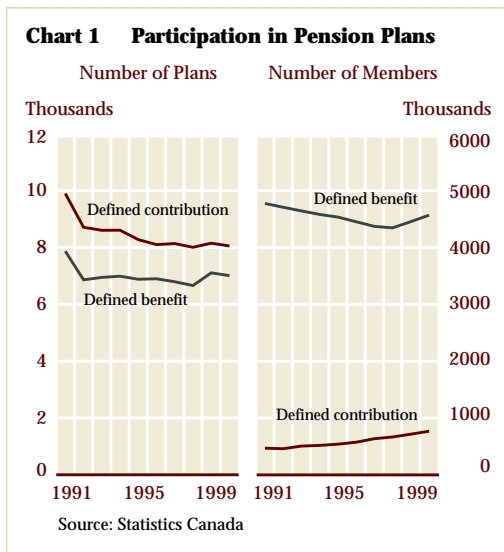


# What Is the Funding Status of Corporate Defined-Benefit Pension Plans in Canada?

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In recent years, the funding adequacy of defined-benefit pension plans—in Canada and in other industrial economies—has deteriorated markedly, reflecting financial market developments that have adversely affected both fund assets and liabilities. Unfunded pension obligations can adversely affect the financial condition of the sponsoring corporation, representing a potential drain on cash flow and a reduction in the net worth of the firm. In the extreme, this could have implications for financial stability.

A *defined-benefit* pension plan provides plan members with a predetermined level of pension income when they retire—the exact level depends on variables such as income and years of plan membership—and employer sponsors tend to assume a large proportion of the risk of meeting that benefit. This contrasts with *defined-contribution* plans, where employer and employee contributions are defined (often as a fixed percentage of employee income), and employees typically assume most of the risk of achieving a certain level of pension income. In Canada, defined-contribution plans account for a greater number of *plans*, but defined-benefit plans account for a much larger share of plan *members*, reflecting the fact that many of the largest plans are of the defined-benefit type (Chart 1).

## Background

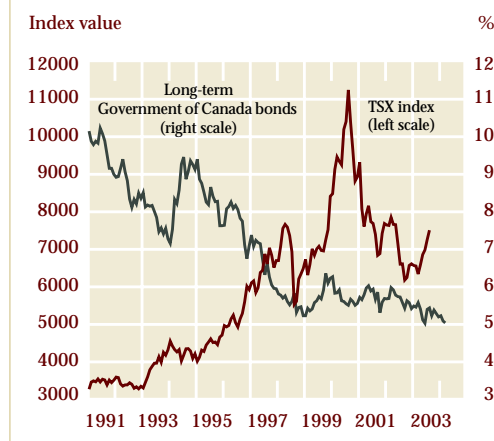
Weak equity markets from 2000 through late 2002 initially raised concerns about the deteriorating funding condition of corporate defined-benefit pension plans. This is because the typical large Canadian corporate pension fund has 50 to 60 per cent of its assets invested in equities, a proportion that has tended to rise in

recent years.<sup>1</sup> Furthermore, pension plan funding positions have also been adversely affected by the decline in long-term interest rates, which increases estimates of pension plan actuarial liabilities that reflect mainly the present value of future retirement benefits.<sup>2</sup> Chart 2 presents the trend in the equity market and the yield on long-term bonds in Canada over the period in question.

Compounding the funding problem has been the fact that many plan sponsors took contribution holidays when plans were in surplus during the rising equity market of the late 1990s. These contribution holidays were, to some extent, a matter of choice by sponsors, although they also reflected regulations imposed under the Income Tax Act related to the maximum allowable surplus.<sup>3</sup>

Demographic and employment trends suggest that, in five to ten years, some companies might have one retiree for every active employee. Thus, the underlying growth in pension liabilities is continuous and may be accelerating. When the asset base stops growing and actually declines, as it did during the latest bear market, large funding gaps can arise very quickly. The additional boost to plan liabilities from declining interest rates aggravates the funding problem.

**Chart 2 Key Variables Affecting Pension Deficits in Canada**



1. Greater investment in equities by pension plans has been motivated by the belief that they will earn returns 2 to 3 per cent higher than those on bonds over the long run. Equities can, however, impart considerable risk, in the form of volatility, to portfolio returns because they represent a “mismatch” with plan liabilities, which tend to move with interest rates.
2. Lower bond yields should be favourable for bond holdings (which typically comprise about 40 per cent of pension plan assets) but unfavourable for the present value of liabilities, which comprise 100 per cent of the balance sheet. Therefore, the net effect is substantially unfavourable. This problem is amplified by the fact that the duration of bond holdings tends to be shorter than the duration of liabilities.
3. 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. Excess surplus is defined as the lesser of a) 20 per cent of liabilities and b) the greater of 10 per cent of liabilities and twice the annual service cost.

