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PENSION ISSUES

Moderator: THOMAS P. EDWALDS
Lecturers: DANIEL M. ARNOLD
MICHAEL M.C. SZE
Recorder: THOMAS P. EDWALDS

Two research reports were presented for discussion: "Public Employee Retirement Plans Research: Experience Studies, Valuation Reports and Unfunded Liabilities," and "Pension Plan Termination in Ontario since 1988."

MR. THOMAS P. EDWALDS: I'm the research actuary at the SOA responsible for health and pension issues. The format of the presentation will be to present two recently completed research papers that were sponsored by the SOA. We'll do these as consecutive lectures. After both presenters have given their lectures, we'll have time for questions and answers on both papers.

The first lecturer is Dan Arnold. Dan is a vice president and consulting actuary with Hooker & Holcombe, Inc., in West Hartford, CT. He has a master of actuarial science degree from the University of Michigan, which he received "with distinction." He has been a Fellow of the SOA since 1969. He's an EA, a Member of the Academy of Actuaries (MAAA), and a Fellow of the Conference of Consulting Actuaries (FCA).

Dan has served as the editor of the *Enrolled Actuaries Report* published by the AAA. He has been the editor of the *Pension Section News* of the SOA since 1989. He is currently a member of the Government Finance Officers Association of the U.S. and Canada, the Government Finance Officers Association of Connecticut, the Association of Private Pension and Welfare Plans, the American Pension Conference, and the New England Employee Benefits Council.

Dan will be presenting the paper "A Study of Public Employee Retirement Systems" that was sponsored by the Committee on Knowledge Extension Research of the SOA.

MR. DANIEL M. ARNOLD: Back about 1990, I was asked by one of my municipal clients, "What is the mortality experience of firefighters and police officers? Is the mortality higher or lower for firefighters and police officers than for other workers covered by public employee retirement systems?"

In trying to answer that question, I discovered that there was an enormous wealth of information available that was contained in experience studies that had been completed on the various 50 states and large city public employee retirement systems (PERS). Also available were the actuarial valuation reports for these defined-benefit pension plans. All of this information was in the public domain and thus available for reviewing. In fact, copies of these reports were just gathering dust, and the information they contained was not being utilized. I called several systems and said, "I'd like to find out the process for making this information available to the SOA. I'd like to know, how do you request it? What would be the cost to obtain copies?" The typical answer that I received was, "There is no process. Do you want me to send it to you or to the Society? Shall I send it

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overnight or regular mail?" It was an immediate positive response. They responded, "We've got this stuff here and we'd love to share it."

Based on these sample responses, I proposed to the SOA that experience and actuarial valuation reports from all of the major public employee retirement systems be gathered and analyzed. After a couple of years of cajoling different people to undertake the effort, I found myself appointed to the Committee on Knowledge Extension Research (CKER) (Curtis E. Huntington is the chair), which, among other things, has the authority (and money) to undertake such a study. That's what happens when you make a suggestion—you're put on a committee!

The SOA is the education and research arm of the actuarial profession, so it is really a natural for the Society to prepare this study.

The study is based on a review of 60 experience studies covering 101 different plans; 78 actuarial reports covering 183 plans; and 90 component-unit or comprehensive annual financial reports. We covered experience studies, valuation reports, and financial reports of the 50 states' statewide public employee retirement systems. Virtually every system (75 out of the 77 statewide systems) that we asked to participate submitted at least one of the requested documents.

The purpose and research objectives of this work were to collect and analyze data of an actuarial nature on public employee retirement plans and to provide a resource center of information on public plans complete with references, experience studies, actuarial assumptions, and valuation reports within the SOA library.

The research was completed by the combined efforts of the team of Michael J. Samet and Timothy P. Peach from Ernst & Young and W. Paul Zorn of the Government Finance Officers Association of the U.S. and Canada. A subcommittee (Lawrence A. Johansen, Lindsay J. Malkiewich, and I as chair) of the CKER oversaw the project.

The report is organized into the following sections: Section I, Introduction; Section II, a review of the findings of recent PERS experience studies; Section III, a review of individual reports; Section IV, a summary of assumptions and methods used in recent valuations; Section V, a review of investment practices and policies; Section VI, a summary of the findings; and the Appendices, which provide details on the data collection methodology as well as the compiled data.

Summary findings for key actuarial assumptions included:

- **Active Mortality.** Average ratio of actual-to-expected experience (A/E) ratio was 71% with wide variation. This assumption does not have a major impact on plan costs and can impact costs positively or negatively depending on plan design. However, a large number of experience studies recommended decreases in active mortality rates.
- **Disablement Rates.** Average A/E ratio was 92% with wide variation. It is difficult to assess the impact of disability rates on plan costs because of drastic differences in the definition of disability and plan provisions related to disability. Actual occurrences of disability vary during the economic cycle, with many systems experiencing large occurrences during tough economic times.

