

An Update on the Funding Status of Defined-Benefit Pension Plans in Canada

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Since 2000, the funding adequacy of defined-benefit (DB) pension plans in Canada and in other industrial economies has deteriorated, largely reflecting financial market developments that have adversely affected both pension fund assets and liabilities. Unfunded pension obligations can affect the financial position of the sponsoring corporation or government entity, representing a potential drain on cash flow through the need to make special contributions. At a minimum, this represents a financial burden and, under extreme scenarios, can have adverse consequences for the financial system, as well as for the sponsor and its employees.

Of course, employees might well bear some of the burden of persistent deficits in DB pension plans through higher contribution rates, reduced benefits, and, in some cases, plan conversions or terminations. Indeed, pension deficits are one factor that can threaten the viability of DB plans.¹

The pension system is an important element of the financial system. The focus of this report is on the near-term outlook for the solvency situation of pension plans, particularly its sensitivity to financial market developments. It highlights the results of a new study by Mercer Human Resources Consulting conducted for the Bank of Canada that is an update of a 2004 study (Armstrong 2004). The study is based on Mercer's client database of plan sponsors, which contains information on registered federal and provincial pension plans across Canada in both the public and private sectors.²

1. For more on the issues concerning the future of DB plans in Canada see Armstrong and Selody (2005).
2. Mercer's plans represent about 35 per cent of the registered pension plan universe in Canada, using Statistics Canada data as the benchmark. It is the private sector database that provides the largest snapshot of the system. Excluded from the study are government plans, such as the Old Age Security (OAS) and the Canada/Quebec Pension Plans (CPP/QPP) that are partially funded and are not registered pension plans, as well as public service pension plans having all or a portion of their assets in governments' consolidated revenue funds, such as the federal and Quebec plans.

The study assumes that, over the near term, sponsors bear the burden of a funding deterioration through higher special contributions, although it is understood that this is a simplification of likely outcomes where employees would also have to bear some of the costs.

Background

Weak equity markets from 2000 through late 2002 initially raised concerns about the deteriorating funding condition of corporate defined-benefit pension plans in Canada (Chart 1). This is because the typical large Canadian corporate pension fund has 50 to 60 per cent of its assets invested in equities. An even more important adverse factor for pension plan funding has been the decline in long-term interest rates, which has increased actuarial estimates of pension plan liabilities. These liabilities are a function of the present value of future retirement benefits.³ While equity markets have subsequently recovered, bond yields have tended to stay low (Chart 1).⁴

Compounding the problem is the fact that many sponsors took contribution holidays in the 1990s when plans were in surplus, either voluntarily or because of the limits imposed by Income Tax Act regulations.

3. Lower bond yields increase the value of bond holdings (which typically comprise about 40 per cent of pension plan assets), but also increase the value of 100 per cent of plan liabilities. The net effect is substantially unfavourable for funding. This problem is amplified by the fact that the duration of the bond portfolio tends to be shorter than the duration of liabilities, making liabilities relatively more sensitive to interest rate movements.
4. It should also be noted that the funding positions of plans have been hurt by recent changes in actuarial standards that reflect longer life expectancy. This makes the calculation of solvency liabilities more sensitive to prevailing market interest rates.

Regulations Pertaining to Pension Funding

In Canada, defined-benefit plans are regulated at either the federal or provincial level, depending on whether employees work in business areas that fall under federal or provincial jurisdiction.

Funding rules

With respect to funding, DB pension plans must file an actuarial valuation report at least once every three years with their respective regulator (OSFI at the federal level or one of the provincial pension regulators).