## Pension Funding Regulations and the Corporate Sponsor

Pension plans in Canada are regulated at either the federal or provincial level, depending on whether employees work in areas that fall under federal or provincial jurisdiction. The Office of the Superintendent of Financial Institutions (OSFI) oversees the plans of businesses under federal jurisdiction, such as banking, transportation, and communications, as well as those of federal Crown corporations under the Pension Benefit Standards Act, 1985 (PBSA). Each province, in turn, has its own pension legislation and regulations; however, the legislation tends to be reasonably similar across provinces.<sup>4</sup>

Canadian pension plans must file an actuarial valuation report at least once every three years with their regulator (be it federal or provincial). Both a *going-concern* and a *solvency* valuation are required. 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. A going-concern deficit (i.e., liabilities exceed assets) must be funded by the employer over a maximum of 15 years.

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.<sup>5</sup> A solvency deficit must be funded over a maximum of five years.

In the current environment, many pension plans are facing solvency deficits. If a valuation report has been filed showing a deficiency, the regulators would normally require annual contributions sufficient to cover current service costs and,

at the same time, close the solvency shortfall over the mandatory five-year time frame.

The existence of pension deficits, particularly of the *solvency* variety, and the requirement for additional pension contributions, can pose financial hardship for the sponsoring corporation. The degree of potential stress for the sponsor depends on the magnitude of the required payments relative to the size of the firm, as well as on the firm's own financial condition. Indeed, a pension obligation, although "off-balance-sheet," is a legal liability, which can ultimately force a firm into bankruptcy if the contributions required by the regulator cannot be met. Thus, pension deficits represent a potential claim on the earnings and net worth of the corporation.<sup>6</sup>

## Recent Developments in Pension Funding

Many of Canada's largest, publicly traded corporations offer their employees defined-benefit pension plans.<sup>7</sup> In aggregate, these plans have fallen heavily into deficit since 2000 (see Table 1). For example, National Bank Financial has estimated that the 79 companies in the TSX large-cap and mid-cap indexes with defined-benefit plans went from an aggregate *surplus* of about \$18 billion at the end of 2000 to an aggregate *deficit* of \$20 billion at the end of 2002 (National Bank Financial 2003).<sup>8</sup> This translates to a deterioration in the funding ratio—the ratio of plan assets to liabilities—of 28 per cent, that is, from 114 per cent to 86 per cent.<sup>9</sup>

A more recent study that examines a different sample of 68 large defined-benefit plans (including both public and private sector plans) over a somewhat longer time span (from 1999

4. Many of the largest plans are licensed in Ontario. The Financial Services Commission of Ontario supervises plans licensed in Ontario through its Pension Plans Branch. It is responsible for supervising about 47 per cent of all plans in Canada and 35 per cent of plan members.

5. Since under this exercise the plan is hypothetically being wound up, solvency liabilities are calculated by determining the cost of securing the promised benefits elsewhere—for example, through purchases of annuity contracts—on the valuation day.

6. In 2003, General Motors in the United States completed a US\$18 billion bond issue for the sole purpose of covering funding shortfalls in its pension plans.

7. While some companies have converted their defined-benefit plans to defined-contribution plans, this has not been the norm in Canada. Instead, more firms are offering their employees a defined-contribution option and are often requiring that new employees take this option. Large corporations frequently have several pension plans operating in various jurisdictions.

8. Other studies by UBS Warburg and the UWO Ivey School of Business arrive at similar estimates to the end of 2002 using slightly different survey samples.

9. Note that these data are based on the accounting or Canadian GAAP measure of pension deficits as opposed to the regulatory funding measure that is used through the rest of this report.

to 2002) estimates that the aggregate funding ratio of those plans has deteriorated by about 30 per cent (Ambachtsheer 2004).