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- **Withdrawal Rates.** Average A/E ratio was 94% with moderate variation. This is a very important assumption since vested benefits for terminating members carry little liability compared to retirement benefits, and terminating members often take a refund of their contributions in lieu of a retirement benefit.
- **Retirement Rates.** Average A/E ratio was 94% with moderate variation. This is a critical assumption since age at retirement is a key factor in costs of retirement (the earlier people retire, the higher the costs particularly for plans with automatic cost-of-living adjustments).
- **Retiree Mortality.** Average A/E ratio was 98% with moderate variation. This is a critical assumption since the longer people live, the higher the costs of providing them benefits (especially if the benefits are indexed to inflation). The current accuracy of the ratio is diluted by the fact that the assumption must also reflect future mortality improvements. Consequently, this assumption may slightly underestimate costs.
- **Disability Mortality.** Average A/E ratio was 107% with wide variation. The data for this assumption are too thin to draw conclusions.
- **Interest Rates.** More than 50% of the plans had interest rate assumptions between 7.75% and 8.0%. Assumptions about real rates of return are modest with 70% of systems using a real rate of 3.5% or lower. Projections of long-term rates of return (based on expectations about rates of return in asset categories and portfolio distributions in these categories) suggest that at least two-thirds will earn real rates between 3.5% and 4.5%. The number of studies recommending increases in interest rate assumptions is negligible.
- **Salary Scales.** Average salary scales range between 5.5% and 7.5%. This is slightly in excess of anticipated rates in the private sector, which range from 5% to 6%. About three-fourths of the PERS studied use an inflation assumption of at least 5%. There is some activity with regard to lowering assumed salary scales. This change may indicate a “leaner and meaner” public sector labor market and more rapid turnover of staff.
- **Actuarial Cost Methods.** Entry age is the most popular method. It is typically considered a conservative funding method.
- **Asset Valuation Methods—Equities.** Asset smoothing techniques are useful for muting the impact of market oscillations. Asset smoothing techniques are popular for the valuation of equities with two-thirds of systems using some form of smoothing method.
- **Asset Valuation Methods—Fixed Income.** Asset smoothing techniques are popular and useful for muting bond price fluctuations. It is unlikely that PERS allocations to fixed-income securities will decline in the future since most plans are mature and consequently have substantial cash-flow requirements. In addition, policy and statutory restrictions often set a maximum on investments in equities.

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Copies of the study may be ordered from the SOA. Price per copy is \$125 for private sector purchasers and \$75 for public sector purchasers. Contributors to the study will be mailed one copy free of charge. I am very pleased to have played a role in the completion of this study.

MR. EDWALDS: Our second lecture is on pension plan terminations in the Province of Ontario. This is a project sponsored by the Retirement Systems Research Committee of the SOA. Our lecturer will be Mike Sze, who was the principal author of the report.

Mike is a Fellow of the SOA, a Fellow of the Canadian Institute of Actuaries (FCIA), and an Enrolled Actuary. He's a principal and actuarial manager at Hewitt Associates in Toronto. He has his Ph.D. in mathematics from Ohio State University. He's currently a member of the Board of Governors of the SOA. He is Chairperson of the Committee on Social Security Retirement and Disability Income of the SOA, a member of the Social Insurance Committee of the AAA, and a member of the Investment Practice Committee of the CIA.

He has also has been a past chairperson of the Retirement Systems Practice Area Committees of the SOA. Mike has worked in both Canada and the U.S. in pensions for over 20 years.

MR. MICHAEL M. C. SZE: I wonder why we are talking about Canadian plan terminations in an audience of predominantly U.S. actuaries. Of course, the important thing is we are neighbors. It will be beneficial learning from each other; at the same time, many of the problems on pension plans, on social security, and so on, are quite similar for Canada and the U.S.

Although I'll be talking about Canadian things, you can easily draw a parallel in the U.S. Of course, there are Canadian actuaries in the audience who will correct me if I say the wrong thing about Canada.

Tom said this study was financed by the SOA. Why is it that we want to do a study on Canada? Let me first talk about the reasons and then why to do it. What are the key questions for which we want an answer? How do we do it? The process is much more detailed than many of the research projects that you have seen.

We have seen a great deal of confidential data that researchers would not usually see. I didn't see the data, but the researchers saw them. I'll share with you some of the research results, and then give some conclusion. As you might expect, the conclusion is just that there should be more lead in the study of other projects.

Why do we do such a study? Well, in both the U.S. and Canada, we have seen a substantial number of plans terminating in recent years. Policymakers, as well as others, have been quite alarmed by it. Everybody wants to know what's happening and why it happened.

Of course, what compounds matters is many plans terminate in order to go from a defined-benefit plan to a defined-contribution plan. What's the impact of that to the coverage of people? What's the impact to the security of the employees? This is what we want to analyze.

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Why do we choose Ontario? Over 40% of the pension plans in Canada are in Ontario. The data are most easily accessible. And luckily, in Ontario, we also had the full cooperation of the Pension Commission of Ontario. We were allowed to use and to study the confidential data that they have. Of course, we also diligently observe the confidentiality of the data; I'll talk about that later.

