

**1992 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 9

Disability Income

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MR. DAVID E. SCARLETT: Most of you know that beginning with 1992 statutory annual statements, some state insurance departments will require that the board of directors of life and health insurers designate an appointed actuary to give an opinion about the adequacy of reserves. Actuaries have been signing statements of opinion about reserves since the mid-1970s, but this is different.

A New Standard Valuation Law

The appointed actuary has some new responsibilities regarding the assets held with respect to the reserves about which he or she is giving an opinion. First of all, the appointed actuary must determine whether or not the reserves make adequate provision for the company's obligations. That's the old requirement. Now reserve adequacy must be determined in light of the assets held by the company with respect to those reserves. That's the new requirement, new at least for disability actuaries.

The new model law continues:

The opinion shall apply to all business in force including individual and group health insurance plans, in form and substance acceptable to the commissioner as specified by regulation.

Thus, it seems very clear that the appointed actuary, when considering reserve adequacy for individual disability insurance (DI) or group LTD, must also consider the assets backing up these reserves. The appointed actuary is allowed to aggregate the reserves and assets for different lines of business, and can offset redundancies of one line against the deficiencies of another. However, my comments will be limited to the new law in relation to disability insurance.

Some companies may be exempt from filing an actuarial opinion regarding asset adequacy analysis, depending on the size of the company and certain financial ratios. Category A and

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B companies (companies whose assets are \$100 million or less) can be exempted every year if certain financial criteria are met. Category C companies (assets between \$100 million and \$500 million) can be exempted two out of three years if certain financial criteria are met. Category D companies (assets over \$500 million) must file the actuarial asset adequacy opinion every year.

Cash-Flow Testing for Disability

The first question that may occur to the disability actuary is: Why do I need to be concerned with assets? Most disability insurance has no cash surrender or other nonforfeiture values, so there's no disintermediation risk as with interest-sensitive life and annuity products.

Although disintermediation is not a big risk, declining interest rates can result in premiums and reserves (which were calculated using higher rates) that are no longer adequate. Call provisions and mortgage repayments may create a reinvestment risk. Therefore, the actuary should be sure that appropriate assets are being held, assets that will generate sufficient cash to cover the benefits at the right time.

Does the disability actuary need to do cash-flow testing? The Actuarial Standards Board has promulgated Actuarial Standard of Practice No. 14, *When to Do Cash-Flow Testing for Life and Health Insurance Companies*. Section 5.4 of this document is entitled "Cash-Flow Testing Is Not Always Necessary," and says in part:

Not all products are subject to the same type or degree of risk. Following are examples of situations when cash flow testing may not always be necessary: . . .

Variations in benefit and expense experience for disability income and medical expense reimbursement policies may arise from uncertain secular trends in experience. These variations may appropriately be analyzed using statistical techniques applied to historical data to quantify the risk.

It seems clear that those who wrote this actuarial standard also recognized that disability insurance has different risks than interest-sensitive products, and that variations in benefit and expense experience may be more important than variations in interest rates.

If the disability products being tested are group LTD, or individual franchise or guaranteed renewable products, then the company has the ability to adjust the rates, and in some cases, to not renew or even to cancel the coverage. For these products, my own opinion is that sophisticated cash-flow testing may not be needed, if three conditions exist:

1. If the disability actuary assumes that the 1985 Commissioners Individual Disability Table A (CIDA) or 1987 Commissioners Group Disability Table (CGDT) may not be adequate, and therefore does a careful claim reserve development analysis each year, adjusting claim reserve factors accordingly;
2. If the disability actuary is reasonably comfortable that the disability assets have a low risk of default, (for example, the disability assets should not consist of a high percentage of risky real estate ventures); and
3. If the disability actuary has determined that the asset liquidity and investment cash flow will roughly match the cash-flow needs of the disability policies (in fact some companies that think they know which way interest rates are going to move may be purposely mismatched).

However, I think that noncancellable disability insurance needs to be approached with great care, because the insurer is locked-in to the rate structure, and the risks are high. It's my opinion that reserve adequacy for noncancellable disability insurance must be examined by means of a gross-premium valuation, with some sensitivity testing on the various assumptions. First of all, a gross-premium valuation (net of reinsurance) should be done using the most likely assumptions, in the opinion of the disability actuary. This is the base scenario. Then some sensitivity testing should be done.

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With respect to interest-rate-sensitivity testing, there is a list of seven interest-rate scenarios in the NAIC Model Actuarial Opinion and Memorandum Regulation (which also happens to be the New York Regulation 126 requirements). Perhaps only the decreasing interest-rate scenarios make sense for a disability-gross-premium valuation. These decreasing scenarios are:

1. Uniformly decreasing over 10 years at 0.5% per year, then level.
2. Uniformly decreasing at 1% per year over five years, then uniformly increasing at 1% per year to the original level at the end of 10 years, then level.
3. An immediate decrease of 3%, then level.

For cash-flow testing, these NAIC scenarios are subject to a minimum interest rate of 4%. I would suggest that these tests be applied first to the disability assets, to calculate the investment rates of return that may develop for this group of assets. These resultant rates of return are then used to test the interest-rate sensitivity of the gross-premium valuation.