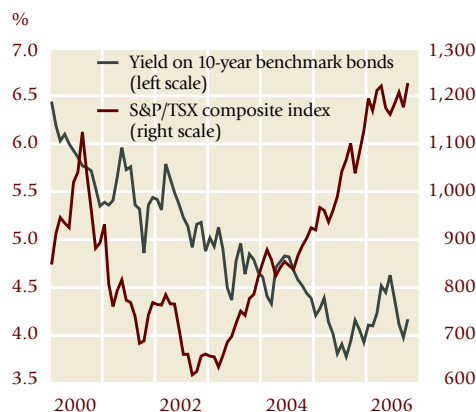
Both a *going-concern* and a *solvency* valuation are required. The going-concern assessment is based on long-run values for plan assets and liabilities.⁵ A going-concern deficit (i.e., liabilities exceed assets, resulting in a funded ratio under 100 per cent) must be funded by the employer sponsor over a maximum of 15 years—the sponsor must make special contributions to close the shortfall, in addition to the normal contributions to cover ongoing pension service costs.

A solvency assessment is made on the assumption that the plan is wound up on valuation day. This method typically uses market value or fair value for plan assets and windup values for plan liabilities. A solvency deficit must be funded over a maximum of five years.

If a plan is facing both a solvency and going-concern deficit, the higher required minimum payment is binding. In the vast majority of cases, the higher payment would be the required solvency payment. Thus, the focus of this study is on the solvency situation.

In terms of other applicable funding rules, the federal Income Tax Act prohibits the sponsors of plans in surplus from making contributions

Chart 1 Key Variables Affecting Pension Funding



Source: Bank of Canada

5. The going-concern assessment can be based on either market values or long-run values for plan assets, the latter being derived from smoothing or modelling procedures. Liabilities are calculated as the present value of the expected stream of pension payments, factoring in the effect of variables such as salary increases.

Table 1
Evolution of Solvency Position
 \$ billions

	31 December 2003	31 May 2006
1 Number of plans	847	761
2 Number of plans in deficit	603 (71%)	594 (78%)
3 Number of plans in surplus	244 (29%)	167 (22%)
4 Assets of plans in deficit/total assets	79%	44%
5 Aggregate solvency ratio	93%	95%
6 Solvency ratio of plans in deficit	89%	85%
7 Solvency ratio of plans in surplus	112%	104%
8 Aggregate solvency position of all plans-surplus (deficit)	(15.4)	(14.1)
9 Aggregate solvency position of plans in deficit	(20.0)	(20.2)
10 Yield on Canada bonds 10 years and over	5.13%	4.53%

when pension surpluses exceed certain thresholds.⁶

Solvency-relief measures

In the May 2006 Federal Budget, the federal government introduced temporary solvency funding relief—“to help re-establish full funding of federally regulated defined benefit pension plans in an orderly fashion, with safeguards for promised pension benefits.” The principal measure (among others) permits plan sponsors to extend the solvency payments from five to ten years, subject to certain terms and conditions. These include achieving a certain level of approval from members and retirees, or obtaining letters of credit for the difference between solvency payments made on a ten-year schedule and those that would have been required on a five-year schedule.

The Province of Quebec, through its pension regulator *la Régie des Rentes*, also implemented similar funding relief measures for Quebec plans.

Estimating the Current Solvency Situation

The Mercer study estimates the current solvency situation as follows. First, for each plan in the sample, Mercer extrapolates the funding situation from the time of its last regulatory filing to 31 December 2005 and 31 May 2006. The projected market value of plan assets is based on the pension fund returns derived from each plan’s target asset mix and actual market returns. Plan liabilities are projected based on the information for each client in the database.

Table 1 presents the situation on a solvency basis as of 31 December 2003 (the date of the previous study) and as of the latest estimated date of 31 May 2006. On balance, it appears that there was some improvement in the funding situation over the two-and-one-half-year period:

- the proportion of assets of insolvent plans (solvency ratio less than 100 per cent) to total assets in the sample (row 4) decreased from 79 per cent to 44 per cent;

6. Under Section 147.2 of the Income Tax Act, employer contributions to registered pension plans must stop when a certain maximum allowable surplus is reached, typically 10 per cent of plan liabilities.

- the aggregate solvency ratio (assets/liabilities) for all plans (row 5) increased from 93 per cent to 95 per cent, mainly because some large plans have gone from being moderately underfunded to being moderately overfunded.