Why did we choose the period from 1988 to 1993? For Canadians, that's an obvious choice. But there are so many U.S. actuaries here I might as well mention the reason. In Ontario, and in most other provinces of Canada, there is new pension legislation (just like there is in the U.S.). In Ontario that pension benefit act was effective January 1, 1988.

Some people have complained that those laws, regulations, and rules are too complicated. They're stifling the pension industry. As a result, there are many terminations.

Now why do we cut off at 1993? We could have gone on to 1994 but by the time the 1994 results are done we'd be presenting results in 1996. So you have to cut it off somewhere.

Also, in Ontario and in most parts of Canada, the number of defined-benefit pension plans peaked in 1988. So that is another good reason.

The key questions that we want to answer of course, are: What is the trend? How many plans terminated? What's the percentage of employees affected by these terminations? And what would be the security of the plans that are affected?

We also want to know why the plan is terminated? What's the cost? Does industry have any impact on plan terminations? Do unions have an impact? What are the plans' formulas? What's the effect on participants?

If a plan terminates, employees' security is destroyed. We often hear that this is particularly true in the U.S., but it is true in Canada too. Employees are left holding the bag. What's the replacement ratio of these pension plans? When plans are terminated, are these plans replaced by other plans, or are they just completely out?

There was also the funded ratio to consider. Are these plans 100% funded or are they basically lowly funded?

These were the questions that we tried to answer. This is considered a very important project, so it has the support of both the SOA and CIA. The SOA actually came up with the major funding of the project. The group that is particularly involved from the SOA is the Committee on Retirement Systems Research.

The CIA group overseeing this is the Pension Plan Coverage Task Force. Specifically, the project oversight group involves Malcolm P. Hamilton, Charles Barmer, and me from Canada, as well as Tom Edwals and some other researchers from the U.S. Of course, it also involves the superintendent of the pension commission and all the directors of the pension commission.

What's the data source? We are very fortunate that both the Canadian federal government and the Ontario provincial government have been extremely helpful by providing detailed,

specific data on active plans from *Statistics Canada* and on terminated plans from the Ontario government.

These data are not just statistics; they are data shown plan by plan. These are confidential data affecting the employees of the plan and the plan sponsors. Furthermore, some information obtained is considered to be of a proprietary nature, belonging to the actuarial firm performing the plan termination.

So there has been much discussion and preparation on how to protect the confidentiality of this data. There were lawyers involved from both the Pension Commission of Ontario as well as the SOA office.

We recruited third-party research students from the University of Waterloo. They are paid by the SOA. For a nominal fee, they are loaned to the Canadian government and the Ontario government. So for the time that they were doing the research, they were actually employed for a nominal fee by the Ontario government. They were sworn to secrecy about any data. They will see the data, but the data would remain at the Ontario government office. It would not leave the building. The researchers would summarize the data and the statistics would be shown to the actuaries in the supervisory group. But the actuaries would not see the raw data.

Chart 1 is a graph of the private sector plans that are registered in Ontario. The time period that we are using is January 1, 1988 to January 1, 1994. The solid line represents the trend of the defined-benefit plans that are registered in Ontario, and the dashed line represents the number of active employees that are covered by the plan. If you look at the trend, you see there is quite a bit of a decrease in the number of plans. It averages out at about a 5% decrease each year. I know that 5% is a lot of plans, but the more important thing to look at is the number of people who are covered.

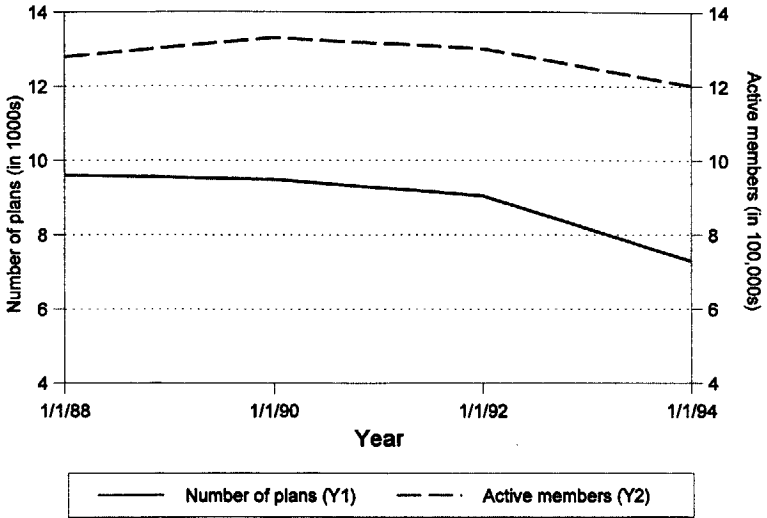
It remains relatively stable; there's just about a 1% drop on the average in plan participants. However, 1% is not a minimal number if you think about it in comparison to the labor force.

On the average, the labor force increases about 1% a year. And now the active participants drop 1% a year, so there is more than a minimal decrease in the coverage. However, this decrease is smaller than what people feared until this study was performed. This is an important point.