To handle morbidity sensitivity testing, I turned to the Canadian Institute of Actuaries memorandum entitled "Standard of Practice on Dynamic Solvency Testing for Life Insurance Companies." This document suggests various deterministic scenarios which the disability actuary might want to consider:

1. For worsening morbidity rates: morbidity rates increase by 3% of the base rate per year for five years, then remain level.
2. For sudden worsening in morbidity: in the first year of the projection, morbidity claims are assumed to be at the level of the 95th percentile in the distribution of aggregate annual claims. After the first year, morbidity returns to the levels used in the base scenario. I'm guessing that maybe a 20% increase in claim costs is about the 95th percentile.

The Canadian Institute of Actuaries memorandum also has the following suggestions for expense and lapse testing:

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1. Unit expenses are assumed to increase at a rate that is 3% greater than the expense inflation rate assumed in the base scenario.
2. Lapse rates are assumed to be either twice or one-half the rates assumed in the base scenario, whichever is more unfavorable.

All of the above scenario tests are intended to be independent of one another. That is, the adverse deviations don't happen at the same time. However, perhaps there is one combination of events that the disability actuary may want to test in the gross premium valuation work. When there is a recession, it is reasonable to expect some temporary increase in morbidity. Also, it may be reasonable to expect some temporary decline in interest rates as the Federal Reserve tries to stimulate the economy. To test this situation, perhaps the interest assumption should be reduced over, say, a three-year period, and the morbidity should be increased for the same three years. It may then be reasonable to repeat this reduction in interest rates, and increase in morbidity, every six or 10 years in the gross premium valuation to simulate economic cycles.

Conclusion

I would caution you that these thoughts are strictly my opinion, and it remains to be seen what will be acceptable to regulators. However, I have discussed these ideas with other disability actuaries, who seem to be in general agreement with the approach, although perhaps not agreeing with all of the details. I think everyone can agree that the valuation actuary, now called the appointed actuary, has broader responsibilities than ever before, and both the reserves and assets of the disability lines must be analyzed in greater depth as a result.

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MR. ALBERT A. RIGGIERI, JR.: My discussion will focus on asset adequacy analysis for disability income insurance. In doing so, I will draw upon our past practices at Paul Revere as well as our future direction. As is true with most companies, we consider the valuation environment to be evolving and are working to keep our practices up to date with the changes taking place. As evidence of this, we will be completing cash-flow testing for our disability income business for year-end 1992. We consider this testing as a means to provide us with additional information concerning reserve adequacy and not a replacement for our past practices. We also recognize that prior practices alone will not meet our future needs in order to satisfy the requirements under the new valuation laws. My presentation will cover two main topics. First I will review our past practices and relate them to our ability to make statements as to reserve adequacy. Then I will present our views concerning cash-flow testing and how it will improve our ability to draw asset-adequacy conclusions.

In the past, the primary means by which we have convinced ourselves that we held statutory reserves that were adequate to withstand at least moderate fluctuations in experience was to compare them to our net GAAP liabilities. As is the case today, since we have significant margin over the GAAP liabilities, which themselves have reasonable margins relative to expected experience, we feel that there is no question as to the adequacy of our statutory reserves. In drawing this conclusion, we need to consider how well the assumptions behind these reserves fit with our most current expectations concerning future experience.

In order to make this judgment, we must constantly monitor our current experience in the areas of investment return, policy persistency, incidence of claim, and claim termination relative to our statutory and GAAP reserve assumptions. We do this monitoring separately for policy and claim reserves with the information also being used to update our reserve assumptions. Although these practices are not as useful as cash-flow testing in considering the overall adequacy of reserves, they are necessary in order to keep abreast of changes occurring

in our business environment and in keeping valuation assumptions up to date. These practices will also provide information that will be used to set some of the assumptions needed for cash-flow testing.

Let me highlight a few of these practices for you so that we can see how they are useful in keeping reserves up to date with experience, but fall short of cash-flow testing in terms of determining overall reserve adequacy.

Claim Reserving Practices

First, in monitoring claim termination rates, we run actual to expected studies where our expected basis is our underlying valuation table. As experience emerges, we consider the need for adjustments to our valuation tables to match the experience. An example of this occurred in 1990, when we decided that our reserving needed to reflect longer claim durations during the first two years of disability. A change in experience of this type is easy to deal with from a valuation point of view in that, soon after making the valuation change, your liabilities will begin to reflect your latest expectations. Since we use our own experience during the first two years of claim for statutory and GAAP valuation, this translates quickly to improved liability estimates.

We also run claim reserve runoff studies to validate our conclusions from claim termination studies. In addition, we observe trends, seasonal fluctuations, and any impact that our claim administration practices could be having on our reserves. Our early duration claims were under stress prior to 1990, and our longer duration claims had favorable runoffs. Our goal is to maintain a small positive runoff uniformly spread throughout our claim reserves in order to keep a reasonable margin for adverse claim termination experience built into them. Our claim reserve assumptions after two years of disability are based upon CIDA termination rates, which contain margin relative to our actual terminations.

We also track experience on our incurred but not reported (IBNR) claims. We use 36 months of experience and calculate averages and standard deviations with results related to our

premium base. Our reserve for IBNR claims is based upon the average IBNR cost plus 2/3 of a standard deviation. This gives us a 75% confidence level assuming a standard normal curve. Our goal is to have all of our reserves established at a level that implies at least a 75% confidence level. Experience is tracked monthly and updates other than those driven by normal premium growth are made frequently to keep on top of emerging trends.