The moderate improvement achieved over this period reflects strong equity markets in Canada and the fact that many plans have been making special solvency payments. However, the yield on benchmark Government of Canada bonds declined by about 0.60 per cent over the period (row 10). This factor significantly hindered efforts to improve solvency ratios.

Distribution of solvency ratios

Table 2 presents the distribution of plan assets on a solvency-ratio basis as of the three estimation dates: 31 December 2003; 31 December 2005; and 31 May 2006.

It indicates that, as of 31 May 2006, about 46 per cent of plan assets were in plans with a small surplus (100 to 110 per cent), 22 per cent of assets were in plans that were only moderately underfunded (with a solvency ratio between 90 and 100 per cent), 10 per cent were underfunded at 80 to 90 per cent, and about 12 per cent were severely underfunded, with solvency ratios under 80 per cent.

Note that, between 31 December 2005 and 31 May 2006, there was a large shift in assets from the moderate deficit category (90 to 100 per cent) to the moderate surplus category (100 to 110 per cent). It is also interesting to note that the proportion of plans that were severely underfunded (solvency ratio less than 80 per cent) fell back from 16 per cent at the end of 2005 to 12 per cent at the end of May 2006.

The improvement in the distribution of solvency ratios in the very short period between 31 December 2005 and 31 May 2006 highlights how sensitive the solvency situation is to movements in the bond yield, which increased almost 50 basis points over this period.

Comparison of study results with OSFI solvency test for federal plans

It should be noted that OSFI (2006) released the results of its solvency test for all federally regulated defined-benefit plans, which represent about 10 per cent of all defined-benefit

Table 2

Distribution of Solvency Ratios

Per cent of assets

Ratio (%)	31 December 2003	31 December 2005	31 May 2006
<80	11	16	12
80-90	11	15	10
90-100	57	51	22
100-110	10	9	46
>110	11	9	10

Table 3

Economic Assumptions

Per cent

Yields	Current 31 May 2006	2010 Baseline case	2010 Case A	2010 Case B
Differential between the long-term GOC nominal and Real Return bonds		2.25 ^a	2.62	1.94
GOC treasury bill	4.18	3.76	4.49	3.12
GOC bonds 10 years and over	4.53	4.53	5.27	3.90
Real Return Bond	1.87	2.28	2.65	1.96
Average portfolio returns ^b		5.76	8.80	2.88

a. The long-term yield differential between GOC nominal and Real Return bonds is used as a proxy for expected inflation, bearing in mind potential distortions, such as liquidity in the Real Return Bond market. The differential has been 2.25 per cent, on average, since 1998.

b. These are projected returns for a plan with a typical asset mix: 35 per cent Canadian equities, 12 per cent U.S. equities, 10 per cent international equities, 40 per cent fixed-income investments, and 3 per cent short-term investments.

Table 4

Evolution of the Solvency Situation for Plans in the Mercer Study

Per cent

	31 May 2006	2010 Baseline case	2010 Case A	2010 Case B
1. Solvency ratio—all plans	95	109	131	92
2. Solvency ratio—plans in deficit as of 31 December 2005	85	107	128	91
3. Solvency ratio—plans in surplus as of 31 December 2005	104	120	150	100
4. Proportion of system assets accounted for by plans in deficit	44	6	0	94

plan assets in Canada. Its results are broadly similar to the Mercer sample for Canada. OSFI estimates an average aggregate solvency ratio of about 90 per cent as of December 2005, compared with 91 per cent as of June 2005. It estimates that about three-quarters of federally regulated defined-benefit plans are in deficit.

The Mercer sample includes both federal plans and provincially regulated plans. At the national level, Ontario accounts for about 50 per cent of all plan assets.

Funding Projections to the end of 2010

In a forward-looking exercise, Mercer uses a model to project solvency ratios ahead to 31 December 2010 under three economic scenarios: baseline, Case A (favourable for solvency positions), and Case B (unfavourable for solvency positions).

These scenarios are obtained in two steps. A stochastic model (with percentiles) is used to project the end points in 2010. A deterministic model is then used to project the values of the variables on intervening dates. Each variable converges to its 2010 value.