Monitoring the trend in pension funding can be difficult because most public companies report the funding situation for their pension plans only once a year, at fiscal year-end. However, more current information can be gleaned from “synthetic” indexes, which model on a monthly basis the cumulative impact of market movements on the funding position of a “typical” Canadian corporate defined-benefit pension plan. Such measures suggest that the funding situation for the average defined-benefit plan barely improved in 2003 in spite of very strong equity markets in that year.<sup>10</sup> This can be explained by the fact that liabilities grew almost as fast as assets, partly because of declining interest rates. Chart 3 presents the components of the Watson Wyatt Pension Barometer, which are indexes of pension liabilities, assets, and the funding ratio (i.e., the asset/liability index) over the past ten years for a representative pension fund. It indicates that in 2003, a plan with an asset mix of 60/40 equity/fixed income would have seen its assets grow by 14.5 per cent in 2003. But these gains were largely neutralized by the 12.5 per cent growth in liabilities. In terms of this liability growth, about 7.1 percentage points represented normal growth. The remaining 5.4 percentage points resulted from a decline of 36 basis points in the discount rate—proxied by the yield on long-term Canada bonds—over the year. The net result is that the funding ratio improved by only a modest 2 per cent in 2003.<sup>11</sup>

## Distribution of the Funding Problem

Discussion about the condition of an average or representative pension plan is useful only up to a point. To more accurately assess the financial stability implications of pension funding

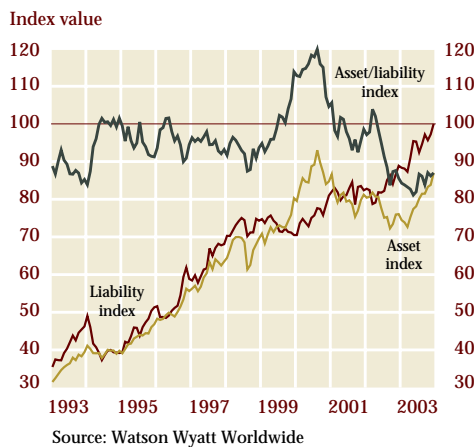
Table 1

Statistics for Corporate Defined-Benefit Plans

|  | 2000  | 2001  | 2002  | 2003 (est.) |
|--|-------|-------|-------|-------------|
| Number of overfunded companies         | 57    | 27    | 13    | 16          |
| Number of underfunded companies        | 22    | 52    | 66    | 63          |
| Plan liabilities (\$ billions)         | 122.8 | 134.0 | 140.9 | 158.5       |
| Funding position (\$ billions)         | 17.8  | -2.5  | -20.3 | -19.0       |
| Funding ratio – assets/liabilities (%) | 114.0 | 98.0  | 86.0  | 88.0        |
| Median discount rate (%)               | 7.0   | 6.75  | 6.5   | 6.14        |

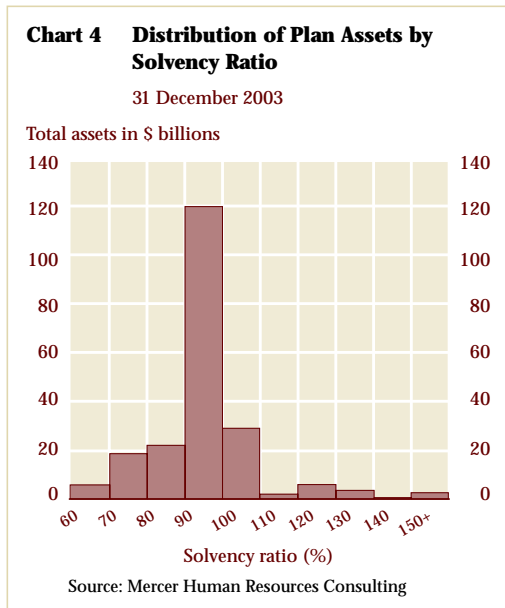
Source: National Bank Financial, except for 2003 which are estimates produced by Bank of Canada staff. These estimates assume the same sample of firms as in the preceding years.

Chart 3 Pension Barometer



10. The TSX increased 24 per cent in 2003.

11. Improvement in pension funding for Canadian plans was also constrained in 2003 by the strong appreciation of the Canadian dollar, which adversely affected returns on plan holdings of foreign equities. Most pension funds do not hedge against foreign exchange risk. For example, the U.S. S&P 500 Index rose 26.4 per cent in 2003, but in Canadian-dollar terms it rose just 4 per cent.



deficits, information about the distribution of these deficits (and surpluses) is required.

In this context, Mercer Human Resources Consulting has provided the Bank of Canada with information drawn from its client database of about 850 plans—both private sector and public sector—and aggregated to protect confidentiality. Using Statistics Canada data as a benchmark, Mercer estimates that its client base represents about 30 per cent of the assets of registered defined-benefit pension plans in Canada.