In considering claim-reserve interest rates, we track our average portfolio return relative to our average claim-reserve interest rates. In GAAP, we control the average interest rate required to support our reserves by adjusting the rates for new claims being opened each calendar year. The interest rates are assigned by issue year and claim year to keep a close correspondence to our portfolio rate with some provision for future adverse deviation for the block of claims. Again, keep in mind that the average claim-reserve interest rate will move rather quickly towards the rate being used for new claims. For statutory reserves, with a current valuation rate of 5.5% for new claims that drops to 5.0% in 1993, we know there are significant interest-rate margins built into our reserves.

Overall, using these techniques, our short-term contingencies are kept close to current experience. We feel there is considerable margin in our statutory claim reserves due to interest-rate margins and our long-term morbidity risks are limited, since after a few years of disability, the CIDA claim-termination rates drop into the 5% range. A 20% decrease in annual termination rates over the life of our claims would be covered by excess investment earnings given our conservative reserve interest rates. Where these methods fall short is in the ability to measure the margins under various investment and morbidity scenarios.

Policy Reserving Practices

As is true with claim reserves, we consider our current experience relative to our statutory and GAAP reserve bases to develop opinions as to the adequacy of our policy reserves. With many generations of assumptions in use for them and more long-term contingencies to be concerned with, the analysis is much more complicated for policy reserves than claim reserves. Policy reserves must be adequate to cover very long-term risks in the areas of investment

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return, policy persistency, and claim incidence and claim terminations over the complete lifetime of a block of business.

Although we have seen declining interest rates, improvements in policyholder persistency, and upward shifts in morbidity experience in recent years, our GAAP policy reserves remain an appropriate benchmark for measuring adequacy of statutory reserves. Our long-term interest rates, persistency rates, and morbidity assumptions built into these reserves were established with adequate margins to withstand the recent shifts in experience. For example, our long-term lapse rates built into our assumptions have always been in the range of 6%, which remains consistent with our current experience. In addition, in setting our GAAP policy reserves, we normally assume interest rates will decline as the business ages and morbidity costs will rise. This has provided margins to absorb the recent shifts in our long-term expectations.

In our statutory reserves, we have considerable interest-rate margins, as well as margin in policy-termination rates due to use of death rates as the policy-termination assumption. While these two elements contain margin relative to current experience, basic CIDA claim costs contain little or no margins relative to current morbidity experience.

I have compared claim costs under a recent set of GAAP assumptions to those developed under CIDA with both calculated using a 5.5% interest discount rate. This comparison shows that the CIDA basis develops claim costs that are both lower and have less of a slope than our GAAP reserve basis (70% to 80% at advanced ages). This problem is even more pronounced if we assume that CIDA claim costs will cover both total and residual benefit costs. The primary reason for this is that the CIDA tables were built upon experience from the mid-1970s. This experience most likely reflected:

- Little or no experience related to residual benefits, which is a primary benefit in most current disability insurance contracts.
- Much smaller indemnities and lower replacement ratios.
- Much less impact of mental, nervous, and AIDS-related conditions.

- Little experience at the longer elimination periods where most of the industry's sales are being made.

This can result in reserves under the CIDA basis that are smaller than those calculated using our best estimate of future experience plus a reasonable margin. We have corrected for these deficiencies by comparing CIDA reserves to GAAP benefit reserves on a net-level-premium basis. In places where CIDA reserves are less than GAAP reserves we adjust the CIDA reserves up to the GAAP level. This is much like the adjustment one would make if cash-flow testing were completed and a deficiency were identified except that our test is being completed on only certain segments of our reserves rather than on the aggregate of both policy and claim reserves.

Expense Deferral Practices

Expense deferral practices are conservative under statutory accounting. Under the two-year, full-preliminary-term-valuation method, expense deferral is limited to a fraction of the first two policy-year, net-valuation premiums. This results in total expense deferrals over the first two years of approximately 60-70% of a gross premium. In contrast, actual expenses to acquire disability insurance business run 130-150% of a gross premium. By keeping the expense deferrals limited, and assuming our products are priced to recuperate all up-front expenses, there is a source of future profits in our renewal premium stream. In addition, to the extent that there are profit margins and maintenance expense elements included in gross premiums, which more than cover expected future expenses, there is an additional element of conservatism in our statutory reserves.

Overall, we can see that our statutory policy reserves are kept up to date with current experience and contain margins in the basic assumptions through establishing a test linking them to GAAP reserves. We also have conservative expense deferral practices and future profit components built into our premiums as additional margin. Again where these practices fall short is in their ability to test the impact of long-term fluctuations in our experience. This is very important for opining on the adequacy of policy reserves.

Cash-Flow Testing

I would now like to turn attention to the subject of cash-flow testing for disability income business.

In performing cash-flow testing, we expect to be able to draw better conclusions as to overall reserve adequacy:

- Directly measuring the margins in our statutory and GAAP reserves relative to our current expectations will allow us to develop opinions as to reserve adequacy that are based upon quantified margins rather than qualitative opinions.
- It will also allow us to consolidate our analysis and have one direct measure of reserve adequacy versus a piecemeal approach such as I have described.
- We will also be able to directly test the impact of our asset portfolio structure on the ability to maintain our investment margins. This is particularly important in an era of declining investment returns as we are currently experiencing.
- It will allow us to properly take into account the impact of federal income taxes as a cost item.
- It will allow us to test multiple scenarios related to investments, persistency, expenses, and morbidity to see how our in-force block of business will perform and identify management actions we can take to counter adverse experience.
- We will be able to test the impact of likely AIDS and HIV+ scenarios on our in-force block of business.

