

**1995 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 12

Disability Income -- Individual

Robert W. Beal

Stephen J. Mitchell

Charles M. Waldron

DISABILITY INCOME -- INDIVIDUAL

MR. ROBERT W. BEAL: I'd like to introduce my panel. Chuck Waldron is a consulting actuary for Milliman & Robertson. His topic will be the adequacy of the Commissioners Individual Disability Table A (CIDA) actuarial reserve basis. A number of you have probably faced this issue in your work, and so we hope Chuck will give you some more insight.

Steve Mitchell is the group long-term disability (LTD) actuary at UNUM. That's right. I did say group. The reason I invited Steve is that UNUM has been very industrious in using its very sizable group claim database to develop claim reserves by diagnosis. Steve has had a lot of practical work in this area, and I think it's an area that many of us who have more or less specialized on the individual side could use.

When Steve and Chuck are done, I'm going to talk about measuring profitability for corporate reporting, specifically percent of premium and return on capital.

MR. STEPHEN J. MITCHELL: I want to speak primarily about classification systems for claim reserves. Bob mentioned, in particular, diagnosis. In setting up classification systems for your claim reserves, which vary claim reserves by particular characteristics, the process is much the same for group and individual disability. It's much the same whether you're doing it for diagnosis characteristics or product characteristics. I will talk about the process and the tools that you may have available to utilize for this process.

What is a classification system for claim reserves? It's varying your liability estimates by either your claimant characteristics, product characteristics, or customer characteristics.

Why would you want to do that? What would be the benefits of varying your claim liability? One benefit is, any time you can improve the estimate of your claim liability, you get a better measure of your claim costs. The second benefit is you can create liability measures that will shift with your mix

of business. If you establish your liabilities reflecting differences by product or diagnosis, as those characteristics in your block shift, your liability is going to shift automatically and prevent you from getting behind the eightball. A third benefit is in measuring experience for financial reporting, internal pricing, or internal management reports. You get a better measure of experience to the extent you can peg that liability, again, closer to the true claim cost. You get better information for any of the decision-making processes you're undertaking in your firm.

Let's discuss a few examples of the kind of classifications you might want to undertake if you're thinking about varying your claim reserves by particular characteristics. A very common approach is diagnosis based. There are a number of ways you can do this. Clearly, you can pick out some that are going to have very different patterns. AIDS claims and maternity claims are clearly two categories that behave much differently than the other diagnoses.

Another classification would be any product characteristics that you have. The scope of your product offerings, whether they be elimination periods or differing definitions of disability, is going to reflect different behaviors, and you may choose to recognize those in your classification system. For example, customer characteristics, whether they're by occupation or geographic region, may behave differently. Your classification system may recognize these differences in the claim termination rates.

What's the appropriate classification system for your block of business? That's going to depend a lot on two factors: the level of differentiation in your block and the magnitude of differences in claim experience that you observe. For example, if you sell one particular product that covers one event to one group, say small group cancer, you may not have enough variety to justify multiple classifications. If you have a wide variety of definitions of disability, elimination periods, and different markets (e.g., association markets and industries, employer group markets), your block may have many significantly different patterns of claim terminations.

The real-work of establishing a classification system can be broken into four phases. The first phase is data gathering. That's basically getting the information you're going to need. The second phase is analysis, the process of using the data to draw conclusions about which factors are impacting your termination rates and which ones to recognize. The third phase is implementation, creating the

infrastructure once you've determined what you want to do and putting those differences to work in your measurement system. The fourth is review and monitoring, which is basically the ongoing maintenance portion of keeping the classification system working.

I want to talk about each of these phases. In the data gathering phase, you can look to a variety of data sources. One key source should be any in-house experience you have on your own block from the various product designs and the termination experience that you're able to gather. A second source would be industry publications whether they be newsletters, articles, or Society of Actuaries tables, such as the CIDA table or the Group Long-Term Disability (GLTD) table. These tables provide at least some benchmarks you can use in your analysis. You may even find diagnosis-specific data. For AIDS, work within the Society, the Centers for Disease Control (CDC), and medical studies may give you some important data.

These data are going to fall into a couple of different categories. Some are going to be in the form of termination rate tables. Of course, those are going to be the most helpful for you to compare your own experience. Others are going to be much less specific. Usually in surveys, newsletters, or medical data, there might be just one or two relevant statistics, such as average duration. They are going to be more useful in a benchmarking exercise rather than giving you a whole stream of claim continuance experience.

Three issues that you will face during the data gathering phase are availability, quality, and credibility. First, were the relevant factors affecting termination rates captured on your database? The second issue is quality. How can you be assured that the data were captured appropriately and accurately? The third issue you may have with your data that hounds all of us is statistical credibility. Are there enough data collected to make any meaningful determinations?

When you enter the analysis phase, which is really the bulk of the work, you're really trying to answer two questions. You're trying to answer the question of which characteristics impact termination rates, and what's the magnitude of that impact?

1995 VALUATION ACTUARY SYMPOSIUM

Most of the tools you have available to you fall into the following categories. The first class of tools would be graphical. You use graphical views to see effects. You just chart it out to see what it looks like. The second class of tools would be actual-to-expected (A/E) termination rate studies that you could perform against some fixed benchmark. And the third would be statistical testing. There are statistics that are designed to test for homogeneity, the property of things being alike. They let you know when things seem to be diverging statistically, so you can figure out whether two sets of termination rates are significantly different.

I'd like to discuss the advantages and disadvantages of each category and the issues that may arise when you try to apply these techniques.

With regard to graphical analysis to understand the differences in termination rates, one advantage is, clearly, graphs are fairly easy to produce. Once you've captured the data and downloaded them in the personal computer (PC) environment these days, it's very easy to produce numerous graphs. However, there are disadvantages to using a graphical view. One, you have no relative ranking. You still don't know necessarily how important each difference is if you're doing a bunch of slices. When you're just graphing, you have no consideration of the size of the sample and, consequently, no measure of credibility. If you compare a graphic based on two or three claims, or two or three terminations, to one based on a thousand observations, you're just looking at one graph, it's not necessarily going to be clear which is more credible. You may see some relative effect, but it doesn't tell you how to recognize that magnitude. So you have to be careful when translating the impact on your claim reserves. Graphics, since they are easy, can provide you with some valuable information and some good estimating as to which factors seem significant in determining termination rates in your block. You can at least use them to hone the categories you might want to use for further study.

A/E termination rates are another class of tools that are very useful if you're trying to establish a classification system for your claim reserves. One advantage of this type of analysis is that sophisticated software is usually unnecessary. Whether on a quarterly basis or a yearly basis, many companies have some system they use to review their disability termination experience against their assumptions. So you're going to be able to use this system for another purpose. The other advantage

is it's going to suggest the magnitude of the effect. Unlike the graphic, it's going to give you information about the relative credibility around the different factors.

A disadvantage to A/E rates is the lack of specific relative rankings and absolute standards. It doesn't tell you that one factor is more important than another. Determining credibility is still an issue as well. But usually when you're doing an A/E run, you have some measure of exposure that's going to give you a relative weight of how much of a sample size you're looking at. For example, say that you had one fixed benchmark of termination rates, and you are comparing termination rates for two different elimination periods. An A/E analysis will allow you to look across claim durations. You will get some idea of the relative exposure that each piece has. You can see the ones clearly comprised of only one or two claims versus a real credible size sample. It also gives you some idea through the A/E ratios of the magnitude of the differences that you experience, unlike the graphical approach.

The third class of tools is statistical testing. There's a couple of different statistics that are designed for testing homogeneity. One of them is the Wilcoxon Statistic. Another one is called a Log Rank Wilcoxon. The advantage of these is that they compress the results to a single number, and given the distribution of that number, whether it's chi squared or whatever, you have some basis of interpretation. The disadvantages of this approach is that you need some pretty sophisticated software to support the analysis. I would doubt that a lot of us have in our tool box, or on our Excel spreadsheets, nonparametric tests for homogeneity, unless you have a lot of free time on your hands. The second disadvantage is that you do need to get some statistical knowledge on when to apply the test and how to interpret the results. But they are a powerful class of tools, and I think that in a lot of circumstances they can provide some real insight.

As I said earlier, the analysis portion of using the tools is where the bulk of the work occurs. The implementation can also be significant work depending on what you come up with. It's really during the analysis phase that you're going to make choices about which variables to recognize, for example, which product forms or diagnoses. You're also going to determine the magnitude of those effects and choose the level of differentiation to recognize.

1995 VALUATION ACTUARY SYMPOSIUM

The next phase is implementation. The key thing with implementation is to make sure the classification system dovetails with your current claim reserving system. To do this, you can take one of a variety of approaches. If you're using a standard table, such as the CIDA, GLTD, or Commissioners Disability Table (CDT), you may choose a factor approach with higher factors for diagnoses with higher death rates or higher recovery rates, and lower factors for the chronic disabilities. You could also use this factor approach even if you have your own aggregate experience table that you've constructed. You could use separate factors for recognizing any diagnosis, product form, or regional differences.

Another approach would be to construct separate tables. Unfortunately this approach gets complicated fast if you decide to make a variety of splits. If you reflect diagnosis differences and then layer on top of some product form differences, your system can get fairly complex. You might find yourself wanting to use some combination of the factor approach along with separate tables. You might have separate tables for major diagnoses, but then you use factors to reflect differences in the elimination periods, or definitions of disability.

The last phase is the ongoing maintenance phase. Once you have established your classification system, it will need to be updated from time to time. The best way to do this is to monitor the A/E termination rates periodically to verify that expectations are holding. This will provide your first clue if things are not going according to your expected benchmark.

Another aspect to the maintenance phase is thinking about new factors that could be impacting your termination rates. For example, such factors could result from changes in your product mix, changes in the external environment, or entrance in a new market with a more liberal or stringent definition of disability.

A third item in the maintenance is the monitoring of a miscellaneous category for new developments. Whenever I develop a classification system, my rule is always to leave a miscellaneous category. There may be three specifically defined categories, and then an all-other category. This other bucket includes everything that doesn't fall into the other ones. You keep looking at the all-other category to see if something material develops. For example, if you had established three or four diagnoses

categories, you might have in addition an all-other category. In this all-other category, you might have seen recently a lot of chronic fatigue claims develop. That's the kind of thing you want to scan for. When one of these new developments becomes a material portion of your all-other category, you might want to consider creating its own specific category within your classification system.

In summary, I've tried to lay out a number of elements of the process, and some of the tools that are available to you, if you choose to create a classification system for your claim reserves. You do need to make an investment. It's a time-consuming exercise, but it does afford you better information for making decisions. Believe me, it can be a very worthwhile investment.

MR. CHARLES M. WALDRON: As Bob told you, my portion of the presentation is to discuss the 1985 CIDA in the context of reserve adequacies. Since this is a valuation actuaries symposium, I thought that might be a nice slant to take. To really do a thorough job, I probably needed to develop an intercompany study, commission people to manipulate the data, and develop mathematical techniques that remove the statistical anomalies, without losing the underlying morbidity trend. I could then submit that work to review by the industry, solicit comments, get the feedback, incorporate the influential comments and publish the material all on time so that it could get the legal review to be included at this meeting. Since Bob called me yesterday, I didn't think I would have quite enough time to get all that done. Therefore, you won't find that I did the intercompany study. What I did do, however, was open the lower drawer of my desk and pull out a lot of data that I had collected over the last year as a consultant, and pulled them all together into two presentations. I made sure there was no one company that dominated the data and certainly made sure a company couldn't be identified. Then I put together a bunch of charts.

In my review, I'm going to try to cover four topics. I will talk a little bit about the incidence rates, the termination rates, the disabled life reserves, and the active life reserves. I even have some calculations of reserves in here that you can take a look at. The nice thing about this is, I'm not very good with numbers, so you won't see too many of them. As you might expect, what you're going to end up seeing here is the 1985 CIDA. If you use it unadjusted, it may be appropriate for some companies, and, of course, inappropriate for others. We'll also look at the financial effects of the

1995 VALUATION ACTUARY SYMPOSIUM

block of claims and policies that would be used if those policies were representative of true experience.

I'm going to use the word *study* because I couldn't think of a better one, but this is really a review. I would not consider it to be a rigorous actuarial study. The study period was 1991 to 1994. There are bits of data from all kinds of sources. There were approximately 4,000 claims in my study, and there were quite a few policies. I forgot to count them, so I can't tell you exactly how many there were. Since 1994 is fairly recent, I had to impute incurred but not reported (IBNR). So I looked at IBNR from the three previous years of actual business, and assumed that 1994 would come in looking very similar, and I imputed that into the numbers.

I have a variety of benefits that were being offered in the study. It's not exactly homogenous. A cost of living adjustment (COLA) and partial payments from residuals are included. People who have had own occupation versus not are also mixed in. Even policies issued as a result of a guaranteed insurability option or future insurance option are included. Multilife underwriting and sales were also mixed in. I can't tell you the percentages because I don't know that.

The policies in the data were not issued earlier than 1965, and I found none later than 1994. So I felt that was pretty good. I felt the sample size was not large enough really to take a rigorous look at the business segmented by issue year. Although I did look at experience by issue year, I didn't bring it along with me. To give you an idea for those of you who might be interested in that experience, there seems to be in these data a definite demarcation around 1984 that shows that the business issued before that seems to do better than the business issued after that. I have talked with some companies that say that trend has turned around somewhere around 1990. So that the business data after 1990 aren't as bad as what occurred before that if you ignore the pre-1984 period. My data were inconclusive on that, and I could not tell if improvement had occurred.