Chart 2 are all the plans that are registered in Ontario. Unlike the U.S., registered plans in Canada include both defined-benefit plans and money-purchase pension plans, which are defined-contribution plans. Let's compare the number of plan terminations in defined benefit and defined contribution. The number of defined-benefit plans did not drop as much as the number of defined-contribution plans. As a matter of fact, the number of defined-contribution plan terminations is greater than that of defined-benefit plan terminations.

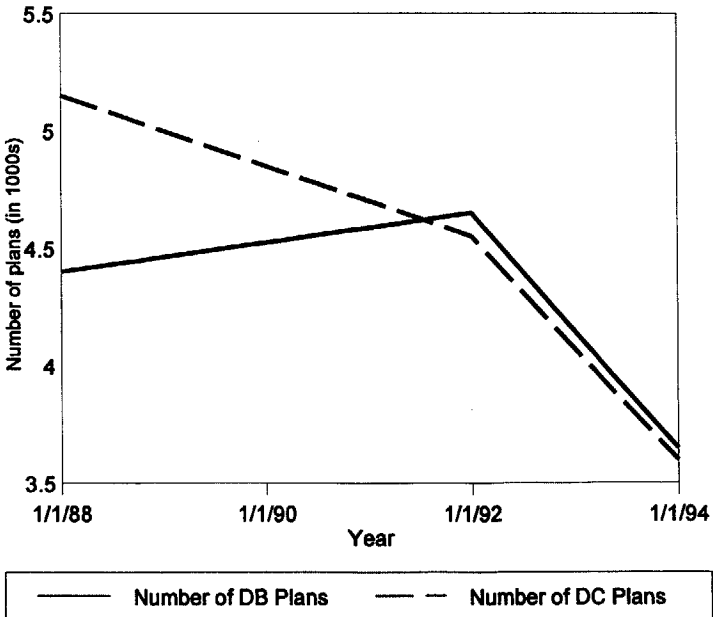
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CHART 1
PRIVATE SECTOR PLAN REGISTERED IN ONTARIO—DEFINED BENEFIT PLANS



Source: Statistics Canada—Annual Information Return Data

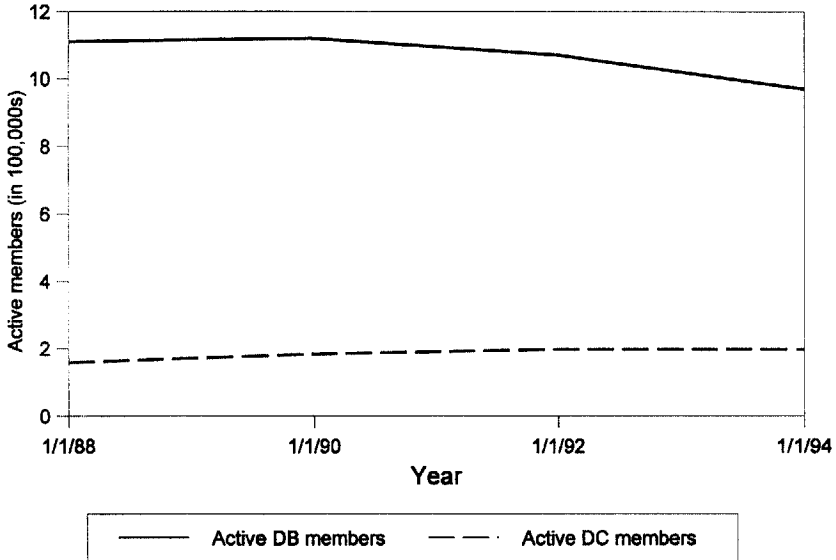
CHART 2
PRIVATE SECTOR PLANS REGISTERED IN ONTARIO
NUMBER OF PLAN TERMINATIONS



Source: Statistics Canada—Annual Information Return Data

What about the number of participants (Chart 3)? The number of defined-benefit plan participants decreased by about 1% per year. Defined-contribution plan participants actually increased by a small amount; however this picture puts everything in context. Even though there's a drop in defined-benefit participation, there are many more defined-benefit plan participants than defined-contribution plan participants. In terms of coverage by a registered plan, it is defined-benefit plan participants that create the important issue there.

CHART 3
ACTIVE MEMBERS IN PRIVATE SECTOR PLANS



Source: Statistics Canada—Annual Information Return Data

Plan participant and plan termination outcome are much affected by the size of the plans (Chart 4). The black bar represents plans that are involuntarily terminated. The company goes bankrupt or there's a plant shutdown, that kind of situation.