For each plan in the database, Mercer extrapolates the plan's financial condition on both a going-concern and solvency basis, from the last actuarial valuation up to 31 December 2003, taking into account actual market returns, the plan's asset mix, and estimated funding contributions.

### Distribution of solvency ratios

Chart 4 presents the distribution of plan assets on a solvency basis as of 31 December 2003. It indicates that two-thirds of assets were in plans that were only moderately underfunded, with a solvency ratio (assets/liabilities) between 90 and 99 per cent. Only a small proportion of assets—about 10 per cent—are accounted for by plans with solvency ratios of 80 per cent or lower.<sup>12</sup> Similarly, a small proportion of assets appear to have positive solvency ratios at this point. Most of these assets fall in the 100 to 110 per cent range.

### Funding projections to the end of 2008

In a forward-looking exercise, Mercer uses a model to project solvency ratios five years ahead to 31 December 2008 under three economic scenarios: baseline, pessimistic, and optimistic.<sup>13</sup>

The *baseline* scenario is essentially a continuation of the current low-inflation environment over the projected horizon. The *optimistic* scenario assumes financial market developments that are more favourable for pension plan valuations—that is, higher inflation, higher interest rates, and higher equity returns. This scenario

12. These represent about 220 of the 850 plans.

13. Projections are derived from a stochastic model that incorporates key economic variables and rates of return on major asset classes.



uses the 5-year 25th percentiles of these variables under Mercer's stochastic model. The *pessimistic* scenario is characterized by lower inflation, lower interest rates, and lower equity returns and employs the 5-year 75th percentiles of these variables. Table 2 presents the assumptions used in the projections, while Table 3 presents the total portfolio returns for each year under each economic scenario, assuming a representative asset mix of 57 per cent equities (domestic and foreign) and 43 per cent fixed-income assets.<sup>14</sup>

Mercer makes this projection (Tables 4 and 5) for two sets of plans—the group of plans in deficit and the group in surplus, as at 31 December 2003.

The solvency projections incorporate the projections for market returns, as well as the regulatory rules for funding. Plans in solvency deficit as at 31 December 2003 are assumed to be put on a contribution schedule that would eliminate those deficits over five years. The solvency position is reassessed at the end of each year and the contribution schedule revised, if required. Plans in surplus at the starting point are assumed to make contributions to cover normal pension-service costs unless the surplus exceeds the limits imposed by the Income Tax Act, at which point contributions must stop.

It can be seen from Table 4 that under the baseline scenario, plans that have solvency deficits as at 31 December 2003 are expected, in aggregate, to remain slightly in deficit as at 31 December 2008, even if special solvency payments are made. The reason for this is that the baseline return on assets (around 6 per cent for a typical asset mix) is not sufficient to cover the growth in liabilities.<sup>15</sup> Under the baseline projection, the aggregate solvency ratio for this group of plans does, however, improve materially from 89 per cent to 97 per cent.<sup>16</sup> Under the

14. The actual asset mix of each plan in the sample is used in the projection.
15. Under the assumed scenario for interest rates and return on assets, liabilities grow more than assets each year. The special solvency payments are calculated annually based on the current deficiency and are not based on a forward-looking assessment of the trend.
16. Furthermore, under the baseline projection the number of plans in deficit drops from 603 in 2003 to 519 in 2008.

**Table 2**  
**Economic Assumptions Used in the Mercer Projection**  
Per cent

| Economic variable                               | Initial level<br>(January 2004) | Scenario |             |            |
|---|---------------------------------|----------|-------------|------------|
|   |                                 | Baseline | Pessimistic | Optimistic |
| Inflation                                       | 2.34                            | 2.34     | 1.59        | 3.34       |
| Yield on treasury bills                         | 2.58                            | 3.46     | 2.72        | 4.47       |
| Yield on Government of Canada bonds (10 years+) | 5.13                            | 5.13     | 4.38        | 6.13       |
| 5-year equity return                            | 8.20 <sup>a</sup>               | 8.15     | 3.60        | 13.20      |
| Risk premium on equities <sup>b</sup>           | 2.95                            | 2.95     | 2.95        | 2.95       |

a. Canadian equity return. Projected returns assume equal mix of Canadian, U.S., and international equities.  
b. Spread over yields on long-term Canada bonds  
Source: Mercer Human Resources Consulting