As you can get a sense, I have a lot of disclaimers and limitations. It's not a definitive study, I don't believe. For example, if a claim had a lump-sum settlement, it was treated as a termination at that point without adjustment. The breaks in a total disability claim for residual or just an open period of time in which no benefits were paid was basically ignored. It was assumed to be a continuing

DISABILITY INCOME -- INDIVIDUAL

disability. As I said, it's not a terribly homogeneous group of benefits. In looking at that data by contributing company, there were a few benefits that were significantly different from the others.

Chart 1 shows A/E incidence ratios where the expected rates are based on the CIDA tables. Conventional wisdom has suggested that the industry was experiencing lower incidence rates than the 1985 CIDA would indicate. As you can see, Chart 1 doesn't really support that in a real general sense. Each one of the lines in Chart 1 represents a separate elimination period. You'll note the highest one is the 90-day elimination period. I have some thoughts on that. At first you'd think the 90-day has the poorest experience. I'm not sure that's necessarily true. It could be what I call the elimination period effect that's in the 1985 CIDA. The 1985 CIDA might be slightly optimistic. For those of you who may not be aware of it, a person disabled for 90 days and who has a 90-day elimination period is a lot less likely to recover than somebody who had a 30-day elimination period. It has something to do with being able to receive benefits sooner, and hence, the individual can stay out a little longer. That is a form of antiselection of the business.

What's interesting is that the 60-day elimination period looks very good. That could also probably be the same effect because the 1985 CIDA uses the 30-day table to generate the 60-day incidence rates. The other interesting thing that you note here is the A/E ratio by age. The magic age is somewhere around 40-45 where the rates are higher at the younger ages relative to the 1985 CIDA, then they become lower at the older ages.

Chart 2 shows trends in incidence rates in each year 1991, 1992, 1993, and 1994. There seems to be a decided trend downward in the A/E incidence ratios. The year 1991 was the worst. The year 1994 appears to be the best though we want to be a little careful. It could be my IBNR adjustment skewing the results. What interested me the most was the youngest age at 25. There are not many claims at that age, but 1993 and 1994 had a dramatic difference from 1991 and 1992. I don't really have a good reason for the change, but I can guess, and I'll take the liberty of doing that. Along about 1991 and probably earlier, I think, companies started doing quite a bit of income verification. And so the high flyers could no longer beef up their income levels. The income verification found

CHART 1

**Male
Actual/Expected Incidence Rates**

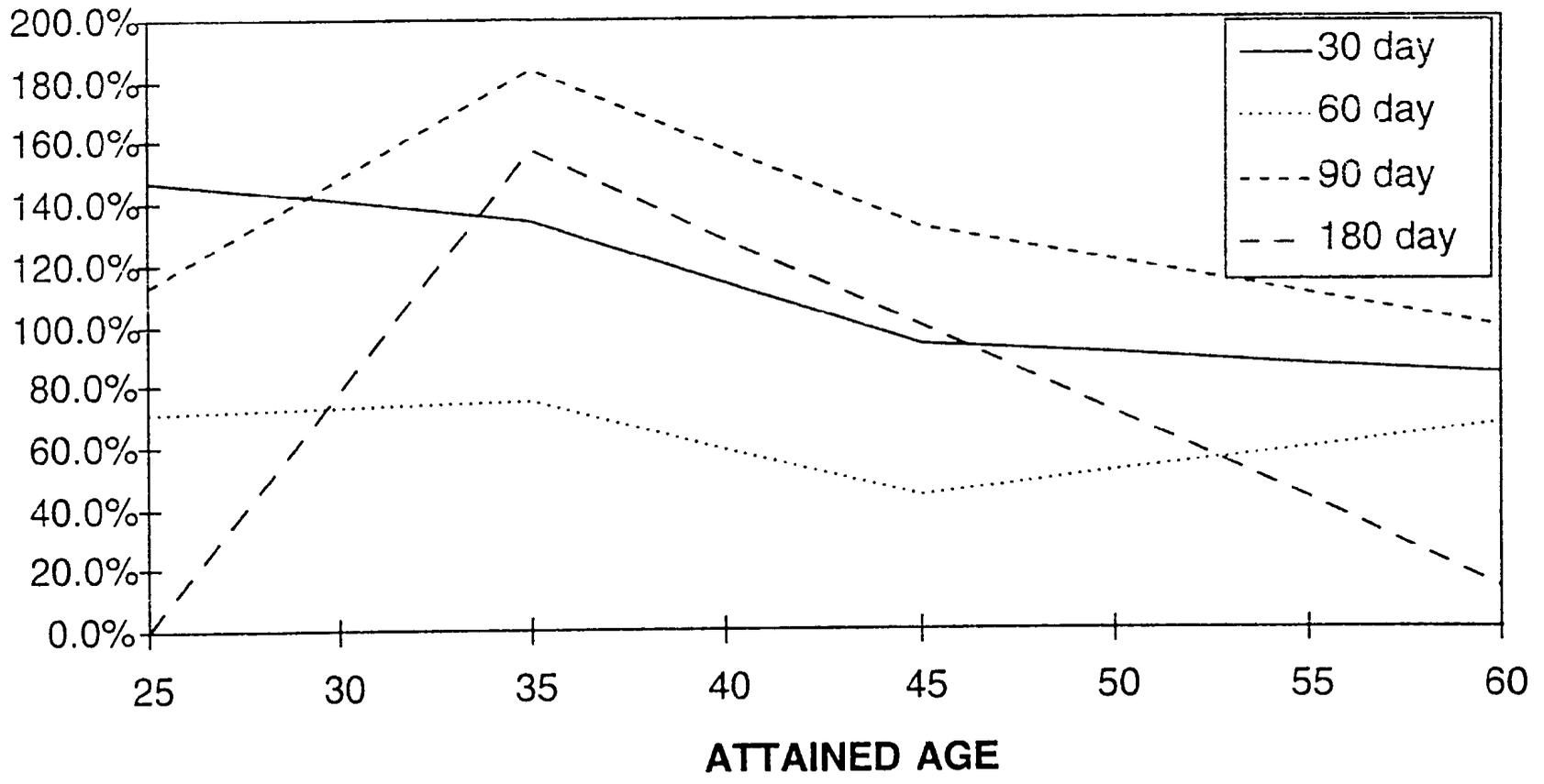
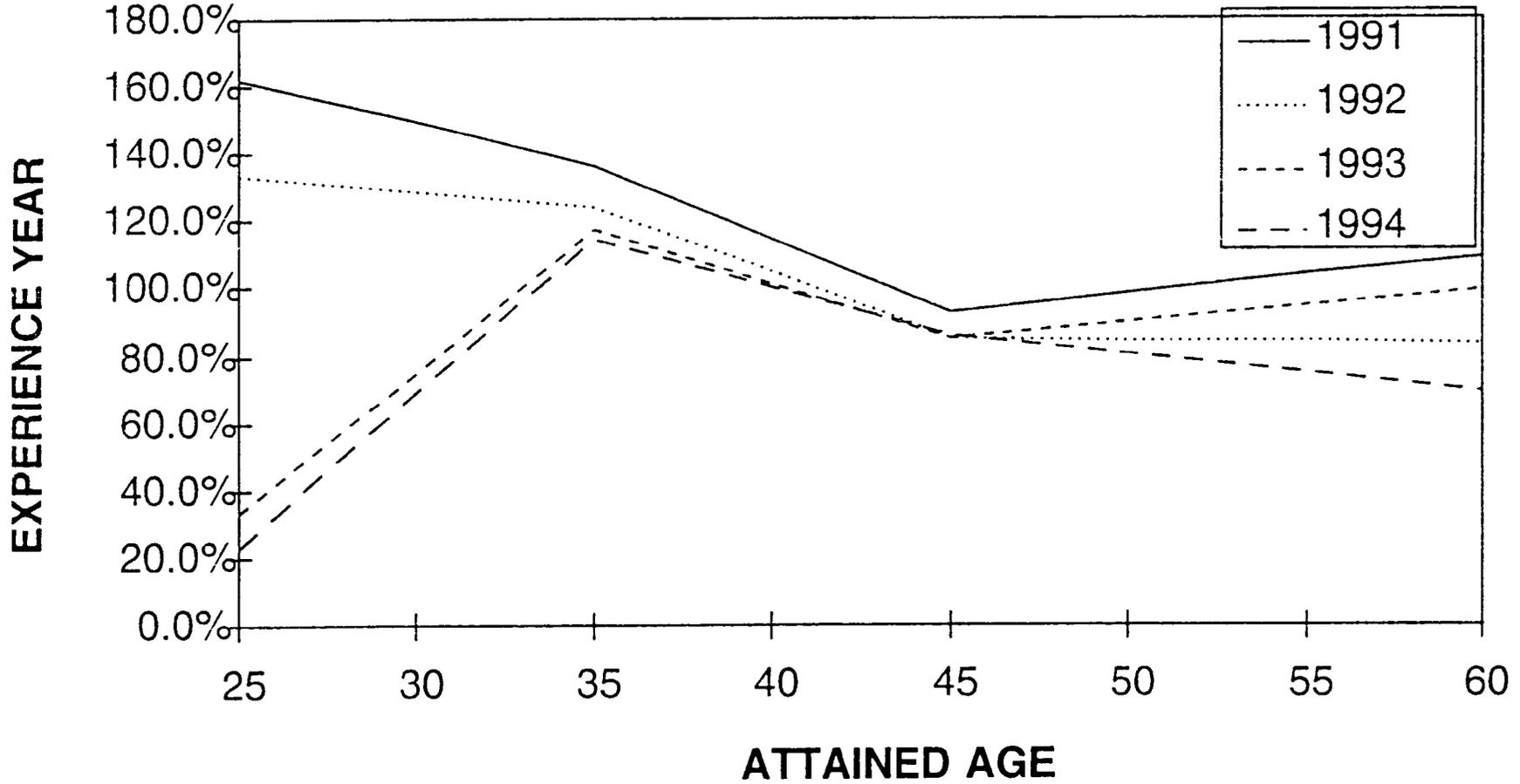


CHART 2

Male
Actual/Expected Incidence Rates



1995 VALUATION ACTUARY SYMPOSIUM

that incomes were inflated and checking eliminated the antiselection that was going on due to income. This switch could be explained by that. A second cause may be the economy has changed. Consequently, there probably aren't as many youngsters earning those kind of high incomes anymore.

The experience so far is for males. How does female experience look? Charts 3 and 4 show the same information as we did for males. Relative to the CIDA, female experience is a little better, except at the younger ages. The ratio by age is similar. The younger ages just seem to be higher. The 30-day and 90-day switch places as you get over age 45. I think that's suggesting that pregnancy and childbirth claims are more relevant here, particularly for the 30-day elimination period. And, of course, the 60-day elimination period, again, wound up to be the best.

As for the trend, the female experience is essentially similar to the male experience, but with a much narrower range. You would have thought it might have spread out because, in general, the population of the policies was heavily weighted towards male. Females are a smaller group, and you would expect more variability and a wider band. A fairly narrow band emerged.

That seems to be what's going on with the incidence rates in the material I had. Now, let's take a look at some termination rates fairly quickly. Chart 5 shows termination rates in the first 12 months of disability. Here, I combined the male and female because it gets pretty difficult to get meaningful data due to the lack of volume. You can see that termination rates, in general, are higher on the 1985 CIDA than they were in my study group. I don't think that's any revelation to anybody. What I found interesting is that for the very short durations, it's dramatically different. It gets pretty wide. It's almost 40% fewer terminations in the very first month than the 1985 CIDA had. It looks like they come together in this chart, but it's really about 90% of the other number once you get out one year or so.

In order to see that spread after one year, I used the trick of changing the scale to widen it in Chart 6. It's now per thousand, so that you could see a big gap. In this chart we are into the second year after disability, and going out through the 24th month. You can see the termination rates track down