Our process for completing cash-flow testing will involve establishing a model office for our in-force business with separate cells for our in-force policies, reported claims, and IBNR claims. Outside services and vendor software will be used to set up a model to project asset performance since there is substantial experience available in dealing with the investment issues through these services. We have a segmented portfolio of assets set up for our DI business, so that we will have no issues related to investment allocations across lines of business.

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We will then select our scenarios to be tested. For investments, the New York seven scenarios come directly to mind as a starting point for new-money rates paying particular attention to the scenarios that have declining investment rates. For morbidity and persistency I'd suggest the following scenarios:

- Persistency fluctuations of plus or minus 10% of policy lapse rates.
- A trended morbidity assumption of 1-3% deterioration for 10 years and remaining level thereafter that will be represented as some combination of increasing claim incidence and decreasing claim termination rates.
- A short-term morbidity scenario where results deteriorate 5-10% for one or two years and then return to normal levels again represented as some form of deviation in claim incidence and termination rates.

Expense inflation and CPI-linked cost-of-living adjustment (COLA) increases will be the only areas where we consider direct linkage between asset performance and our obligations. In other words, the level of inflation built into our benefit and expense cash flows will be directly tied to the investment scenarios. I expect the COLA increases to be a challenge to model with a dynamic link to investment scenarios.

We will then combine the investment scenarios with the morbidity/persistency scenarios to obtain a range of results with both types of fluctuations occurring. It will be important to review both ending surplus and year-by-year statutory profits. Scenarios where we have a period of statutory after-tax losses but later gains offsetting the losses will be identified and commented on in our documentation. We will run our testing for a period of at least 25 years and will extend the projection horizon until we have small ending liabilities.

In future years, I expect to move into the area of multiscenario testing for our disability income business with distributions of profitability being developed. A key aspect of this will be our ability to quantify the volatility of the long-term risk factors in our business. The year 1992 is a starting point in this process for us. We are looking forward to entering into this area

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since it will allow us to develop new insights for managing our disability income reserves and new ways to quantify and communicate with others concerning reserving risks.

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MR. ROBERT J. SHLIFER: Until a few months ago I was a product actuary who barely knew how to spell reserve, although I was pretty sure that it ended in an "e." I hasten to say that I had no personal objection to a company holding reserves as long as they didn't interfere with product pricing. I also know where Canada is, which is very helpful if you're working for Sun Life of Canada. But to speak at a valuation actuary symposium? I was perfectly safe -- not!

So, let's have some fun. We're going to go through the education of an actuary. My remarks will deal with our wholly owned subsidiary, Mass Casualty. Sun Life itself has group disability business, but does not have an individual disability line.

If you're going to educate yourself, the first thing you do is go out and get all your textbooks. I was sure that, if I got enough textbooks, that all of the answers to all of the questions would be in there. I didn't bring everything with me, but in no particular order, here is a sample. You need a whole bunch of CIA papers. You need the standard of practice on dynamic solvency testing for life insurance companies. You need a primer on dynamic solvency testing. You need a paper on provision for adverse deviations. You need the new United States standard valuation law and the actuarial memorandum and opinion. You need all of the material with respect to risk-based capital, and you need the Canadian papers having to do with minimum continuing capital and surplus requirements (MCCSR). Plus it helps to have some old valuation actuary reports and a whole bunch of other things.

This presentation is not going to be totally sequential. I'm going to cover gross premium valuations. I'm going to cover a little bit about Canada, and a little about surplus versus reserves. But they're all so interrelated, it is difficult to unmix them.

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Gross premium valuation is mentioned in a number of places in the actuarial literature. For example, loss recognition is needed where actual experience with respect to expenses, interest, morbidity, and lapse indicates that the accumulated reserves, together with the present value of future gross premiums, will not be sufficient to cover the present value of future benefits and expenses, and to recover the unamortized portion of deferred acquisition expenses. Take the gross premium reserve and subtract off reserves less deferred acquisition expense, and you may or may not end up with reserve deficiency that you need to recognize. Also as Dave has pointed out, a gross premium valuation is very helpful in determining fundamental reserve adequacy. The exposure draft from the Academy on appointed actuaries states that, to support an unqualified opinion, the reserve held should exceed the gross premium reserve based on best-estimate assumptions.

So we're going to do a gross premium valuation. Best estimates do not necessarily mean static estimates. If your best estimate is some sort of cyclical trend, for example, that's what you should be using. We did a seriatim valuation of policies, but the assumptions that we used were, in many cases, aggregations rather than breakdowns into finer cells.

I'm going to discuss morbidity further in a moment, so I'll move on to interest. We have our own set of assets for Mass Casualty, and we use an investment model. The model will take the assets and the asset and liability cash flows, grind in reinvestment assumptions and tax reserves, and come up with aftertax interest rates. One of the very interesting considerations is that, to the extent you have to hold higher reserves that are not tax deductible, there are implications on rates.