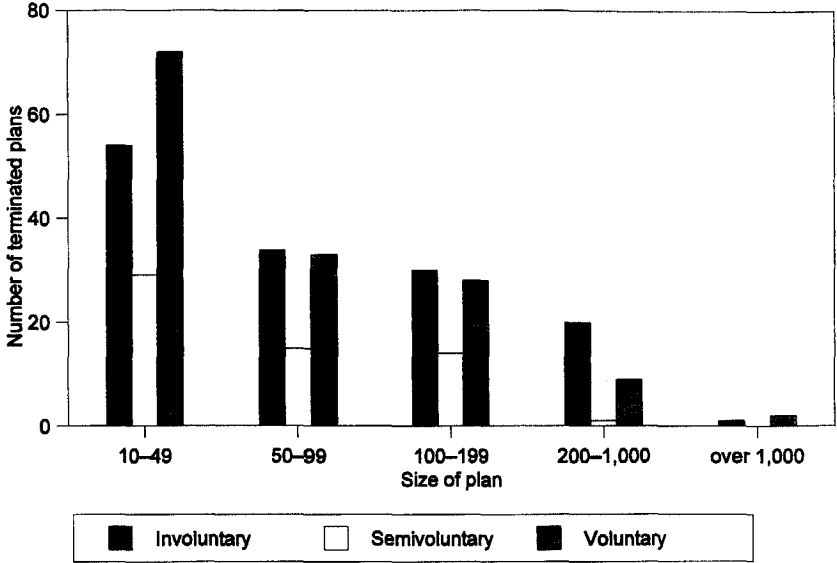
The grey bar represents voluntary plan terminations. Some of these terminations were caused by excessive administrative burden. Some employers want to change to a defined-contribution plan. Some others do not state a reason for the voluntary termination.

The white column represents semivoluntary terminations. Semivoluntary plan terminations are mostly due to business retrenchment or layoff. Some people would actually include these terminations in the involuntary termination. However, since they are different from plant shutdown types of situations, we have kept them separate.

Chart 5 is based on how many participants there are in the plan. Most of the terminations happen at the plans that are relatively small. The research has not included plans that are smaller than ten employees because of data problems.

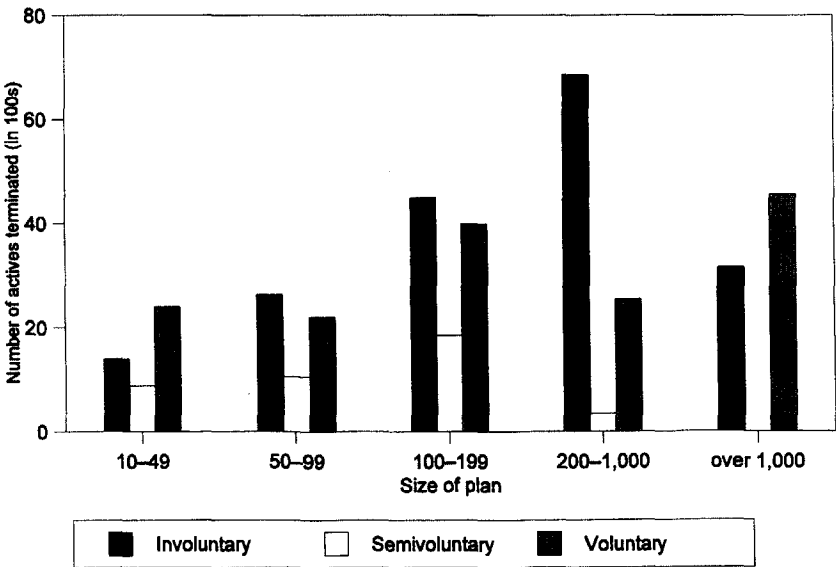
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CHART 4
TYPES OF DB TERMINATIONS BY PLAN SIZE



Source: Pension Commission of Ontario—Termination Data

CHART 5
TYPES OF DB TERMINATIONS BY PLAN SIZE



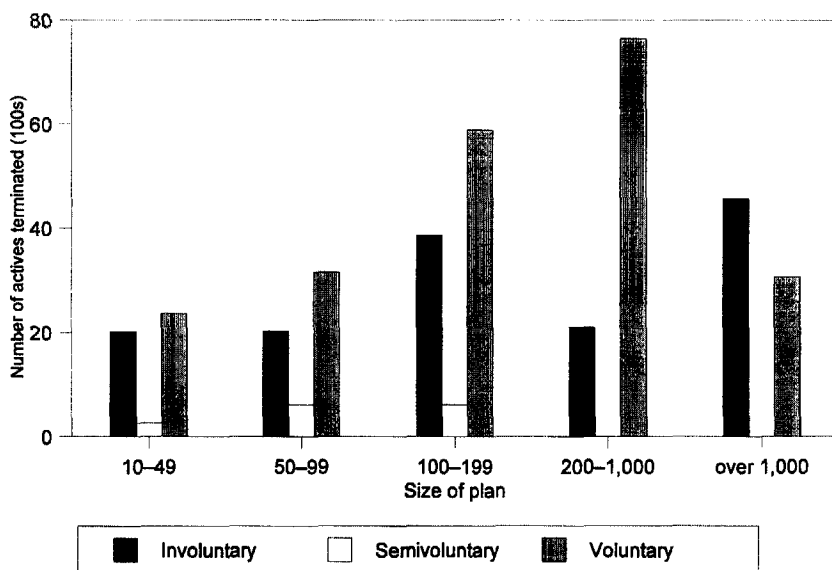
Source: Pension Commission of Ontario—Termination Data

Smaller plans tend to have more terminations and more voluntary terminations than the bigger plans. For bigger plans, it's about even or in some cases the involuntary terminations are higher. I would expect that there are similar results for the U.S.