CHART 3

**Female
Actual/Expected Incidence Rates**

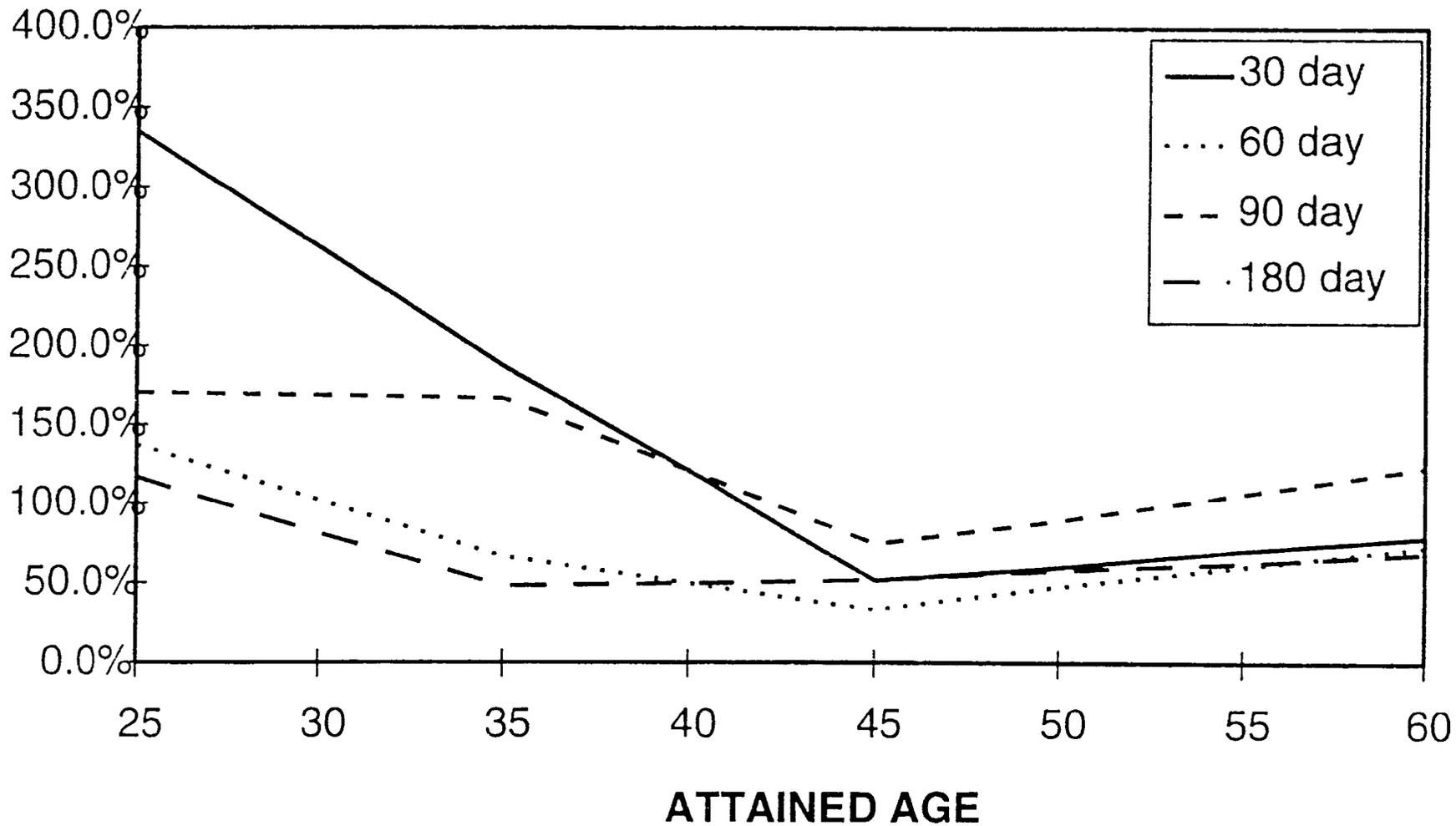


CHART 4

**Female
Actual/Expected Incidence Rates**

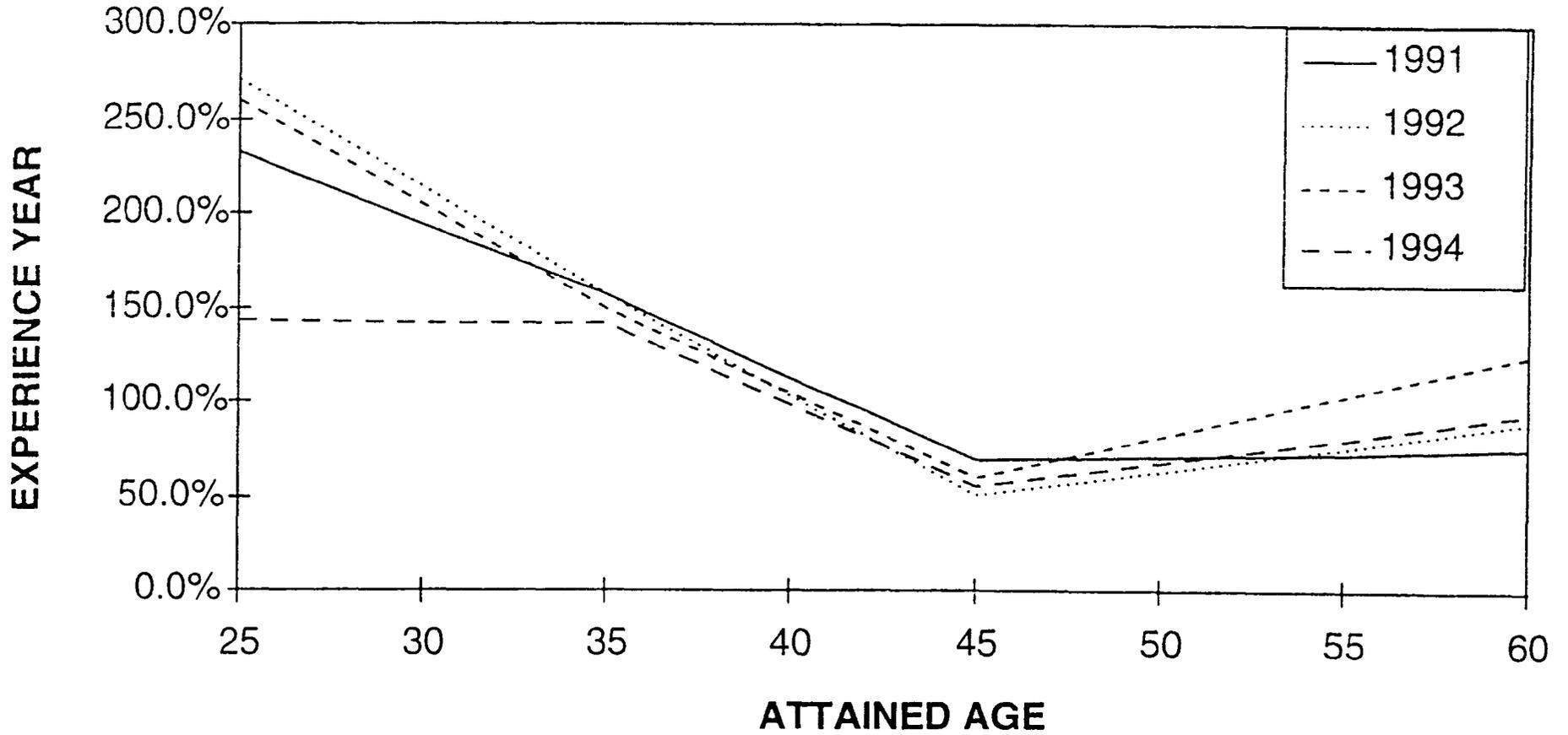


CHART 5

Term Rates: Months 1-12

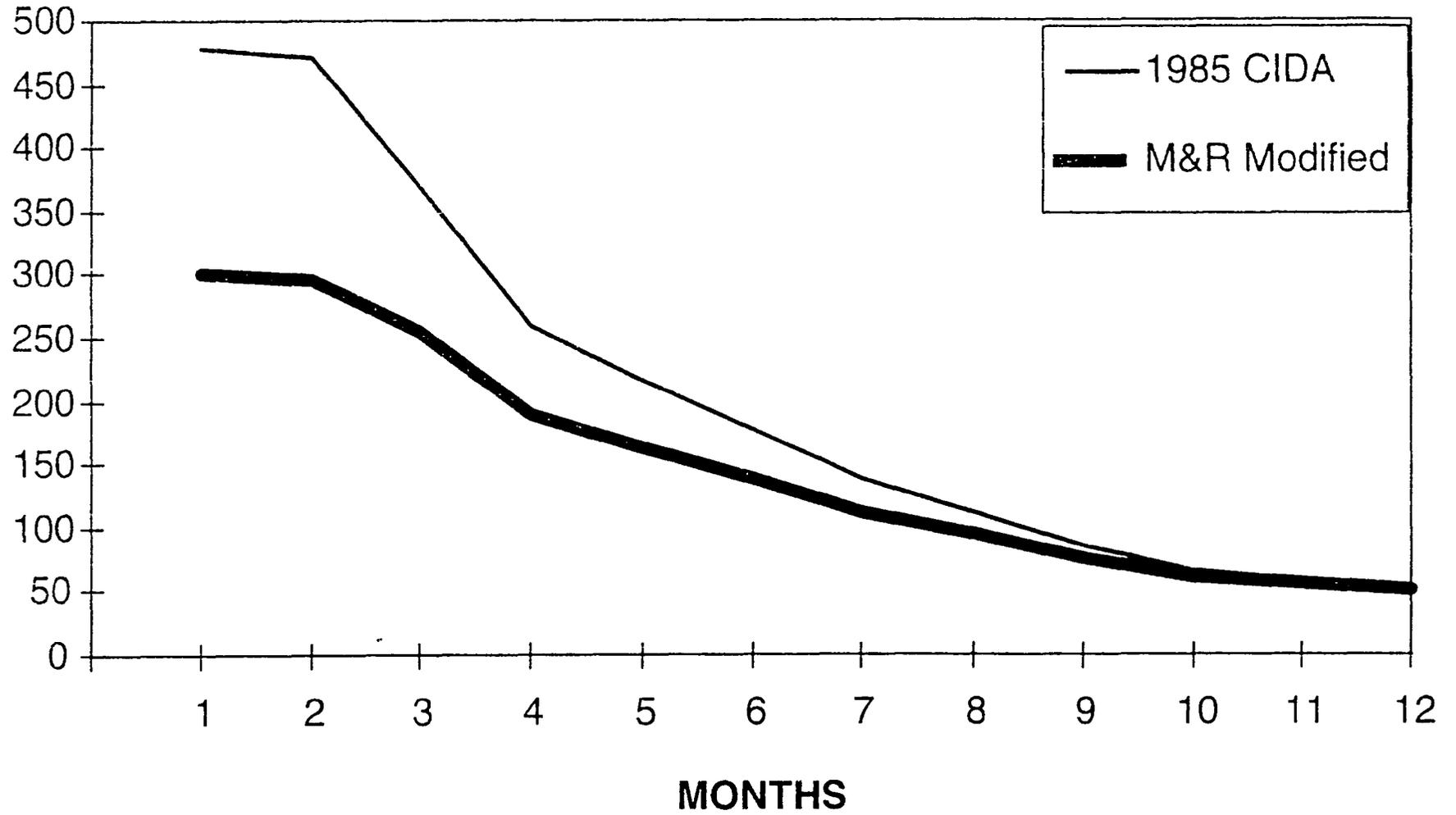
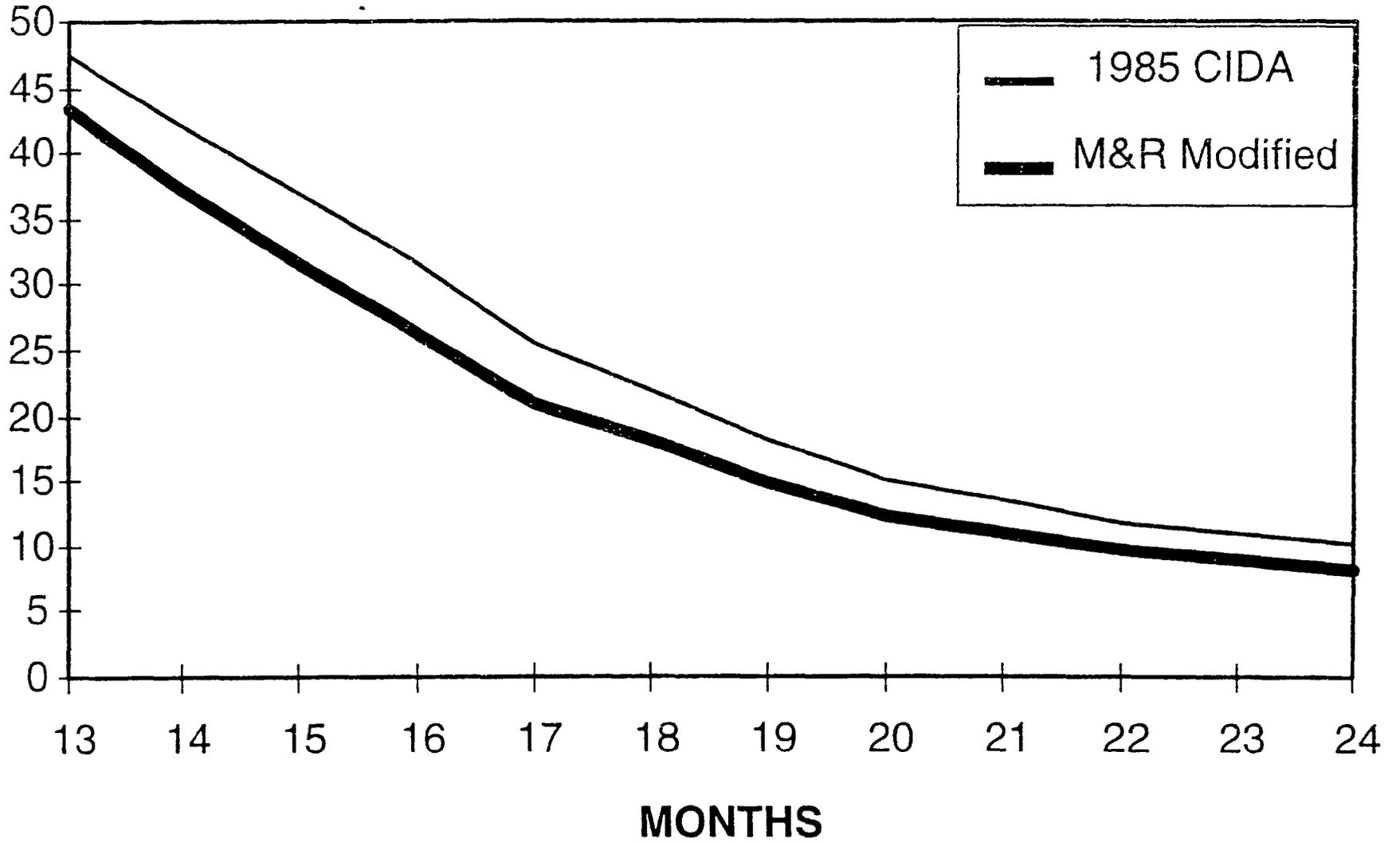


CHART 6

Term Rates: Months 13-24



DISABILITY INCOME -- INDIVIDUAL

pretty consistently. Part of that has to do with the fact that I did do some smoothing. Otherwise, the first time I graphed it, you couldn't tell much.

The modified termination rates in Chart 6 have been smoothed considerably. The reason behind the smoothing is the data just became so thin. The data become so thin out there that you really can't tell much, and I was trying to see some trend. It also helped me later on, when I go to calculate my reserves. I don't get funny answers on the actual numbers.