With respect to general expenses, unit costs should be analyzed as recently as possible, expressing things in the usual way: percent of premium, per policy, or per \$100 monthly indemnity. We assumed a very modest 2% inflation factor. Nobody really feels that that's going to be the inflation rate, but another consideration is, what do you do when you have a serious cost containment program underway? To what extent do you really take that into account in terms of your future expected inflation rate?

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Other gross premium valuation considerations include commissions, using the actual commissions broken down by various contracts. Some sort of assumptions are needed for claim expenses, and taxes, licenses and fees. Since we are looking at the gross premium on a net basis, we also have to take into account the net effect of reinsurance allowances.

There are many other assumptions that you could make. How do you handle waiver? What about modes of premium payment? One question that's going to recur all the way to the very end is, how far should you run the whole thing out? Five years? Ten years? Twenty years? We ran ours out 50 years, and obviously the effect out in the 50th year isn't that great, but it does lead to some interesting philosophical questions.

As regards the morbidity itself, we looked at the morbidity on a direct basis, not a net basis. We looked at actual-to-expected versus Commissioners Individual Disability Table A (CIDA). There was a lot of internal discussion about incidence and recovery methodology. Obviously, you need clean data to start with. You need a lot of credible data, and that's often a problem in the way you look at certain cells. We looked at incidence all the way from 1981 through 1991, although 1991 data probably aren't totally complete because of incurred but not reported (IBNR) claims.

As regards terminations, we did claim run-offs month-by-month and claim-year-by-claim-year to see what might eventuate. How do you interpret them? You see some good years, some bad years, some republican years, some democratic. It's tough to see where this all leads, but we're going to come back to that at the end.

Other complications we had to consider include noncoterminous benefit periods, and one-payment claims. We spent a lot of time on this latter item. It wouldn't seem like there would be a big question. It's there, so it should be in the incidence. It's a very quick recovery, but why not, as long as the claims are handled consistently in the incidence and termination? What do you do about lump sums? Do you try to spread them out with or without interest, or do you just leave them in? It's very easy to overlook riders and ancillary benefits. For example,

we have nondisabling injury in our policy. How do you handle that? What about all of the other disability-based riders that go along with the policy? Which ancillary benefits should we ignore or not ignore?

I have just two, quick, very general observations about the morbidity. We seem to be coming to a conclusion that maybe our incidence is just a tad bit better than CIDA for all elimination and benefit periods combined. The termination rates are slightly worse than CIDA in the first year, really worse in the second and third years, and then they get slightly better than CIDA in subsequent claim years.

I'm going to come back to the gross premium valuation, but every once in a while I say to myself, "If I was only operating in the United States environment, how close am I to being finished?" I have my reserve components, assuming that I've taken everything into account. The next three items -- appointed actuary, asset adequacy and cash flows -- have been taken care of. The other panelists have talked about the asset adequacy so I won't get into that. Cash flows are one of the benefits of a gross premium valuation. If you do it year-by-year, you can get cash flows, not only the claim cash flows but also the overall net cash flow, direct and net of reinsurance. Disability insurance has some fairly long durations for the various liability cash flows.

The next couple of items regarding adequacy levels relate again to the Academy exposure draft, although I understand some of these things may change when a final draft comes out. You go through the draft and think you have found the definitive word on the subject, and then about 10 paragraphs later it comes up with another definitive word. On the question of the reserves, first of all, it says that the actuary should be satisfied that aggregate reserves plus related future revenues are sufficient to pay all benefits as promised under moderately adverse conditions. Under the section on minimum reserves, the draft talks about setting statutory reserves at conservative levels, usually with margins to assure obligations can be matured at a high probability level. But there is no mention of what a high probability level is. It goes on to say, when experience conditions dictate additions to reserves, the actuary

should set reserves at a level where there is confidence that the reserves have a substantially better-than-even chance of maturing the obligations. I've used that phrase about 7,000 times. I love it. It sort of rolls off the tongue. Again, however, that phrase is not at all clear about exactly what it means. So it comes down to this: you've done a lot of work, you've talked about better-than-even chances, but where's your guidance on what scenarios to look at and how to use them? We're going to come back to this very important point.

I only mention risk-based capital here to complete the picture if I were simply dealing with the United States environment. I will note that the C-2 insurance risk component is basically earned premiums times a factor of 35% grading down to 15%, depending on the volume, plus 5% of claim reserves, and the C-4 business risk component is Schedule T premiums times 0.5%.

It might be nice if this was the end of it, but Sun Life is a Canadian company, and our U.S. business is being held to Canadian annual statement (CAS) standards. So as part of our education, let's take a slight detour into the question of reserves versus capital and surplus. I, unashamedly, have stolen a lot of comments and quotes directly from various papers. Basically the papers seem to be heading in the direction that reserves are for misestimation of the mean and deterioration of the mean, versus capital and surplus being for catastrophes and whatever is meant by statistical fluctuations. How do you set your reserves? The various papers talk about various approaches, both empirical and scientific, using techniques such as risk theory, simulations and stochastic modeling. Adding a provision for adverse deviations to the best-estimate reserves completes the picture.