Table 3 presents these scenarios. The baseline scenario is a continuation of the current low-inflation environment over the projected horizon. The Case A scenario assumes economic developments that are favourable for pension plan solvency assessments; that is, higher interest rates and higher equity returns. This scenario uses the 25th percentiles of these variables under Mercer's stochastic model. The Case B scenario assumes economic developments that are unfavourable for pension plan solvency assessments; that is, lower interest rates and lower equity returns, reflected by the 75th percentiles of these variables coming from Mercer's model.⁷

Table 4 presents the projections for the solvency position in 2010 for the three cohorts as measured at 31 December 2005—*all plans, insolvent plans, and solvent plans*—under the three scenarios.

7. The net impact of inflation on projected solvency positions is complex. It depends of the proportion of plans in the sample that have liabilities indexed to inflation versus non-indexed plans. It also depends on the impact of inflation on portfolio returns.

Incorporated in the projections in Table 4 is the fact that plans starting in deficit are, in most cases, making special contributions to eliminate solvency deficits over five years. The required solvency payment tends to be a “moving target” from year to year, since financial market movements affect the estimated solvency position and, in the study, the required solvency contribution is reset each year to capture this effect.

The bottom line: Solvency projections to 2010

The Mercer solvency projections are as follows.

Under the baseline scenario, there will be a substantial improvement in the system in aggregate, resulting in a surplus of 109 per cent in 2010 (Table 4, row 1). Moreover, only a very small proportion (6 per cent) of pension assets will be in deficit (row 4).

Under the Case A scenario, the system will be robustly in surplus with a projected aggregate solvency ratio of 131 per cent, and a negligible proportion of system assets would be insolvent.

Under the Case B scenario, the system would persist in deficit to the extent of 92 per cent (row 1), lower than at the starting point of 31 May 2006. Furthermore, 94 per cent of plan assets in the sample would be in deficit, compared with 44 per cent at the end of May 2006 (row 4).

Projected Solvency Contributions

The next step in the study is to project solvency contributions to 2010 on a year-by-year basis.

Charts 2 and 3 present projections to 31 December 2010 for total employer contributions (expressed as a per cent of total payroll) for deficit plans and surplus plans, respectively, under Mercer’s three scenarios. Implicit in the projections is the assumption of all funding risk by the employer and no adjustment of employee contribution rates or benefit rates to offset current or anticipated changes in financial variables.

Chart 2 shows that the cohort of plans starting in deficit face the need to make contributions that are relatively high as a share of payroll compared with those in surplus (Chart 3). Under the baseline scenario (gold line), the group of sponsors with plans in deficit at the start of the period would need to pay, as a group, between

Chart 2 Deficit Plans

Total employer contributions as a percentage of total payroll under three scenarios

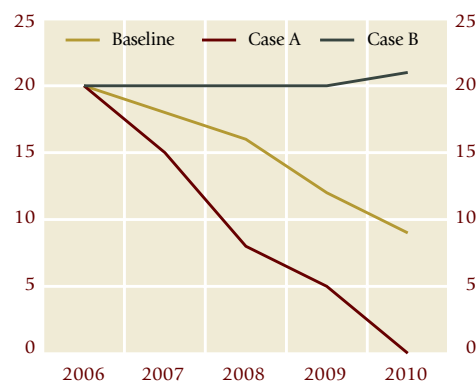
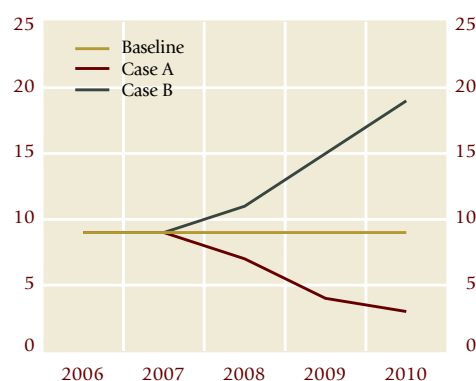


Chart 3 Surplus Plans

Total employer contributions as a percentage of total payroll under three scenarios



16 and 20 per cent of their payroll in total contributions to cover the deficit in the first three years, before falling to 11 per cent in year 4 and 9 per cent in year 5. This compares with a constant 9 per cent of payroll throughout for sponsors with plans starting in surplus at the end of 2005 (Chart 3).