In the earlier months of the second year, there are some companies that have higher than the 1985 CIDA termination rates. When I combined experience from all companies together, I did not get that result.

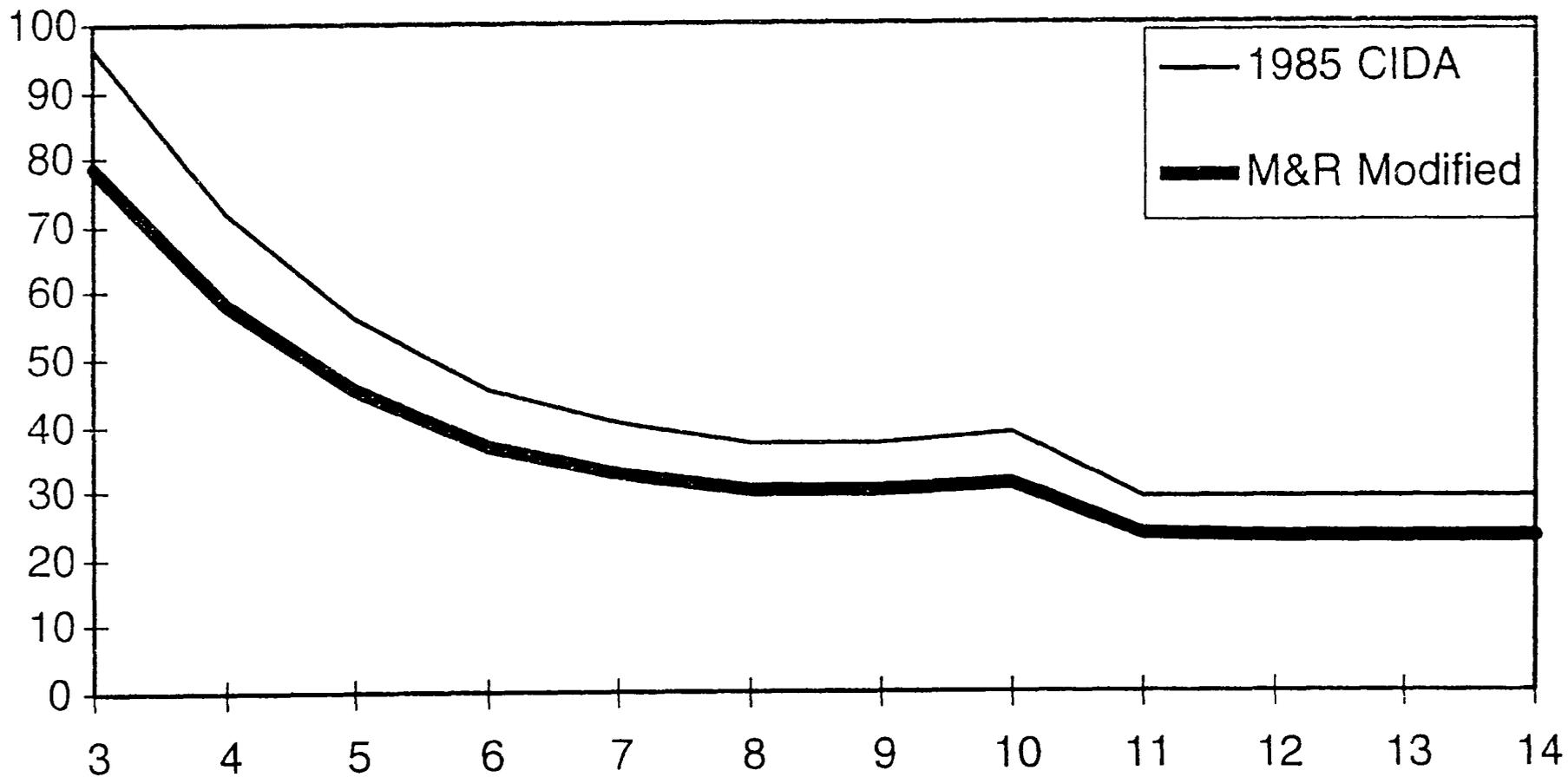
Chart 7 shows termination rates for years three to 14. Again, the modified termination rates were smoothed considerably. Termination rates remain lower and never really catch up. So it looks like termination rates even out through the tenth year are lower than the 1985 CIDA. Probably both claims out there just aren't terminating.

The next series of Charts I have show disabled life reserves for \$100 of monthly benefit. What I'm doing in the charts is calculating disabled life reserves on two bases. One uses the unadjusted CIDA table, and the other uses the modified termination rates from the study. The reserves that I have calculated here are for males, age at disability, 45, with a 90-day elimination period and to age 65 benefit period. I used 4.5% discount rate, which I think valuation actuaries understand as a nice number these days.

Since my population is a variety of people and an aggregate of all occupational classifications, I had to come up with something for the unadjusted CIDA. I didn't particularly want to have to go case by case all the way through the population and figure out which occupation class the person should have been. So I used CIDA occupational class two as a proxy to represent the aggregate occupational classification of my group so that we'd come close to having an apples-to-apples

CHART 7

Term Rates: Years 3-14



DISABILITY INCOME -- INDIVIDUAL

comparison. Not surprisingly, disabled life reserves, in the first twelve months, probably should be higher than what the unadjusted 1985 CIDA would tell you.

Chart 8 shows that, at the real short durations, the 1985 CIDA seems to be significantly weak for disability income. Again, it assumes that the population I have is representative of industry information or, for that matter, your population. It continues to decrease as the duration of disability increases. In fact, it's nearly double the CIDA at the one month mark.

The second year shown in Chart 9 is characterized by increasing reserve values throughout the period, the same as the first year. Once I plotted that, I said, "Well, that doesn't tell me much, and the values seem to track nicely." What's interesting though, if you take a look at this, the modified reserves, which are based on termination rates from my population, peak at the 24th month. That's the highest value. After that, it starts downward. The unadjusted CIDA continues upward and doesn't peak until about the fourth or fifth year. I think it's the fourth year on this one. The gap is going to continue to narrow until we get all the way out to the end.

Chart 10 shows years three through ten. You can see how the modified CIDA peaked and started down. The CIDA rises a little bit. Again, the ratio continues to narrow and will continue to do that. You can extrapolate from there beyond the tenth year if you want. All the way to age 65, the data are going to narrow and finally come together at age 65. I can assure you in the table they did, so I'm hoping that will work. This is a rather uneventful number, I think.

Active life reserves, however, are a little different story. I don't think they're quite so uneventful. You saw the incidence rates, at the younger ages, particularly. So, are we going to get the same consistent results? Again, I used the male, 90 day, to age 65, at 4.5% and the CIDA class two. I used, again, the unadjusted CIDA versus the modified table. First look at issue age 25 in Chart 11. I was very pleased to see this thing start out at zero and end at zero.

The active life reserves in Chart 12 for issue age 35 are always lower for the modified table. So even though the incidence rates were a little higher, the better experience at the higher ages in my table