As regards capital and surplus, I mentioned the United States risk-based capital. In Canada we're talking about dynamic solvency testing, which is basically layering onto the in-force block of business your five-year business plan, and testing it under various scenarios. Surplus is divided in the primer on dynamic solvency testing into four categories: risk, momentum, vitality, and distributable. The fundamental idea is that the first two, risk and momentum, have to do with the in-force block of business as of the statement date. The risk surplus is the

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amount required to protect existing policyowners against random fluctuations in experience over time, future catastrophic events and misestimates or deteriorations in future experience beyond a reasonable level of adverse deviation. The definition is not really clear. It is saying surplus is to protect against everything in excess of reasonable levels of adverse deviation. Momentum surplus is the additional surplus necessary to reflect the adverse trends in earnings due to events occurring that are inevitable based on your current situation. Contrast all of that with vitality surplus, which is the additional amount of surplus required to deal with ongoing growth in new business up to the planning horizon, and distributable surplus, which is what is left.

The CIA has a paper on provision for adverse deviations specifically for individual life insurance. While there is not an awful lot of guidance about individual disability insurance, you can certainly glean some things from the paper. I'd appreciate any comments as to exactly how relevant the information is to disability. The valuation assumption is the expected assumption plus a margin for adverse deviations. The expected is the best estimate of future experience, and instead of trying to do it from a formula approach, the paper addresses qualitative standards, which are called considerations, and quantitative standards, which are called parameters.

It is interesting to look at some of the standards and definitions. The paper talks about margin as part of the valuation assumption covering the uncertainty related to expected assumptions, and the provision is an additional reserve created by adding a margin to the assumptions. The adverse deviation takes into account the misestimation and the deterioration of the mean of the assumption and does not take into account statistical fluctuations and catastrophic occurrences. The parameters define high and low margins, and you qualitatively need to figure out whether you can really bet toward the low margin or whether you have to go toward the high margin. Very specifically, the paper describes certain significant considerations that preclude the selection of a margin near the low end of the range, and that would seem to be entirely reasonable.

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With respect to dynamic solvency testing, the minimum continuing capital and surplus requirement paper defines the required and available surplus. The formula is a lot more complex than it is for risk-based capital. It deals with factors having to do with the length of premium guarantee period remaining, which is probably not an unreasonable thing, varying by individually underwritten and other business. The claim reserve factors vary by benefit period and duration of disability. The primer on dynamic solvency testing talks about static solvency versus dynamic solvency, and obviously the conclusion was reached that dynamic solvency is the way to go.

The fundamental process for dynamic solvency testing is to calculate and report historical patterns of actual free surplus as required by applicable regulatory standards for the most recent three-year period; to project these standards for five years using best estimates of experience and the business plans of the company; to recalculate the five-year projections on a set of 10 prescribed scenarios, each of which focuses on the specific, single, potentially adverse trend and experience; and then to do whatever other additional scenarios you think you need to do. Again, at the end of the paper on dynamic solvency testing there are 10 scenarios. Dave Scarlett mentioned some of these, including worsening morbidity rates by 3% a year for five years, increasing expense rates 3% greater than inflation, various sales scenarios, decreasing interest rates, and worsening withdrawal rates.

We're coming to the \$64 million question. You have examined all the theoretical concepts, you've done a baseline scenario for your gross premium valuation, and you've tested some additional scenarios. The additional scenarios we tested are not from any one particular list. This is not the New York seven. This is not the 10 that we just talked about. Our scenario testing shows, starting with the baseline scenario that, if you lower your recovery rates or termination from disability rates by 10% for three years, that will increase the gross premium valuation by 29%. Separately, if you increase your incidence by 10% forever, that will increase the gross premium valuation by 13%. If you do both of them, the increase will be 45%; the scenarios are not quite additive. If you change lapse rates by 10%, it will have a 2% effect. If you increase your lapse rates, it'll reduce the gross premium valuation by 2%. If

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you reduce your lapse rates, it'll increase the gross premium valuation by 2%. Apparently, the effect of policies persisting longer is more important than the amortization of acquisition expenses. We used an 8% interest assumption. If you significantly raise the interest assumption, you're going to lower your gross premium valuation by 10%, and if you reduce your interest assumption a little, you're going to increase your gross premium valuation by 3%.

Which brings us absolutely, positively, completely full circle. I've done my gross premium valuation. I've done scenarios. I've read all the papers. I've read all the responsibilities of the appointed actuary and the valuation actuary and all the freedom it gives us. So what is the bottom line? How much do you set up? What do you do with all these scenarios? Do you average them? How do you know if you have a 70% chance of maturing your obligations? How long do you run your assumptions out? Do you really expect each of the assumptions to act independently, or if your incidence goes up, don't you expect that perhaps your terminations will go down, or vice versa? I'm going to end on that question mark.

DISABILITY INCOME

MR. PAUL D. HITCHCOX: I'd like to take you through an economic cycle, namely the 1991 recession.

As disability valuation actuaries, we are constantly reminded of the need for vigilance -- watching out for the disability risk as it changes over time.

But what exactly is the group disability risk? In this era of zero-day residual and long accumulation periods, the disability risk becomes less clear.

You no longer have to suffer a complete loss of income for a definite period of time. You only have to have a 20% loss over 90 days to begin receiving LTD benefits. It becomes increasingly easy to file for an LTD benefit.

In essence, group LTD insures the wealth of a population. LTD replaces 60% to 70% of lost income. And as the economy impacts members of that population, and those members lose their jobs and their income, LTD becomes a natural source for replacing that lost income. This is especially true under the newer, more liberal contract provisions.