What about participants affected? Of course, once you start talking about the number of participants terminated, the statistics are dominated by the larger plans. That is why when you talk about the number of people covered, the column heights are heavily weighted towards the larger plan.

One thing that we want to look at is whether terminated plans are replaced by other plans (Chart 6). Look at the smaller plans. There are probably a number of plans that are replaced by defined-contribution type savings plans. But the larger plans oftentimes are not replaced. Why aren't they replaced? As we saw for the larger plans, many of the plan terminations are involuntary. If the business goes bankrupt, there will not be a replacement plan. There's probably a strong relationship between whether the plans terminated voluntarily or involuntarily and whether they are replaced.

CHART 6
REPLACEMENT PLAN BY PLAN SIZE



Source: Pension Commission of Ontario—Termination Data

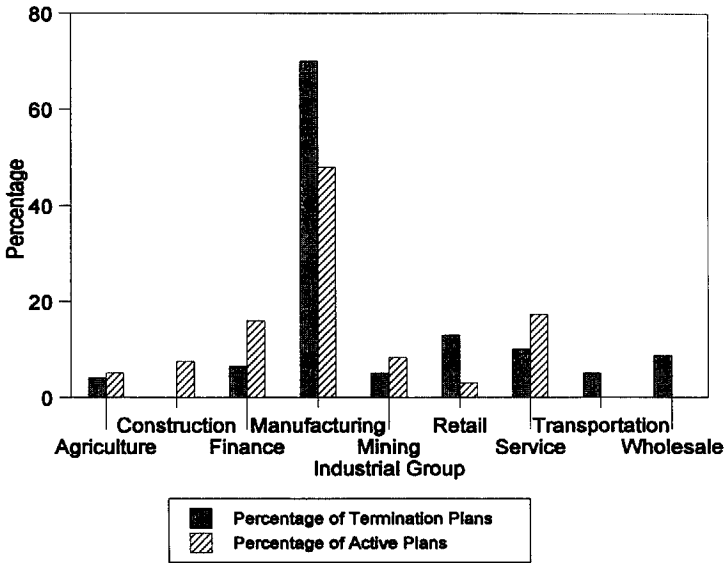
What is the effect of the industry? We have divided the industry into agriculture, construction, finance, manufacturing, mining and service and so on in Chart 7. This classification is very much in line with what is used in *Statistics Canada* data.

Having said that, the group that has the most terminations is the manufacturing group. The period under study is that from 1988 to 1994. That is the period when there was a severe recession. It's no wonder the industry that was hit was the manufacturing industry. Notice that there are two columns for each industry. The gray bars reflect the percentage

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of terminated plans. The more alarming part is that even though the manufacturing sector occupies a big portion of active plans, they occupy a bigger portion of terminated plans.

CHART 7
EFFECT OF INDUSTRY ON PLAN TERMINATION



Source: Pension Commission of Ontario—Termination Data

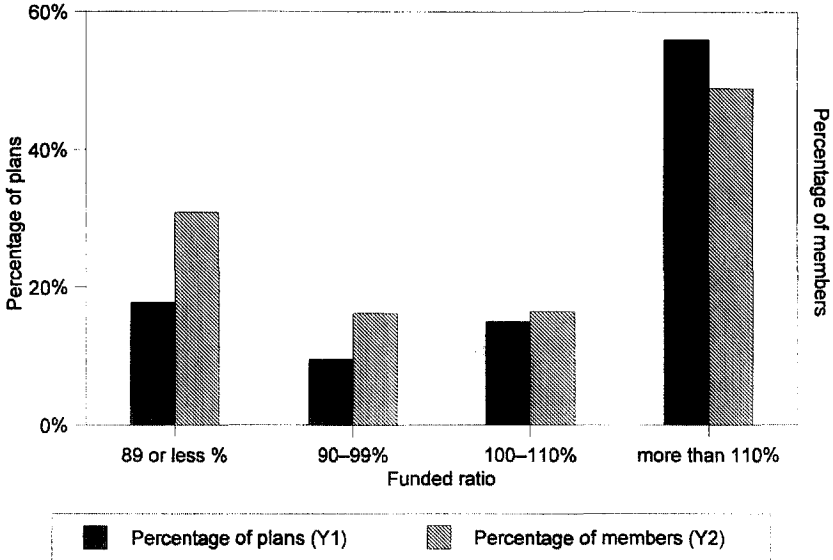
The gray bar is substantially higher than the striped bar, which says that there are proportionately more terminations than active plans.

The two other groups that still have a sizeable number of terminations are the service and finance sectors. However, there are more active plans by proportion than terminated plans. This is something that we might want to think about. All terminated plans were funded (Chart 8). The funded ratio is defined as market assets divided by plan termination liability. I know that plan termination liability doesn't cover salary projection and so on. But at least on an accrued benefit basis, it is consoling to know that most of the plans are fairly well funded. There's only a portion, less than 20%, of plans that are underfunded. Among those plans the average funded ratio is 80%.