CHART 8

Disabled Life Reserves: Months 1-12

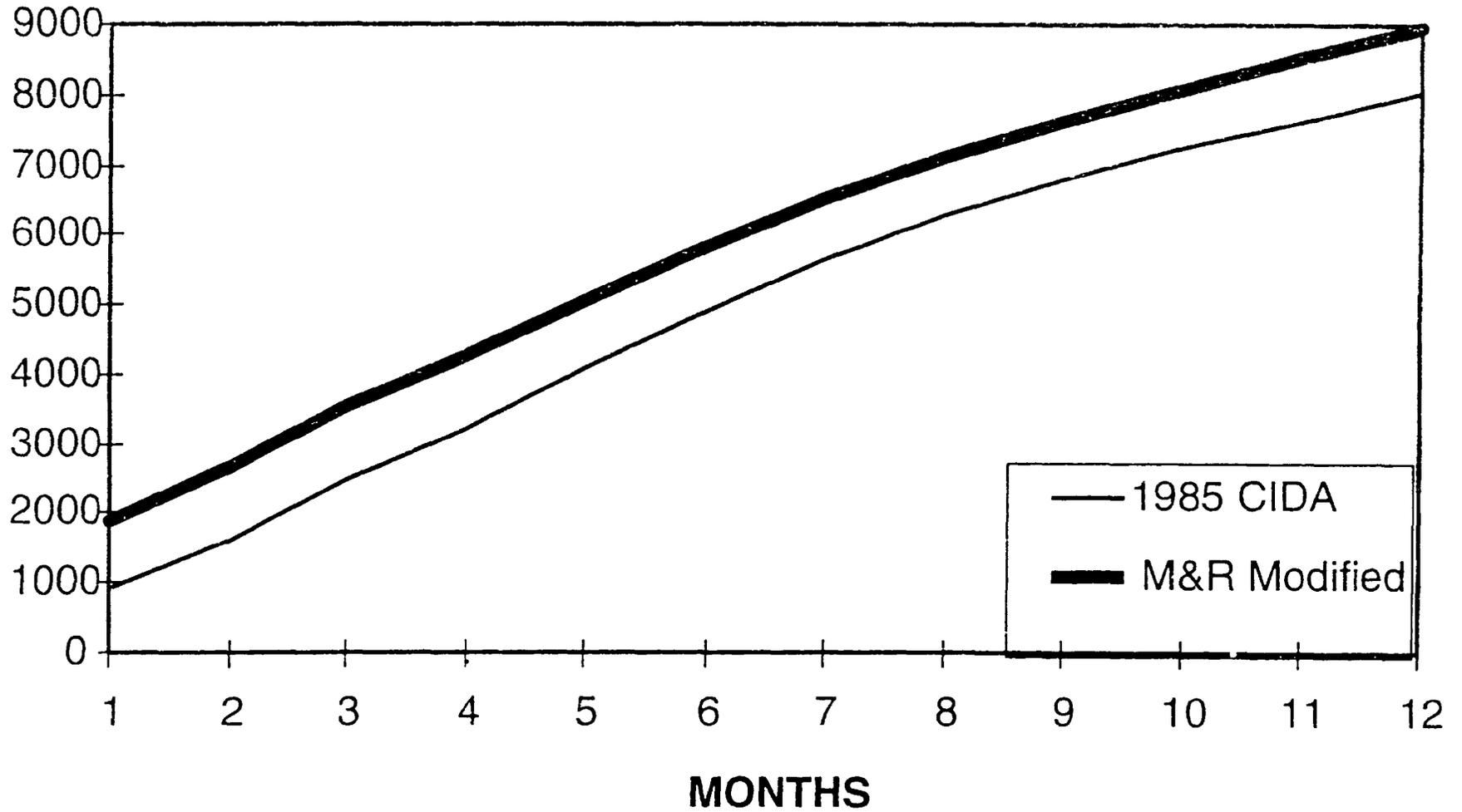


CHART 9

Disabled Life Reserves: Months 13-24

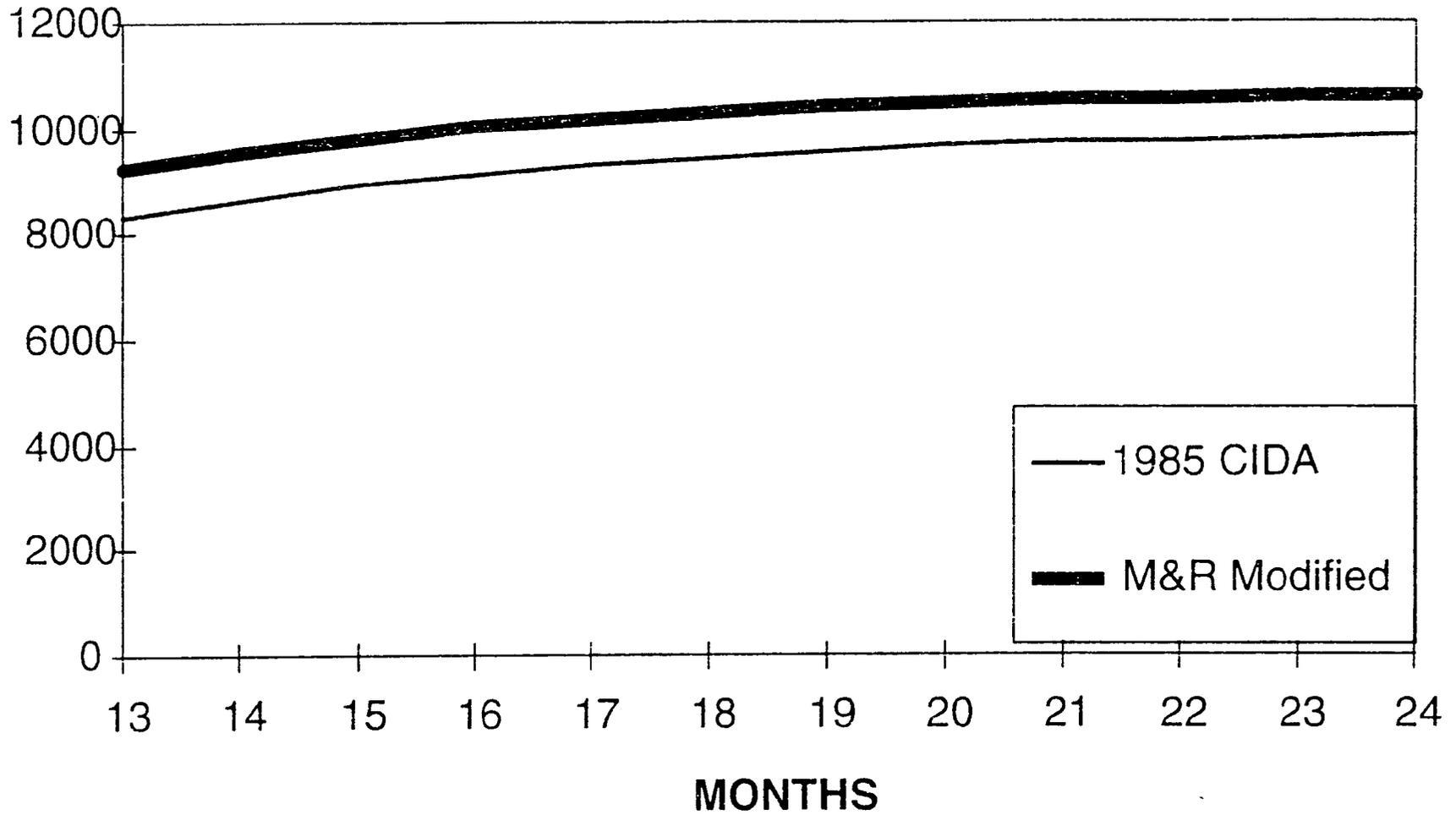


CHART 10

Disabled Life Reserves: Years 3-10

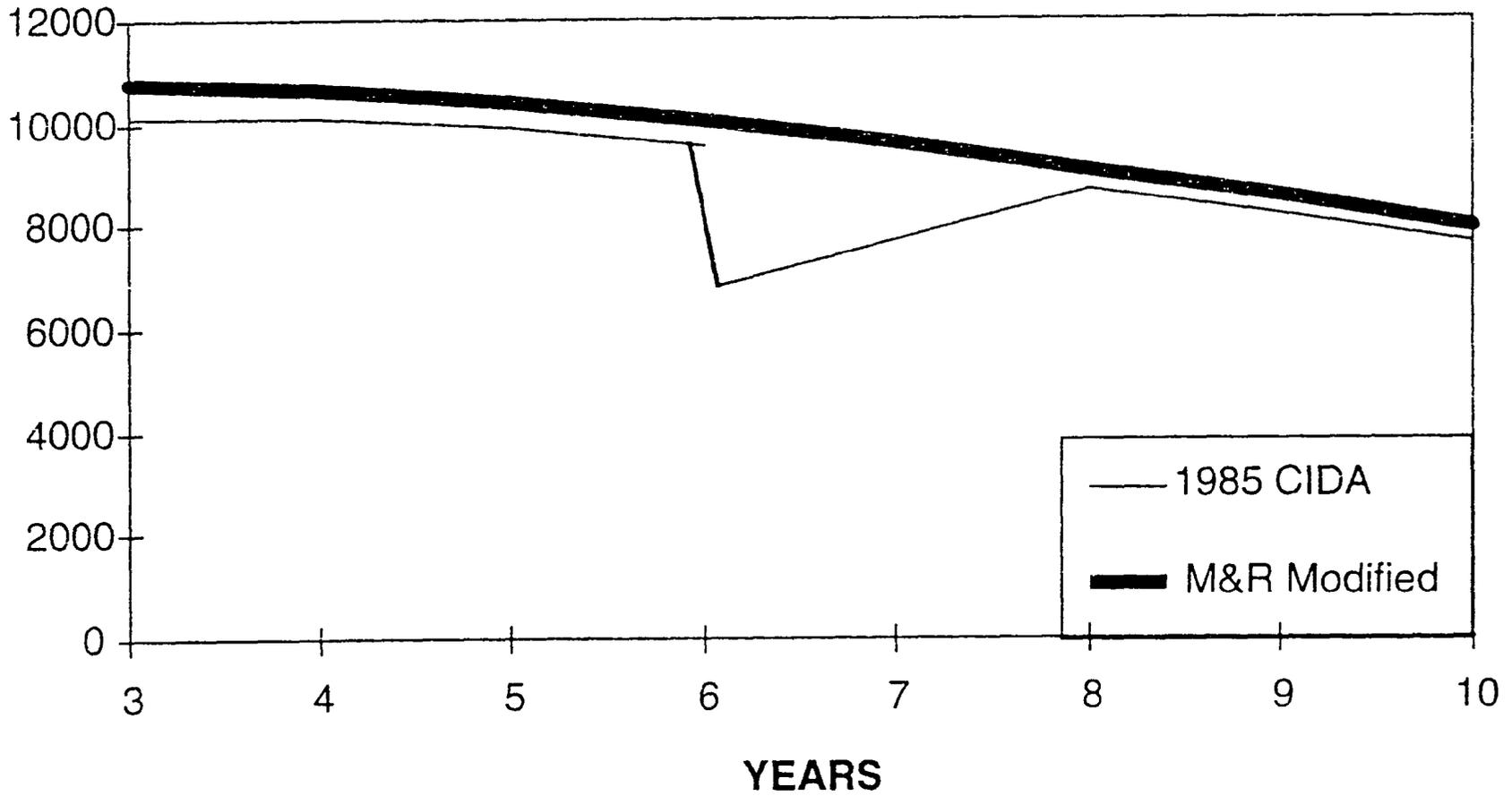


CHART 11

Active Life Reserves: Issue Age 25

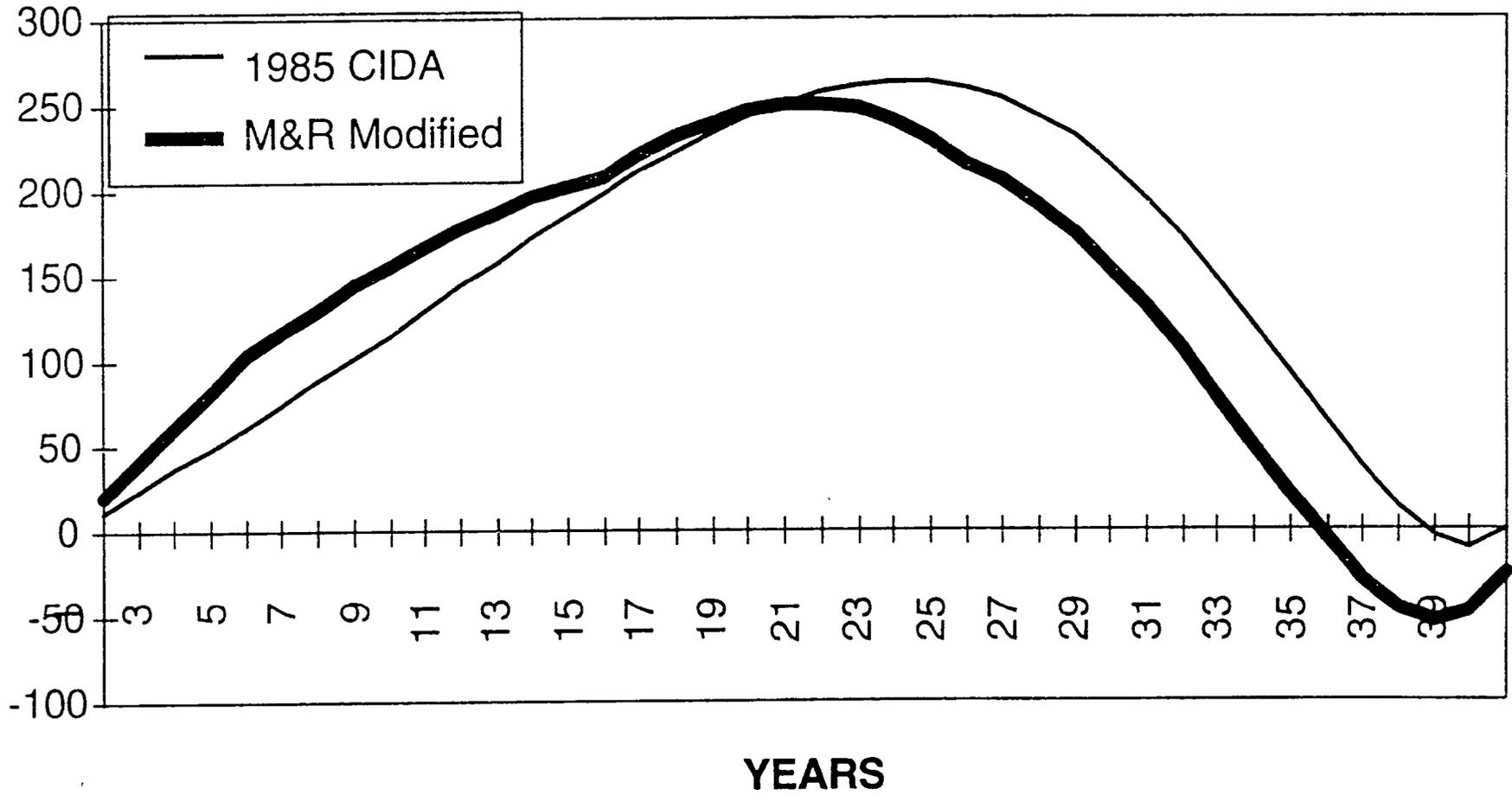
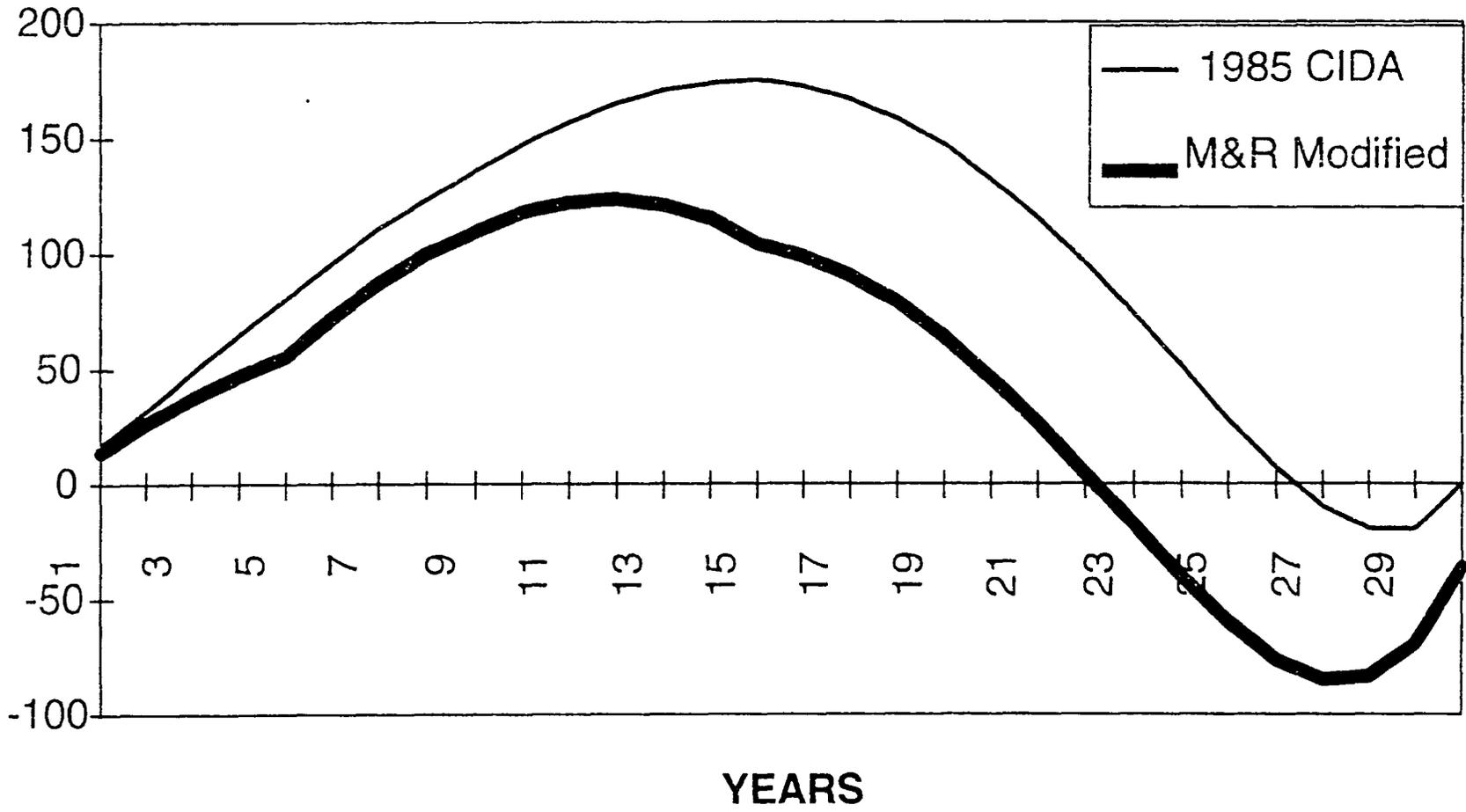


CHART 12

Active Life Reserves: Issue Age 35



DISABILITY INCOME -- INDIVIDUAL

came through. It's also interesting that in the last eight years of the policy in force, the numbers would actually be negative. With the unadjusted CIDA, it's only about three years to three and a half years, if you want to interpolate. At age 45 (see Chart 13), it gets even more interesting. The peak of the active life reserve is only twelve dollars. It turns negative by the end of the seventh year, and gets quite negative. And, of course, at age 55 (see Chart 14), both the unadjusted CIDA and the one based on the modified table are negative from the beginning of time. But the modified table active life reserves are a deeper negative.

So what does that tell me? It tells me that, if I have a reasonable distribution of issue ages, I shouldn't have too many of the very young ages, or the under age 35. I think the most typical average issue age is in excess of 35 for this product. It probably tells me active life reserves calculated on the unadjusted CIDA will probably be fine.

These are the three things I hope you get out of this presentation. First, the disabled life reserves based on unadjusted CIDA may be weak. Second, my termination rates are probably always going to be less than the 1985 CIDA. Third, my active life reserves are probably strong, particularly, if I'm testing my adequacy by sticking lapse rates in, which I did not do here. It is quite possible that even at issue age 25, the active life reserves are redundant. Of course, with the active life reserves, the mix of your business is going to be pretty important. If you were to specialize in people at ages 25 and under, using the unadjusted CIDA would not be appropriate. In fact, you might even be a little worried if you're issuing mainly under age 35.