Therefore, one of the biggest factors influencing group LTD experience is the unpredictable health of the economy. And a big challenge for the disability valuation actuary is incorporating the unpredictable economy into group LTD reserves.

I won't pretend to be an economist, although actuaries do get accused of acting like economists. Economists, among other admonitions made against them, have been accused of seeing something working in practice and wondering whether it works in theory.

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The economy remains weak with gross domestic product (GDP) growth at a mere 1.4%, salary and wage growth still hovering around 2%, and anemic levels of consumer confidence.

With an unemployment rate of 7.6% for August 1992, the employment scene does not look any better. The U.S. has lost over 1.8% of its employment base, and of these 1.2 million job losses, two-thirds of these jobs are not expected to return.

While cyclical forces such as an improved housing market are pushing the economy forward, deep-seated structural problems are throwing up barrier after barrier to growth.

And this is a long list of barriers to growth so bear with me:

- the decline of the defense industry,
- the globalization of the economy,
- the bank crisis,
- firings instead of temporary layoffs, and corporate restructuring,
- decreased spending due to lower investment income,
- and the debt binge of the 1980s.

The result is a shaky economic recovery that may be unable to generate enough jobs to keep the unemployment rate from rising to 8%. So how has this abysmal economy influenced LTD?

The impact of the recession on LTD experience has been significant, particularly due to the broad nature of the recession.

As the recession began to take hold, the first impact on LTD experience came through increased incidence. As mentioned, corporate restructuring and the resulting layoffs produced an increased volume of LTD claim applications, or markups. In addition to legitimate applications, claimants were testing the availability of LTD benefits.

DISABILITY INCOME

A hidden problem of incidence is antiselection. Purchases of higher benefits can indicate potential antiselection. The valuation actuary needs to be concerned with the level of future claims, not just in number but in dollar, too. The risk of antiselection deserves special attention by disability pricing actuaries, particularly when the recession was only educated speculation. Additional preexisting restrictions and medical underwriting had to be considered.

Slow economic growth hindered claimant recoveries. With over two-thirds of the lost jobs never returning, the impact of rehabilitation and other return-to-work efforts were minimized.

In addition, the low investment environment will increase the cost of reserves. Also, the higher benefits associated with white collar workers have added significantly to the cost of the recession.

Finally, further corporate restructuring will continue to threaten LTD experience in the near future. LTD will continue to be a viable alternative to replacing lost income from layoffs.

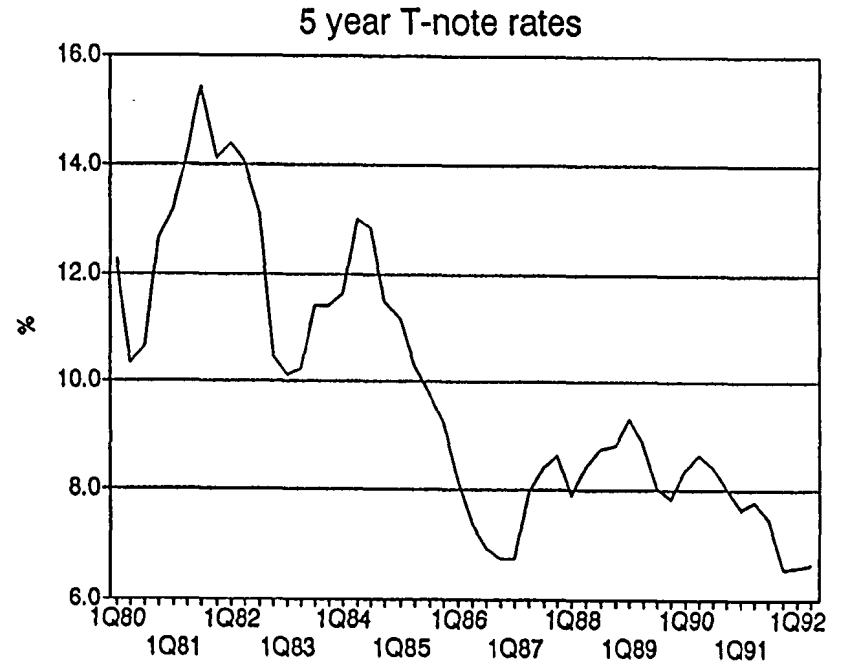
In 1991, employment saw a drastic decline in both blue- and white-collar jobs. The devastating impact to white-collar, middle-management employees made this recession different from the past recessions. If you look at the last two recessions, you can see that the similarity of the two is massive employment declines (Chart 1).

But, this is where the similarities end. The 1982 recession was a blue-collar recession with restructuring in the manufacturing sector.

High interest rates cushioned the effect of low recoveries and allowed for higher investment income for insurance companies.

Finally, the 1982 economic recovery was fueled by record job growth.

CHART 1
1982 vs. 1991 Recession



1982 Recession

- Decade of Consumption
- High Interest Rates
- Disinflation
- Record Job Growth
- Blue Collar Recession, Service Sector immune
- National Debt Explodes
- Economic Growth strong in the first part of the decade
- Flat Income Growth
- Restructuring of the Manufacturing industry

1991 Recession

- Decade of National Savings, Production, and Investment
- Low Interest Rates
- Disinflation
- Minimal Job Growth
- Broad Recession - Greater impact on White Collar
- National Debt has quadrupled since 1980
- Economic Growth weak
- Income Stagnation
- Restructuring of the Service sector

All these items support why those actuaries who looked for a pronounced influence from the economy on LTD just couldn't find it back in 1982.