It's somewhat consoling to know that, in Canada, employees in general are not left holding the bag. If a plan is terminated, the liability and the benefit is calculated on a current-value basis. There's no salary projection involved, and there's no postretirement indexing involved. They only get what they have at the moment. So although the funded ratio is good, it's still not complete protection.

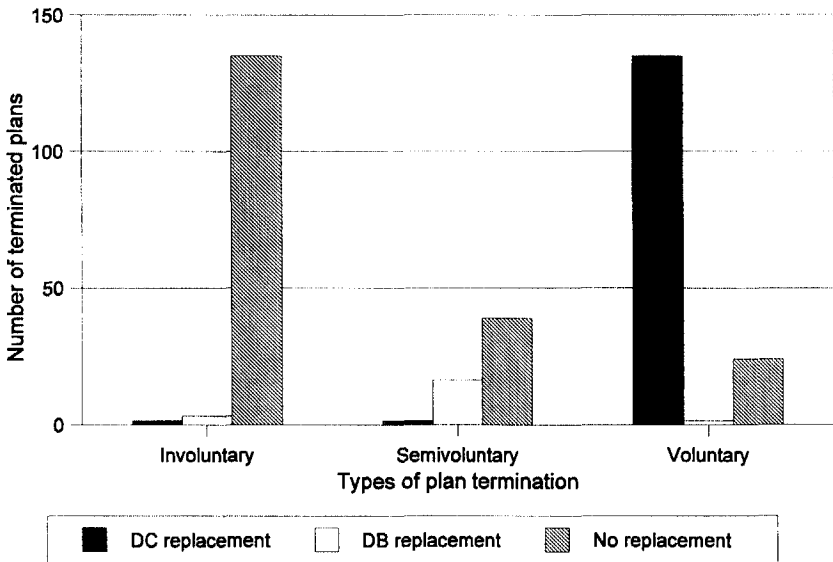
There is a sizeable correlation between whether a plan is terminated involuntarily or voluntarily and whether it is replaced (Chart 9). The co-relation is quite evident, isn't it? If the plans are voluntarily terminated, there would be a defined-contribution type of plan replacing it. If they are involuntarily terminated, there's no replacement plan.

CHART 8
FUNDED RATIOS OF TERMINATED DB PLANS



Source: Pension Commission of Ontario—Termination Data

CHART 9
REPLACEMENT PLAN BY TYPES OF TERMINATIONS

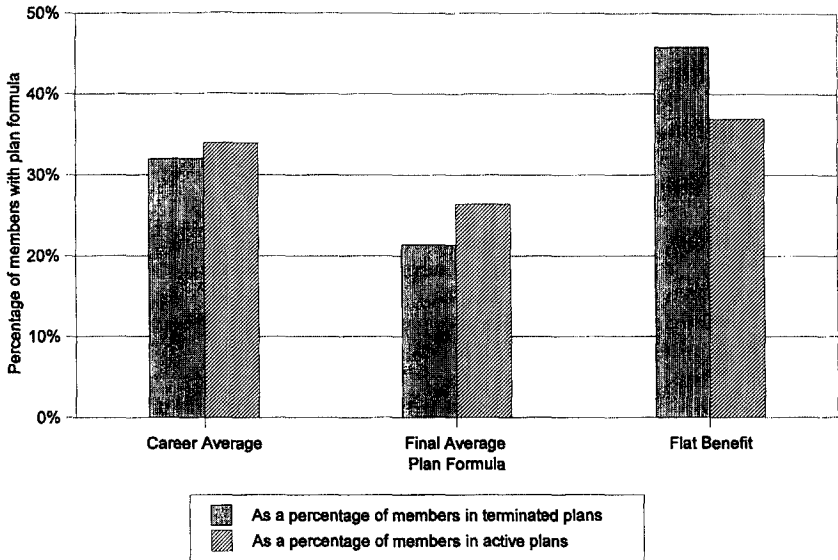


Source: Pension Commission of Ontario—Termination Data

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What's the effect of the plan formula? In general, they are about a third each of flat benefit formula, or final average plan formula, or career average formula (Chart 10). Flat dollar benefit plans show a greater tendency to be terminated than other plans.

CHART 10
DISTRIBUTION OF PLANS BY PLAN FORMULA



Source: Statistics Canada for Active Plan Data and Pension Commission of Ontario for Termination Data

What are these plans? They are manufacturing plans with union involvement, and they mostly reflect the business climate of that era. As a matter of fact, we also analyzed it year by year. The most plan terminations happened in the years 1989, 1990, and 1991. In 1989, we see that they report as the reason some “overadministrated burden.” But for 1990–91, the reason was mostly due to a business recession for economic reasons.

What do we make out of the whole study? The number of plan terminations, while 5% is a big number, is smaller than what we professionals in Canada had been fearing. Most of the plans were well funded on a plan termination basis. The alarming thing is that many of the plans are not replaced. There is sizeable movement from defined benefit to defined contribution. This is where we feel that the study is not totally complete. There are two things that should supplement the study: a study of the defined-contribution plan terminations, which we have done and included in the report, and a study of the number of plans converted from defined-benefit to defined-contribution. I understand that study is now picked up by *Statistics Canada*.