Of course, I'm still convinced company variations warrant individual review. As I mentioned, the data come from a number of different blocks of business. There are variations in incidence rates that were much greater across the block, and so you want to be really careful in what you're looking at.

While claim terminations for each company were overall consistently lower than what the 1985 CIDA would suggest, they were quite different even within the various time periods following disability. So while even though your company has overall termination rates lower than CIDA, you want to be careful looking at where that occurred during the period of disability after the onset. Because the mix

CHART 13

Active Life Reserves: Issue Age 45

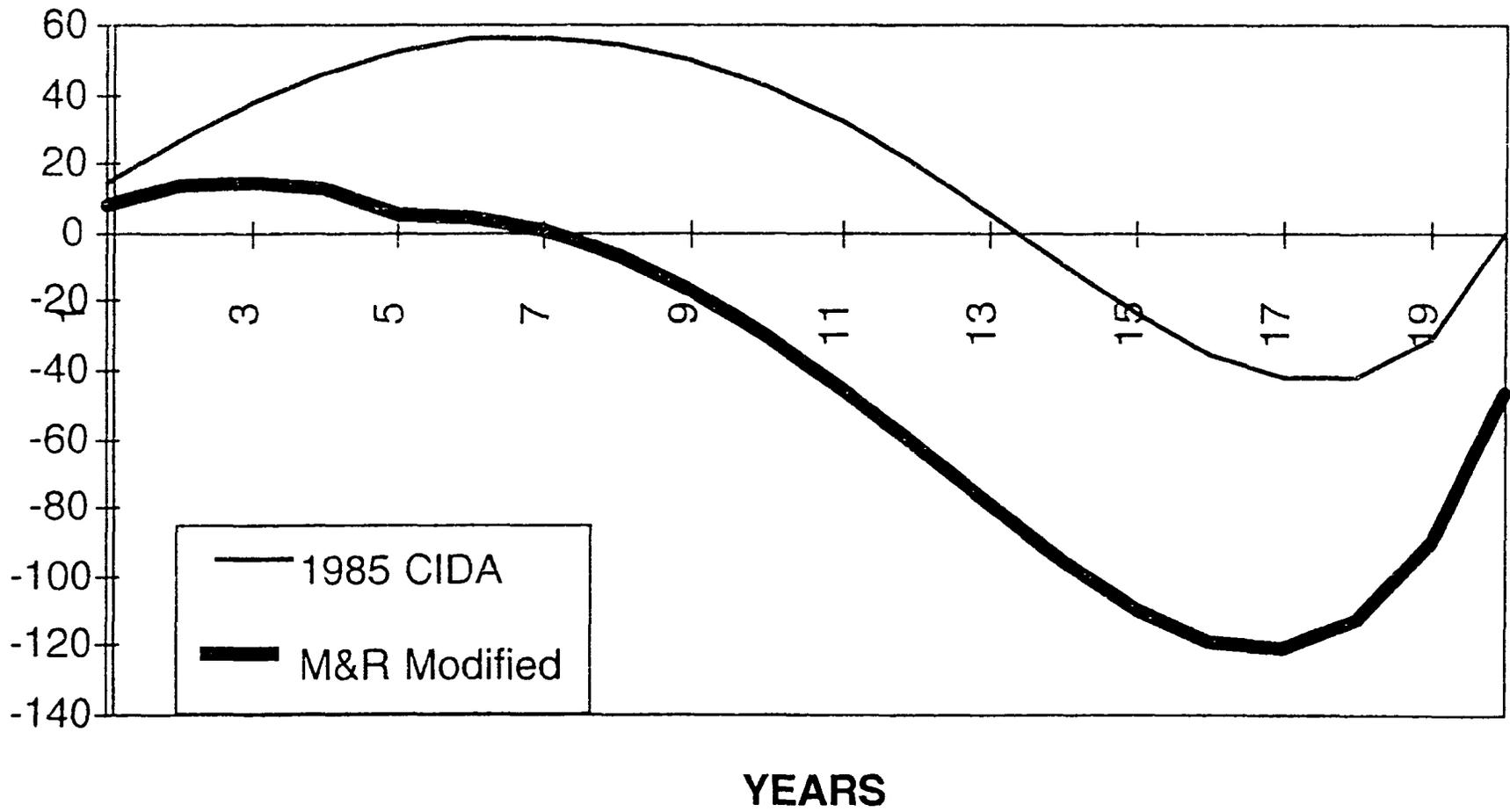
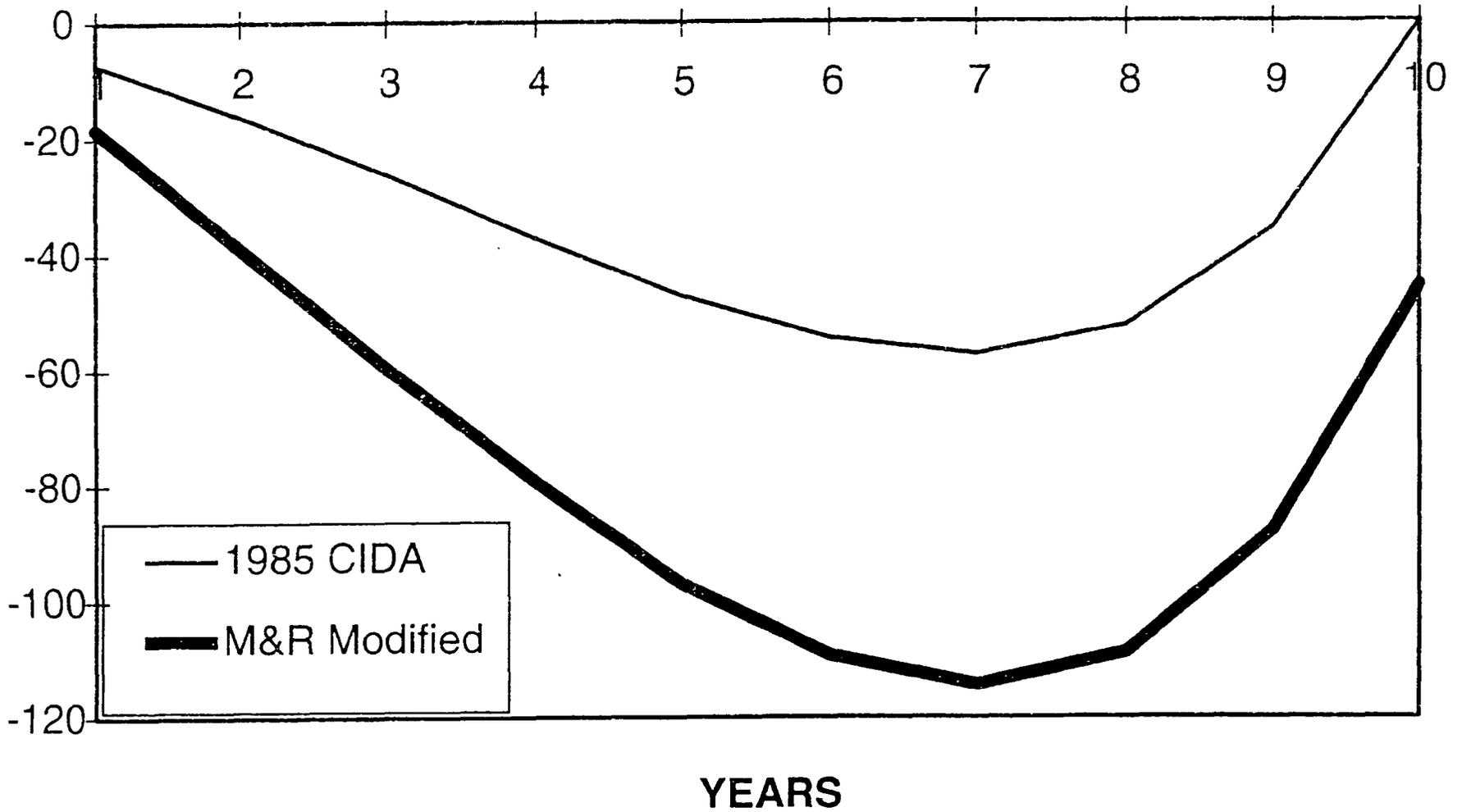


CHART 14

Active Life Reserves: Issue Age 55



1995 VALUATION ACTUARY SYMPOSIUM

of claims are generally up in the short end of duration, you still could be having a problem. And last, having listened to Steve, diagnosis might be one consideration you want to put in to your calculations.

MR. BEAL: As I mentioned earlier, my topic is measuring the profitability of individual disability income within our corporate financial reporting. Considering the financial results of the disability income business over the last decade and some of the more dramatic events that have happened in the last year or two, I would say this subject may be one of the more academic topics. But we should be prepared for the day when profitability in some form finally arrives.

In fact, that leads to a big question. Will we recognize profitable disability income business when we see it? Some day it may arrive. If it does, will our corporate reporting methodologies give us incorrect or misguided information? So, my objective is twofold. First, I'd like to look at the various ways disability income profitability is being measured by a number of companies today. Second, I would like to discuss two ways of relating reporting profitability to pricing profitability: percent of premium and return on capital. They are certainly not new concepts, but actually I'm surprised at how little they are used by companies. So it may be worth the review.

Before discussing the different types of profit measurements used by companies, let's look at the factors that affect how disability income profits are measured. First, is the accounting methodology, statutory, GAAP, and occasionally value-added accounting. A lot of mutual companies and some of the wholly owned stock companies rely solely upon statutory accounting, and they have gotten along famously with it. A majority of these companies now are having to implement GAAP accounting, and one day soon they will probably find themselves relying on GAAP more than statutory.

The second factor is whether or not the company is publicly owned. When a company must release its financial earnings quarterly and be reviewed by investment analysts, it begins to talk and think in the same terms that the investment analysts do, for example, price to earnings and earnings per share. It may be completely contrary to the way the company has analyzed its business in the past, but the company is thrust into it. In the same light, the rating agencies also force companies to think in a

DISABILITY INCOME -- INDIVIDUAL

certain way. The rating agencies may be so concerned with surplus and balance sheet issues that companies may overlook critical issues that could develop within the income stream.

The third factor is the size of the disability income line within the company. Except for a few companies, the individual disability line is typically a very small line of business. Consider Northwestern Mutual. Its individual disability business is the third or fourth largest block of disability income business in the U.S. However, it is still a very small block relative to the rest of Northwestern Mutual. Consequently, in situations like this, financial techniques that may be very relevant to reporting and analyzing disability income results, may not be of interest to the rest of the company.

Fourth, the allocation of assets may reflect how a company reports its earnings. Some companies retain their statutory earnings within the line, and as a result, the assets that are actually in the line may be less than the statutory reserves and required surplus if there have been significant statutory losses in the past. Many other companies periodically transfer assets between each line and a corporate account in order to maintain assets at the level of statutory reserves and required surplus. As you will see, how a company allocates its assets determines whether it can measure return on capital appropriately.

Last, but not least, the financial sophistication of management affects how profits are measured. You can often tell how financially knowledgeable management is by looking at the sophistication of the financial reports and data. In some companies, management wants to keep the financial picture as simple as possible, and may focus on a few key measurements like the bottom line.

I surveyed about a half dozen companies that are still in the disability income business to understand how they measure disability income profits. Many of these companies simply look at the bottom line. They don't get any more sophisticated than that. The bottom line could be in terms of statutory or GAAP, but management is looking primarily at one number. Unfortunately, these days, it's negative. Negative is bad. Positive is good.

1995 VALUATION ACTUARY SYMPOSIUM

The next level of sophistication may consider growth in earnings. That's something a public company often focuses on because the investment community prefers this measure. A public company also pays attention to its earnings per share.

Some companies measure profits as a percent of premium. Companies may have a column in their income statement showing everything relative to the percentage of premium. This may create confusion, depending on how they use it.

Some companies measure the return on statutory surplus. They may call it return on capital, but it should not be confused with GAAP return on capital. It's return on statutory surplus, which is the statutory earnings divided by the average surplus over the year.

Finally, there's return on GAAP capital, which is probably one of the more financially sophisticated profit measurements being used. Sometimes management may talk about achieving a certain return on capital but doesn't really calculate it, or it may measure return on GAAP capital for the whole company, but does not calculate it for each line of business.

Some of the more financially sophisticated mutual companies look at return on capital. They use GAAP, or at least a type of internal GAAP, to measure return on GAAP capital for the disability income line. Some of them approach it much like stock companies. They set a hurdle rate for the return on capital by looking at the risk. They want to achieve an 18-20% return. Other mutual companies, that measure return on capital, still follow the contribution to surplus principles in developing their dividend scales. They relate the growth in surplus expectations to the return on capital hurdle rate. Their targeted return on capital is equal to the expected long-term growth rate in surplus. Consequently, they may only require an 8-10% return in a line of business because the growth in surplus is not expected to grow any faster than that.

As I consider all this, one simple criteria comes to mind for reporting disability income profitability. You must link profit expectations from your pricing exercises to the measurement of profits in reporting. That's why I want to discuss those two methods of measuring profitability: percent of premium and return on capital. Both methods can relate pricing and reporting profits, if not perfectly,

DISABILITY INCOME -- INDIVIDUAL

much better than other methods. The pricing exercise is so much more academic when you're measuring profits one way, with no way to report earnings consistently with your pricing objective. You will never know whether the business is achieving your pricing objective.

Let's assume we're pricing a portfolio of products, if you will, and doing the traditional actuarial analysis. First, let's look at the asset share level for your portfolio. Table 1 shows the financial results as the percent of premium, which means your asset share cash flow (premiums, paid benefits and expenses) is discounted. I prefer using a discount rate equal to the pretax earnings rate. Ideally, I would show management the various cash-flow items on a present value basis as a percent of premium. Benefits are a little bit over 50%. Acquisition expenses, including commissions, are around 20%, and maintenance expenses are 12%. The expected pretax profit margin is 8% of premium.

