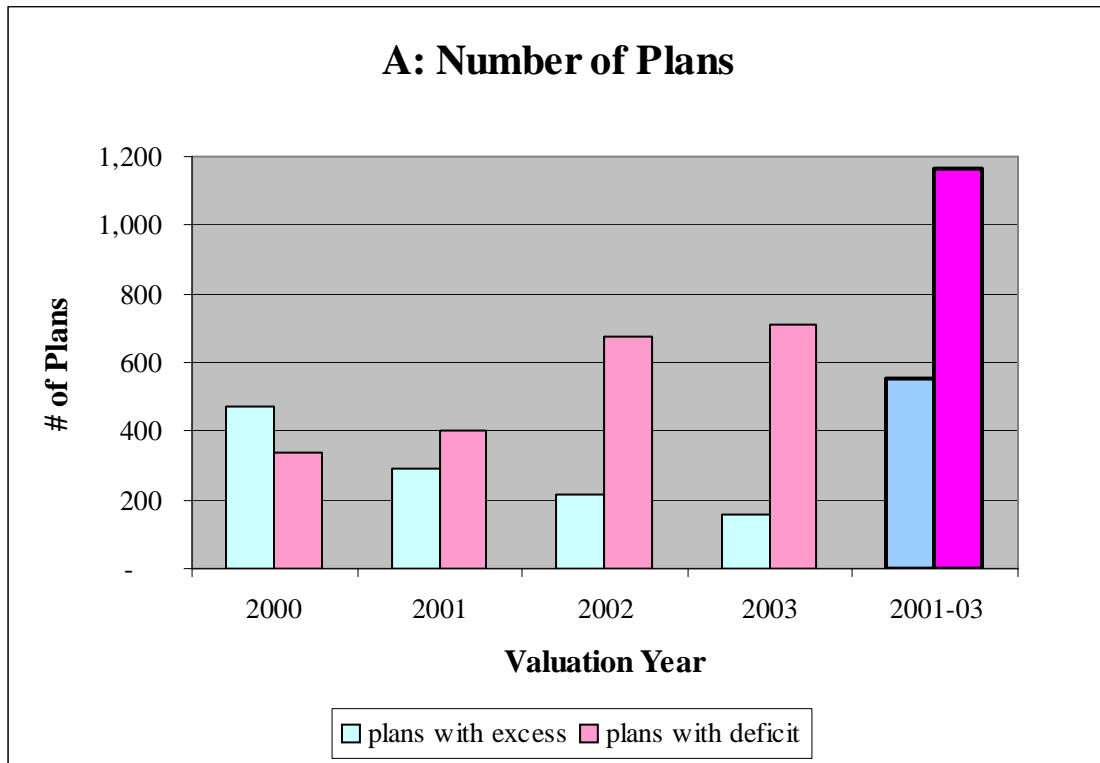
On a dollar amount basis, plans that filed a report during the three valuation years, 2001 to 2003, reported a *net* solvency deficit of \$11.3 billion. This represents the aggregate level of underfunding for the defined benefit plans registered in Ontario, *exclusive of the seven public sector plans<sup>9</sup> and the other excluded plans previously described.*

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<sup>8</sup> Note that the period 2001 to 2003 includes only the last funding valuation report filed for a plan with a valuation date falling in the period July 1, 2001 to June 30, 2004. On the other hand, the 2001 valuation year includes those plans that filed a report with a valuation date between July 1, 2001 and June 30, 2002. Thus, the sum of the number of plans included in each of the 2001, 2002, and 2003 valuation years is higher than the number of plans included in the combined period 2001 to 2003.

<sup>9</sup> Of the seven public sector plans, five had a solvency ratio of above 1.0 and a total solvency excess of \$7.3 billion. The two other plans were underfunded and had a total deficit of \$5.1 billion. In aggregate, these seven plans had a *net* solvency excess of \$2.2 billion.

**Chart 4 - Solvency Funded Positions of Ontario DB Plans (Solvency Excess vs Solvency Deficit)**



### 3.2 Actuarial Assumptions

Table 8 shows the interest rate assumptions used in the going concern valuations. There is a clear trend of using lower interest assumptions. The average of the assumed interest rates declined from 6.96% to 6.65% over the four valuation years, 2000 to 2003. As a comparison, the proxy interest rates for computing minimum transfer values recommended by the Canadian Institute of Actuaries were: 6.5% (2000), 6% (2001), 6.25% (2002), and 6% (2003).

**Table 8 - Interest Rate Assumption by Valuation Year**

Rate (%)	2000		2001		2002		2003	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
<5.50	2	0.2%	2	0.3%	2	0.2%	3	0.3%
[5.50,6.00)	12	1.5%	6	0.9%	7	0.8%	16	1.8%
[6.00,6.50)	80	10.0%	97	14.0%	103	11.6%	162	18.7%
[6.50,7.00)	124	15.4%	167	24.1%	274	30.8%	315	36.3%
[7.00,7.50)	381	47.4%	300	43.3%	427	48.0%	349	40.2%
>=7.50	205	25.5%	121	17.4%	76	8.6%	23	2.7%
Total	804	100.0%	693	100.0%	889	100.0%	868	100.0%
Average (%)	6.96%		6.84%		6.79%		6.65%	

Table 9 shows the relative frequency of mortality tables used in the going concern valuations. An increasing number of plans are also using more up-to-date mortality tables; i.e., the 1994 tables (GAM, GAR, UP). In the 2000 valuation year, only 21% of the plans used the 1994 tables. This percentage increased to 64% in the 2003 valuation year.

**Table 9 - Mortality Assumption by Valuation Year**

Mortality Assumption	2000		2001		2002		2003	
	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans	# of Plans	% of Plans
1983 GAM	617	76.7%	461	66.6%	458	51.5%	298	34.4%
1994 GAM static	83	10.3%	129	18.6%	186	20.9%	184	21.2%
1994 GAR	6	0.7%	10	1.4%	20	2.2%	19	2.2%
1994 UP	82	10.2%	81	11.7%	215	24.2%	353	40.7%
Other	16	2.0%	12	1.7%	10	1.1%	14	1.6%
Total	804	100.0%	693	100.0%	889	100.0%	868	100.0%

## 4.0 Glossary

The following terms are explained for the purpose of this report, “Funding Defined Benefit Pension Plans: Risk-Based Supervision in Ontario” (September 2005).

**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 normally 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 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 expense and investment return allocated to the 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 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 will 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 and prospective benefit increases.

**Hybrid Pension Plan:** A hybrid pension plan includes components of both defined benefit and defined contribution plans.

**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. These plans typically provide defined benefits.

**Smoothed Market Value:** The smoothed market value, a method of asset valuation, 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.