FROM THE FLOOR: Mr. Arnold, do you have an answer yet to your question about the mortality experience for firefighters and police officers? Is it higher or lower than it is for other state employees?

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MR. ARNOLD: Actually, this study does not answer that question. Further review of the submitted experience studies will be needed. However, I did not wait for this study to try and get the question answered. I dug at it myself from earlier studies which I obtained from the office of the actuary of the City of New York and the retirement systems actuary of the State of New York. The results were published in the *Pension Section News* some years ago. I looked at the rates of mortality assumed for postretirement for uniformed services and clerical pensioners. These rates were based upon experience studies covering the period from about 1981 to 1987.

The mortality rates assumed for both service pensioners and disability pensioners were lower for uniformed services than for clerical personnel from about age 40 to age 70. The reverse was true after about age 70. I do not know what the combined results on an actuarial, present-value basis produces.

The lower mortality rates assumed at the younger retirement ages for service pensioners are probably due to selection. That is, police officers and firefighters have to pass tough physicals in order to be hired. Also, they are often subject to continuing physicals during their active employment. Retirements among uniformed services employees prior to age 60 are common and may not be true retirements, but career changes.

As for disability assumptions and experience, the mortality assumed for police officers and firefighters, while they are disabled, is lower because for a police officer or firefighter to become disabled they need to be unable to perform ALL of the duties of their occupation. Thus injuries which put them on disability retirement might not be life threatening. For clerical personnel, qualification for disability retirement often means meeting the tougher Social Security definition; that is, injuries severe enough to prevent the worker from doing substantial gainful work.

FROM THE FLOOR: You said the information about police officers and firefighters mortality experience was already published. In what issue of the *Pension Section News* was that published?

MR. ARNOLD: It was the March 1990 issue on pages 8 and 9.

FROM THE FLOOR: Mr. Arnold, what was the expected basis used in obtaining the actual-to-expected ratios?

MR. ARNOLD: The expected basis varied by plan. There was no standard expected basis used. The results of the various plans were combined. This raises the issue of how useful the combined information is. Well, I recommend that you obtain a copy of the study and get into the details yourself and maybe add those numbers together in a different way.

FROM THE FLOOR: The retiree mortality result of an average actual-to-expected ratio of 98% seems high. How can you tell the trend of experience when you haven't carefully defined the expected basis?

MR. ARNOLD: The accuracy of the overall retiree mortality ratio of 98% is somewhat diluted by the fact that the assumption must also reflect future mortality improvements. A

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static table accurately reflecting improvements would be expected to yield current mortality ratios in excess of 100%. Therefore, a 98% ratio is slightly aggressive.

FROM THE FLOOR: How about the teachers' experience?

MR. ARNOLD: The teachers' studies were looked at separately. The experience in the study is shown for general employees, police officers/firefighters, teachers/schools, and in total.

FROM THE FLOOR: I work in Massachusetts where the pension plans are not well funded. The newspapers are more interested in fraud and inappropriate conduct with the plans' assets than with the adequacy of the funding. What can practitioners do in their local communities to encourage proper funding of public pension plans?

MR. ARNOLD: Massachusetts has a history of underfunding. Actually the state legislature passed a law in about 1940 prohibiting advance funding of pension plans. So that state was on a pay-as-you-go basis until about 1986. Then the state legislature reversed the earlier law and passed a new law mandating advance funding.

What can you do to encourage advance funding of public plans? What I try to do is rely on disclosure. I try to help people understand the implications of pay-as-you-go type programs versus the funded programs. The generational equity issue is the key. The current generation of taxpayers should pay for all of the costs of the current generation of public employees, that is, their salaries while active employees and funds to provide for their retirement benefits too. Advance funding of pension benefits provides that result. Pay-as-you-go financing of pensions means that your children and grandchildren will be paying retirement benefits to former public employees from whom they received no services. They may be paying for two or three generations of retired public employees! I try to get across this result in conversations that I have with my clients who are public employers.

I encourage my public clients to take the longer view, although sometimes the immediate needs of the community may make it very difficult. For example, let me tell you what happened to me in one community where I made a presentation urging advance funding of the pension plan. One of the aldermen said, after my presentation, "Mr. Arnold, I buy everything you have said. I really appreciate your explaining the advance funding concept. But there's just one question I have for you. Which of the public schools shall we close in order to come up with the needed money in order to properly fund the pension plan?" Generational equity talks about an issue that has little priority for elected officials who are elected for two-year terms. They are worried about the needs of today's public schools. They are also worried about getting reelected for another term of office.

Another strategy that I have used with some success involves the collective bargaining process. I arrange to have an educational session with the unions and management to explain the concept of advance funding. The unions are generally very supportive of advanced funding of pension plans. So we try to get both management and the unions to agree that they support the concept of advanced funding, and that the cost estimates for any proposed improvements in the pension plan provisions will be calculated on an advance-funding basis.