TABLE 1
Percent-of-Premium Pricing Calculation

Discount asset share cash flow	
Discount Rate = earnings rate	
	% Premium
Benefits	51.2%
Acquisition Expense	19.8
<u>Maintenance Expense</u>	<u>12.0</u>
Pre-Federal Income Tax Profit	8.0
Internal Rate of Return	15.0

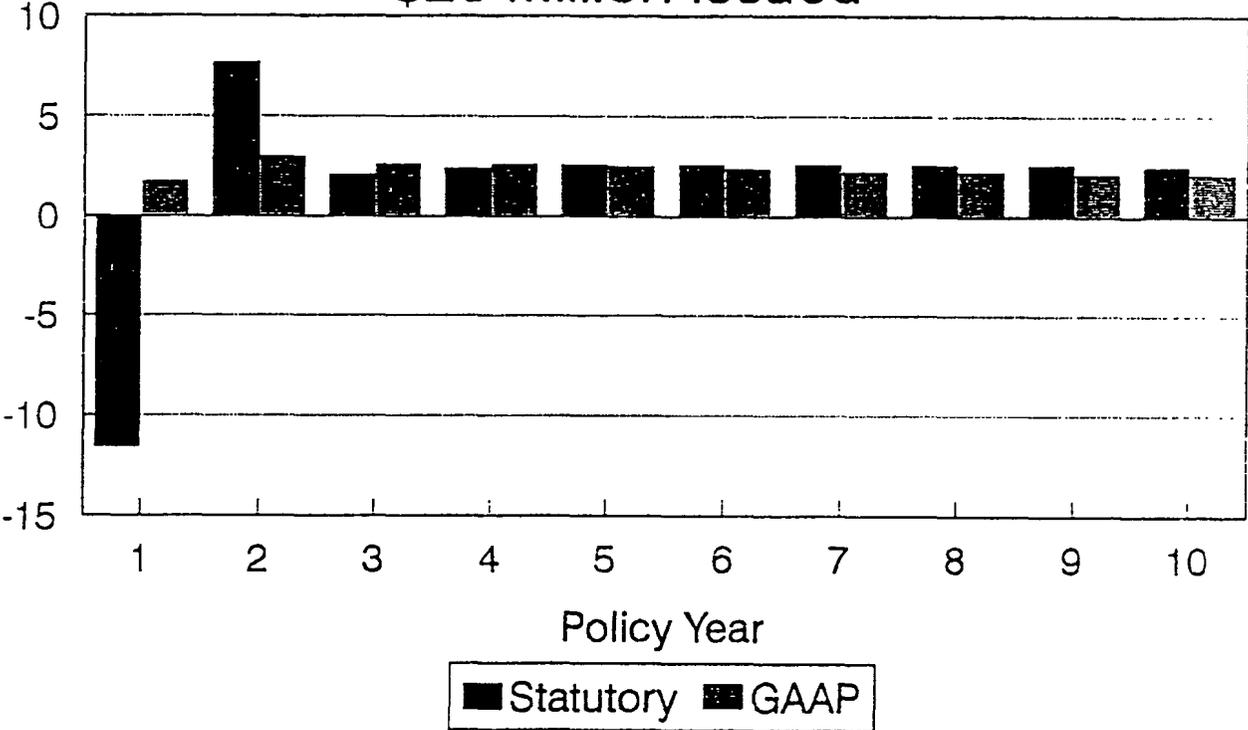
Chart 15 shows the projected statutory after-tax gains at the asset share level. If you discount the after-tax statutory gains less increases in the required surplus at 15% the result is zero. Thus, this product has an expected 15% internal rate of return. This looks like a nice healthy portfolio of products, with 8% pretax profit margin and a 15% rate of return.

Since your pricing assumptions are supposed to be the basis of your GAAP assumptions, you can also project GAAP profits, as shown in Chart 15. In these I didn't load the GAAP assumptions. I'm

CHART 15

**Asset Share Projections
Statutory & GAAP After-Tax Gain**

\$25 Million Issued



DISABILITY INCOME -- INDIVIDUAL

using the unloaded price assumptions to calculate the GAAP active life reserves and the deferred acquisition costs (DAC) in order to illustrate certain relationships. To calculate the investment income in these projections, I have assumed that the assets at the end of each year are trued up to equal the starting reserves plus required surplus, which is necessary to calculate internal rate of return appropriately.

Chart 16 shows the annual loss ratios from the asset share projections. The annual loss ratio is defined as paid benefits, plus change in claim reserves, plus change in active life reserves. The annual loss ratios keep growing as the required interest component in the change in reserve grows relative to that premium. If you subtract out that required interest component from the annual loss ratios, as I have shown in the interest-adjusted loss ratios, you get loss ratios that are 51.2% of premium consistently each year. That's the theory of GAAP at work. If you take out the required interest component, you actually get annual loss ratios that are consistent with your pricing target. Maybe this isn't news to a lot of people here. Somebody challenged me to come up with something new in my presentation, and I said, "Well, talk to the other two guys." But the fact is, when you talk to companies, you will see that interest-adjusted loss ratios are seldom used.

Let's look at the GAAP expense ratios in the asset share (Chart 17). The GAAP expenses are the actual expenses paid, plus the change in your DAC, which in the first year is negative. In subsequent years the change in DAC is positive. The GAAP expense ratios are lower before you adjust for the required interest because the required interest is negative. It reflects the cost of the capital that you spend during the acquisition of this business. So when you apply the required interest adjustment to the GAAP expenses, the cost of your acquisition expenses becomes higher.

Let's build a model office from this asset share and suppose we sold \$25 million of new premium in 1995 growing at 10% per year after that. Let's look at the expected statutory and GAAP results as a percentage of premium in year 1999 (Table 2).

This table illustrates the difference between the GAAP and the statutory financial results, with which most of you are pretty familiar. There is a good chance that management will expect the GAAP

CHART 16

Asset Share Projections Annual GAAP Loss Ratios

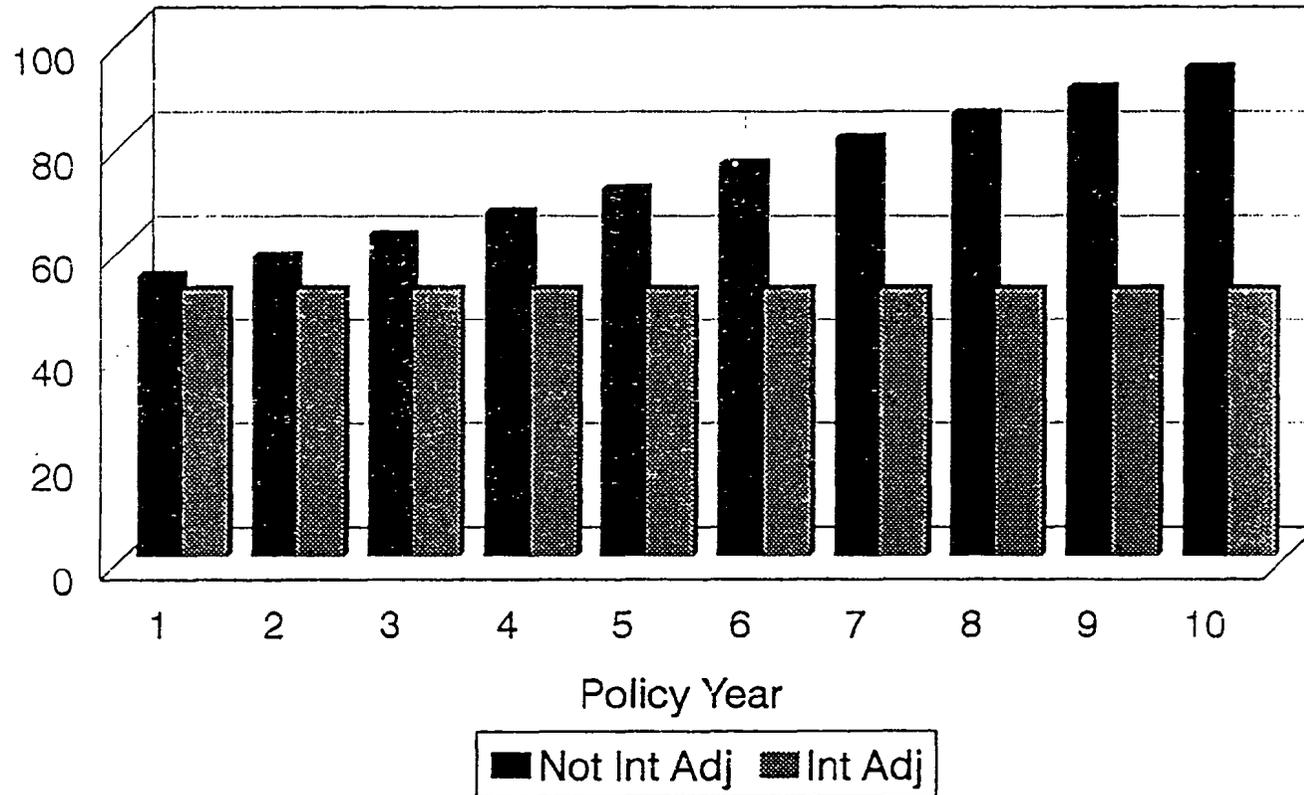


CHART 17

**Asset Share Projections
Annual GAAP Expense Ratios**

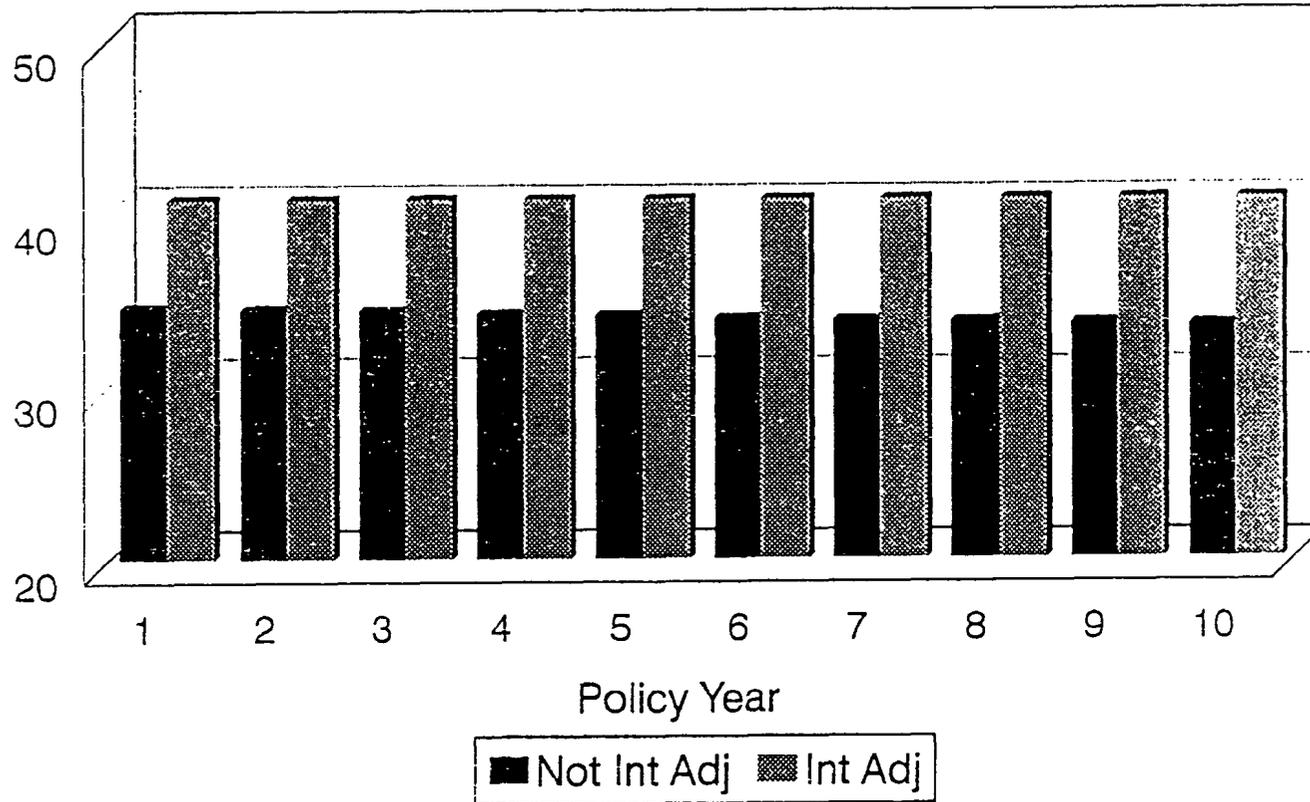


TABLE 2
Model Office

\$25 Million Sales in 1995 - 10% AGR		
Financial Statements - Year 1999		
	Statutory	GAAP
Premium	100.0%	100.0%
Net Investment Income	10.8	10.8
Paid Benefits	11.9	11.9
<u>Change in Resources</u>	<u>39.9</u>	<u>48.7</u>
Incurred Loss	51.8	60.6
Acquisition Expenses	41.8	41.8
Maintenance Expenses	14.0	14.0
<u>Change in DAC</u>	<u>----</u>	<u>-21.4</u>
Incurred Expenses	55.8	34.4
Gain Before FIT	3.2	15.8
FIT	2.5	5.5
Gain After FIT	0.7	10.3

results to mirror your pricing expectations if your morbidity, expenses, and investment income are tracking pretty closely. However, the GAAP incurred loss ratio shown here is 60.6%. Your manager is going to say, "Excuse me, Mr. Pricing Actuary, but didn't you say 50%?" Has anyone run into this problem before? That discussion could arise frequently on why the loss ratios from the financial statement are not in line with the pricing expectations.