Under the Case B unfavourable scenario (Chart 2, green line), the group of companies with plans in deficit at the start of the period will be paying, through the period, 20 to 21 per cent of their payroll in total contributions to cover the deficit—much more than under the other two scenarios.

Impact of the Solvency-Relief Measures

The updated Mercer projections do not incorporate the potential effects of solvency-relief measures.

To assess the possible impact of the temporary federal and Quebec solvency-relief measures, a projection was made assuming that, on average, employers will elect to amortize solvency deficits over 7 years instead of 5 years.⁸ It is estimated that the measures have their maximum benefit in year 1, reducing solvency special contributions by 9 per cent, followed by reductions of 4 per cent in years 2 and 3.

Thus, it appears that, in aggregate, the potential impact of the measures is fairly modest. They could, however, be quite important for individual plans, particularly plans that choose to extend the solvency period to 10 years, as allowed under the regulations.

Other Studies on the Canadian Pension Funding Situation

Other studies have recently reviewed the pension funding situation, using different samples of sponsors than the Mercer study.

For example, Dominion Bond Rating Service (DBRS 2006) has shed some light on the sectoral dimensions of pension deficits. The study notes the following with respect to Canadian and U.S. corporate defined-benefit plans:

“Pension plans are only a concern for a minority of industries and companies, typically those that exhibit the risks of an aging workforce and are highly labour-intensive with strong unions. Examples of these industries are auto parts, forestry and manufacturing.”

The DBRS study goes on to list about 40 corporations in Canada and the United States that report a pension deficit, on a GAAP basis (rather than a solvency basis), in excess of 20 per cent of net worth. DBRS calculates that a 200-basis-point increase in interest rates would significantly reduce underfunding with no action by the companies necessary.

The firm of Towers Perrin completed its sixth annual review of defined-benefit pension plan financial disclosures by 83 of the 100 largest Canadian companies traded on the Toronto Stock Exchange (S&P/TSX). The study compares a number of key financial results for 2005 derived from the annual reports of non-financial corporations. Towers Perrin found that, in spite of double-digit equity returns and sponsors making record contributions, there was no improvement in the funding position (as measured under GAAP accounting) for the third straight year. The authors attributed this lack of improvement to lower bond yields but expressed hope that rising yields in 2006 would provide some relief for sponsors.

Conclusion

The results of the updated Mercer pension study are moderately encouraging, but highlight the high sensitivity of the pension-solvency situation (and the path of future contributions) to economic conditions, in particular, movements in high-grade bond yields.

The baseline scenario—essentially a continuation of the current low-inflation environment with moderate portfolio returns—suggests that the system as a whole will be in surplus in 2010 (enjoying an aggregate 109 per cent solvency ratio). Of course, to achieve this improvement, many plans that are starting in deficit will be making special contributions over the roughly 5-year period, representing a substantial

8. The decision to use 7 years as the effective amortization period in aggregate for applicable plans is a function of Mercer’s judgment of the number of federal and Quebec plans that will either chose not to take advantage of the relief measures or will not be able to because of the various conditions attached to the measures.

proportion (up to 21 per cent) of their total payroll costs. It seems reasonable to assume that, in many cases, this will entail hardship for sponsors.

Furthermore, it is important to keep in mind that the unfavourable Case B scenario would have plans making high contributions for almost five years and, in the end, the solvency situation would be worse than at the start.

To conclude, it appears that the direct consequences for the Canadian financial system of current pension deficits are not large. However, they can have important consequences for the financial condition of individual firms in vulnerable sectors, particularly if combined with another shock. And ultimately, plan members will probably have to share in the adverse consequences falling out of a major funding problem, with the potential for increased contributions, reduced benefits, and even the elimination of the plan.

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