On the other hand, the 1991 recession was a broad recession impacting both white-collar and blue-collar industries with the greater impact on white collar. Again, the economy has a long list of barriers to growth.

Corporate restructuring, minimal income growth and declining interest rates have had a significant impact, with the outcome being minimal economic growth and lackluster employment growth and little hope that LTD experience will rebound as it did in 1982.

Adding to the changing disability risk are the societal and demographic factors.

New disabilities, like AIDS and Epstein-Barr, are emerging.

Appreciation of personal life experiences versus acquisition of wealth from the 1980s runs contrary to risk assumptions that highly educated white-collar workers are inherently incented to return to gainful occupations.

The increase in the number of single parent households brings up secondary gain issues involving the family and leisure time.

Also delayed childbearing runs contrary to traditional risk assumptions concerning maternity ages as well as increasing the potential for medical complications.

One of the most important societal changes that we will be seeing is the aging of skilled workers. With the current social security retirement age increasing, and likely to increase further, more older workers will be covered by LTD.

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Job skills will be rapidly changing. An article in *Newsweek* told of unemployed workers taking classes to become welders. As the instructor of the class explained it: "Now we have unemployed welders."

Finally, the Americans with Disabilities Act civil rights legislation will enforce that employers make "reasonable accommodations"; I won't speculate yet on the impact of that act on disability experience.

So the disability valuation actuary cannot be satisfied by a black-box "here's the number" approach to setting reserves. And in setting those reserves, the valuation actuary must consider the current economic environment, the future expected environment, and the potential for deviations from any standard experience and the impact on future paid claims.

In checking the adequacy of group LTD reserves, the 1987 GLTD Valuation Table provides a solid foundation on which to calculate reserves. Standardly, the termination rates would be modified to reflect your own claim experience, your mix of business and your own benefit adjudication practices. But how might your own claim experience look in a recession?

You can make your own judgments on the possible claim experience in a recession. I would suggest you consider:

1. additional margins in the IBNR reserves to cover increased incidence: fluctuations from increased incidence can easily be 10% or more;
2. the additional expenses associated with benefit adjudication costs: as with incidence, the increased testing of the availability of LTD claims will produce additional pressures on benefit specialists;
3. and finally, the potential cost of the economically driven claims -- those claims that may be testing the availability of LTD benefits: in particular, what modifications to termination rates should be made?

Group LTD Reserve Methods

Consider:

- current and future economic environment
- potential for deviations

Modifications:

- additional IBNR margin
- additional benefit adjudication expenses
- additional case reserve cost of "economically driven" claims
 - what was in 1982 may not be in 1991
 - employment growth slow
 - no inflationary pressures

Notably, a potential miscalculation might occur were one to apply the experience from the 1982 recession to 1991: in 1982, the substantial employment growth assisted recoveries, giving the impression that economically driven claims could be valued assuming a higher rate of recovery. In other words, it looked like economically driven claims were, in general, short-term claims.

Contrary to the lesson of 1982, the 1991 recession has not seen the growth in employment. I would be hard-pressed to advise any significant deviation from the standard disability assumptions for these economically driven claims. In this case, economically driven claims may be just like any other long-term claim.

One final note, the high inflation of the early 1980s contributed to recoveries. Who could afford to remain on 60% of a salary, with purchasing power deteriorating at 10% to 14% each year? The high unemployment will keep inflation in check, and claimants will not be forced "financially" to recover.

Finally, I wanted to mention one tragic emerging trend -- the epidemic of AIDS.

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A total of 365,000 AIDS cases will be reported by the end of 1992, and one million people in the U.S. are currently infected with HIV.

Of course, the early work of Cowell and Hoskins provided the necessary modifications for disability as well as life reserves.

But the emergence of HIV+ coverage, or the potential of paying HIV+ claims under other types of disabilities needs to be fully considered. HIV+ claims may be appearing as mental/nervous claims, with claimants unable to stand the stress and strain of their lives.

This, and the emergence of new therapies requires vigilance for both the proper valuation as well as the proper pricing of AIDS and HIV+ disability claims. The current medication for AIDS reduces the risk of death by 35%, and approximately 40% to 75% of persons with AIDS are being treated.

AIDS and the cost of living adjustment (COLA) present an additional pricing dilemma. I have heard too often the mistaken premise that AIDS claims are presumed to be short-term in duration. Their high mortality rate might suggest this. But with the reduction in mortality rates for AIDS, the COLA provisions can be extremely expensive, as the expected duration of a claim increases.

In wrapping up this perspective, in terms of the future and the economy, we can expect a long slow recovery with a continued decline in employment due to corporate restructuring and an adverse impact on group LTD.

Interest rates are expected to continue to decline in an effort to stimulate spending; of course, this will also directly increase the cost of LTD.

With the "permanent" layoffs, recoveries may still continue to be hindered, with rehabilitation and early intervention efforts minimized.

I hope all this, combined with changing societal values and work ethics, challenges the valuation actuary in an attempt to best portray the true risk of disability.