**Table 3**  
**Portfolio Returns Incorporated in Mercer Projection**  
Per cent

| Year | Scenario |             |            |
|------|----------|-------------|------------|
|      | Baseline | Pessimistic | Optimistic |
| 2004 | 5.85     | 3.59        | 8.29       |
| 2005 | 5.91     | 3.59        | 8.45       |
| 2006 | 5.98     | 3.59        | 8.61       |
| 2007 | 6.04     | 3.59        | 8.76       |
| 2008 | 6.11     | 3.59        | 8.92       |

Source: Mercer Human Resources Consulting

**Table 4**  
**Projected Solvency Position in 2008 for Plans in Deficit as of 31 December 2003**  
\$ billions

|                                  | Estimates as of<br>31 December<br>2003 | Scenario |             |            |
|----------------------------------|--|----------|-------------|------------|
|                                  |  | Baseline | Pessimistic | Optimistic |
| Number of plans                  | 603                                    | 603      | 603         | 603        |
| Total solvency assets            | 166.2                                  | 239.7    | 223.0       | 256.2      |
| Total solvency liability         | 186.2                                  | 246.1    | 251.4       | 238.4      |
| Total solvency surplus/(deficit) | (20.0)                                 | (6.5)    | (28.4)      | 17.9       |
| Solvency ratio (%)               | 89                                     | 97       | 89          | 107        |

Source: Mercer Human Resources Consulting

Table 5

**Projected Solvency Position in 2008 for Plans in Surplus as of 31 December 2003**

\$ billions

|                                  | Estimates as of<br>31 December<br>2003 | Scenario |             |            |
|----------------------------------|--|----------|-------------|------------|
|                                  |  | Baseline | Pessimistic | Optimistic |
| Number of plans                  | 244                                    | 244      | 244         | 244        |
| Total solvency assets            | 43.1                                   | 51.1     | 47.2        | 56.8       |
| Total solvency liability         | 38.5                                   | 47.1     | 49.2        | 44.3       |
| Total solvency surplus/(deficit) | 4.6                                    | 4.0      | (2.0)       | 12.5       |
| Solvency ratio (%)               | 112                                    | 108      | 96          | 128        |

Source: Mercer Human Resources Consulting

pessimistic scenario, the aggregate ratio for these plans does not improve.

For the group of plans starting the period in surplus (Table 5) the solvency ratio actually declines under the baseline scenario—from 112 per cent to 108 per cent. This is explained by the fact that under this exercise, some plan sponsors use a portion of their surplus to take contribution holidays.

## Projected Burden of Funding Contributions

Funding contributions comprise the required employee contributions and the employer contributions, which include both the current service cost and special contributions, if any.

Table 6 shows that plans in deficit at the end of 2003 face the need to make substantial contributions that are relatively high as a share of payroll. Under the baseline scenario, the group of companies with plans in deficit at the start of the period will be paying between 19 and 21 per cent of their payroll over the projection period, compared with 4 to 5 per cent of payroll for companies with plans in surplus at the end of 2003. Under the pessimistic scenario, contributions in aggregate for the plans in deficit are about 22 to 25 per cent of payroll.

Table 6

**Funding Contributions as a Percentage of Payroll: Baseline Scenario**

|      | Plans with solvency deficit as of<br>31 December 2003 (603 plans) |                               | Plans with solvency surplus as of<br>31 December 2003 (246 plans) |                               |
|------|---|-------------------------------|---|-------------------------------|
|      | Employer:<br>Current service                                      | Employer:<br>Special payments | Employer:<br>Current service                                      | Employer:<br>Special payments |
| 2004 | 10  | 11                            | 4   | 0                             |
| 2005 | 10  | 11                            | 4   | 0                             |
| 2006 | 10  | 10                            | 5   | 0                             |
| 2007 | 10  | 10                            | 5   | 0                             |
| 2008 | 10  | 9                             | 5   | 0                             |

Source: Mercer Human Resources Consulting

## Conclusions

In spite of strong equity markets in 2003, the majority of defined-benefit pension plans in Canada are still facing moderate deficits, and a minority are facing more severe deficits.

It is possible to conclude that only a handful of plans are so severely underfunded that the requirement to make pension contributions may well call the viability of the sponsoring firms into question. A large number of firms will, however, need to make substantial contributions in order to close funding gaps, even in a generally benign financial market environment.

One interpretation of this result is that while difficulties in funding pensions may not pose meaningful risks for the stability of the financial system, they may represent a prolonged drain on corporate earnings and cash flow. This, in turn, could leave firms vulnerable to other shocks, such as an economic slowdown that significantly reduces cash flow.

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