So working all the way down through the income statement, you reply, "Well, that's fine, the loss ratio is higher, but we should be happy because the profit margin is 16%. We were only expecting 8%." Actually, you are bending the truth. So what can you do? The solution is to adjust the GAAP income statements for the required interest.

Table 3 shows the result of adjusting your GAAP income statement to reflect the impact of required interest. When you do that, rather than having investment income as a line by itself, you break out investment income between the required interest and what I call excess net investment income. The

DISABILITY INCOME -- INDIVIDUAL

required interest is that component in the change in reserve that is the result of the interest assumption. You will need to subtract required interest out of both net investment income and the change in reserves and DAC. That leaves the excess net investment income, which is the interest on surplus, and the result of obtaining a higher yield on the assets backing your reserves. That's a key point for management to understand when you talk about the profitability of business; that is, how much of the profits comes from asset investment income, and how much from the actual operation, i.e., the premium dollars. As you can see, profits from the premium before excess net investment income are 8% of premium. What a coincidence! When you add the excess net investment income back in, you get to 15.8%. So now management can understand the sources of profit.

TABLE 3
Model Office
GAAP Financial Statement - Year 1999

Not Interest - Adjusted		Interest - Adjusted	
Premium	100.0%	Premium	100.0%
Net Inv. Inc.	10.8	Excess NII	7.8
Incurred Loss	60.6	Incurred Loss	51.2
Incurred Exp.	34.4	Incurred Exp.	40.8
Gain	15.8	Gain Before Exc. NII	8.0
		Gain After Exc. NII	15.8

GAAP has its limitations, particularly, for businesses like universal life and annuities where the reporting of revenue is different. But with individual disability income, because acquisition expenses are amortized and reserves calculated based on the pricing assumptions, GAAP gives very valuable reporting information for understanding profitability and relating it to pricing expectations.

To get the most value from GAAP, the income statements should be broken down into key subsets, like different generations of products that may have their own pricing targets or expectations. You may be able to subset your GAAP results regionally if there is financial machinery to support it.

1995 VALUATION ACTUARY SYMPOSIUM

Let's turn to return on capital. Return on capital is just the GAAP gain after-tax divided by the average GAAP capital. GAAP capital is defined here as statutory required surplus, plus DACs, plus statutory and GAAP reserve adjustments. I think that's fairly standard. The pattern of annual return on GAAP capital is not necessarily level, even when experience is the same as your pricing assumptions. See Chart 18. The internal rate of return of 15% relates to the whole period of time. But depending upon how the GAAP profits flow, you may not see exactly 15% emerge. I'm sure you won't, but for a fairly mature block of disability income business, you will get results that will be close to the internal rate of return, plus or minus 2%. You can see this in a model office like in Chart 19. By combining a number of issue years, the return on GAAP capital begins to stabilize in the 14% - 16% range. The level and type of loads that you choose to add to your GAAP reserve assumptions will affect the pattern of GAAP profits and, thus, the pattern of annual return on GAAP capital. You should test the impact of these loads in a model office before you settle on any.

What are the advantages of percent of premium. Well, as I said earlier, the interest-adjusted results are consistent with the pricing results, which can then support a source of earnings analysis. One of the disadvantages is simply that the percent of premium ignores the impact on statutory surplus, which is a significant concern, and therefore ignores return on capital. In particular, a percent of premium analysis would be neutral on the issue of level premiums, not recognizing the dampening effect that nonlevel commissions have on the return on capital. Another disadvantage is management understanding. Management may not have the level of financial knowledge to understand the role of required interest.

What are the advantages of return on capital? First, management, as well as the investment community, understands return in general. Second, there is an algebraic relationship between return on GAAP capital and internal rate of return, which I won't get into right now. The two concepts are closely related. Third, return on GAAP capital actually links statutory and GAAP accounting.

The major disadvantage is the return on capital can go up and down by itself without material changes in the underlying experience. But we hope these fluctuations occur in a relatively narrow range. The

CHART 18

Asset Share Projections Internal Rate of Return versus Annual Return on Capital

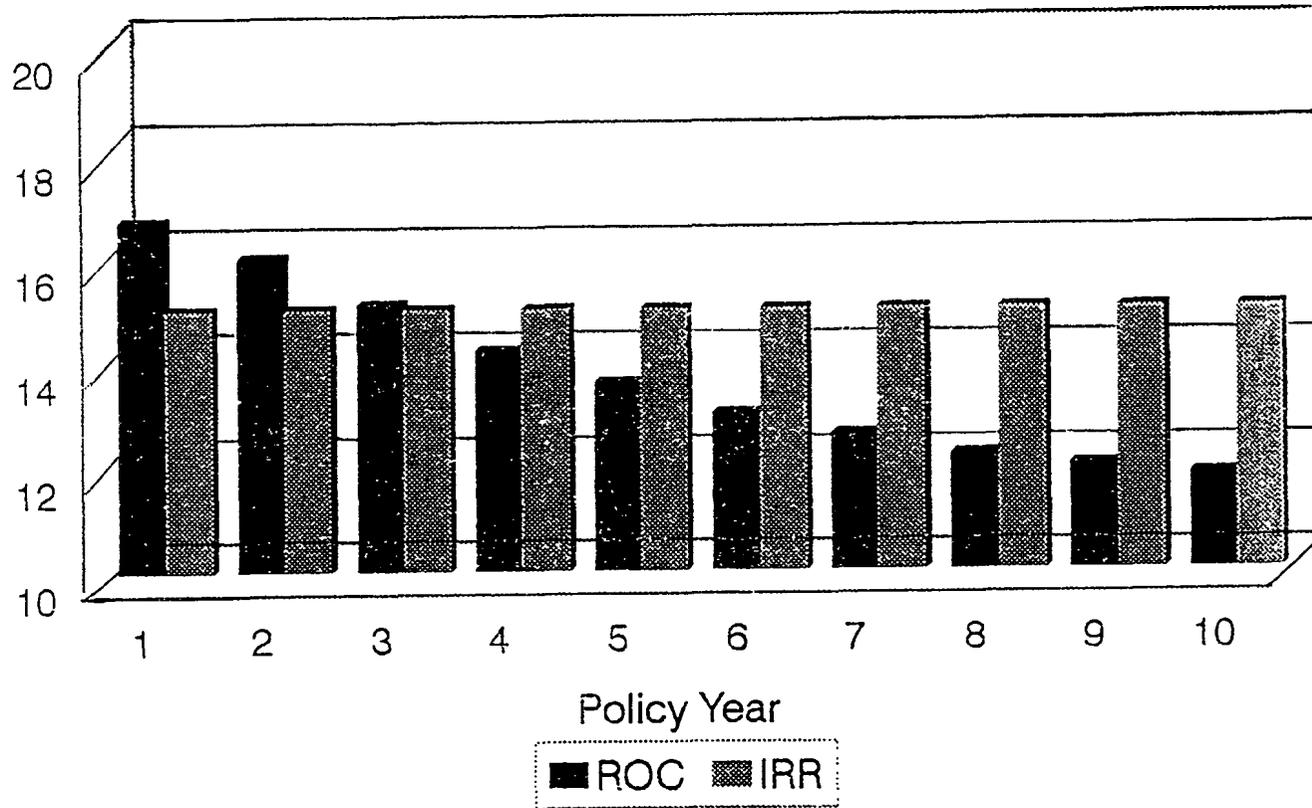
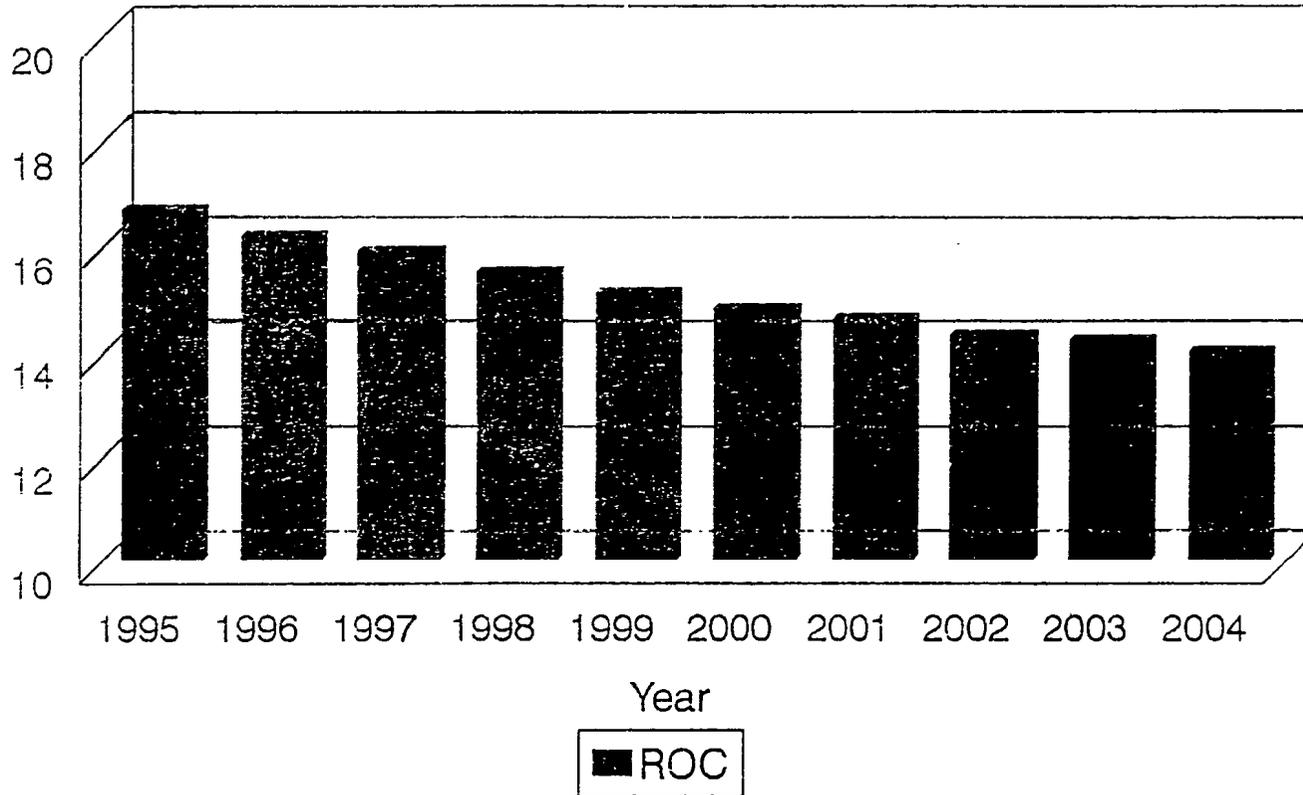


CHART 19

**Model Office
Return on GAAP Capital**



other disadvantage is it really does force your company to true up your line's assets to equal statutory reserves plus required surplus at least once a year.

In conclusion, what I observed when talking to companies, in my opinion, is a lack of sophistication in reporting individual disability income financial results. Financial objectives need to be consistent in both your pricing and in your financial reporting. Measuring profitability is only part of the problem. Achieving profitability is the most difficult problem, but if our financial reporting methodologies are an obstacle, then we will never know for sure whether our hard work is paying off.

MR. DAVID MORGAN ANDREAE: I have a question for Steve Mitchell. If you're trying to do claim reserve analysis by category and you are trying to develop a diagnosis, elimination period, and a third breakdown, can you see any degree of independence among the three different types of categories you're looking at? Or is it the more you subdivide your business, the more credibility you lose?

MR. MITCHELL: You really can't assume independence. There's a couple of things you can do, though. One is to basically set up the order that you're going to go through the categories like diagnosis first, and then once you're comfortable with some diagnosis, look at how the elimination period looks. You may have to blend them. Again, if you're using an A/E approach to try to balance things, it's fairly easy to tell when you do something that throws it out of balance. That's a practical way to do it, though.

One other way to do it is using the statistical tools. We spend a lot of time checking for interactions. One example we found while spinning through was differences in termination rates by case size. We couldn't explain why a 50-life case and a 500-life case would have different termination rates. However, we discovered differences in the definition of disability. Smaller cases, in general, were the smaller professional firms with richer plans, and those were really driving the differences.

1995 VALUATION ACTUARY SYMPOSIUM

There are two ways you can get at these differences. One is just doing some A/E analysis when you do a two-way split on definition of disability and some other variable. A second way involves a type of statistical test step-wise process where you look at the variable and tell whether it has an effect, and then layer in a second variable. The statistical test should give you some sense of whether there's an explanatory effect in the termination rates by adding that second variable, or whether it just doesn't add anything.

Have you ever seen step-wise regression variables are added? You start out with five variables and add two and see how the fit is. Then you keep adding more variables and testing the fit. If you add more and more, you get diminishing returns. It's not incredibly simple to address, and it can get time-consuming.

MR. PHILLIP A. EISENBERG: I guess this is for Steve, also. You were introduced as being group. Does UNUM use this approach in individual? Are you aware of any companies differentiating these claim reserves by cause?

MR. MITCHELL: I confess to being somewhat ignorant of my own company's individual disability practices. But I believe they are, at least, on a simple basis splitting out some diagnosis basis. I think they're treating AIDS separately, and they may be treating some other things separately. But I want to qualify that. I haven't talked to my local individual disability actuary lately.

MR. BEAL: I can add a little light on that from UNUM. UNUM didn't have the database to allow it to get in to do what GLTD was able to do. However, UNUM did separate out AIDS, and separated cost of living experience versus non-cost of living experience. I've seen a number of companies do that.

As far as getting into the mental, nervous, the back, the cardiovascular, and so on, UNUM did not. I have not seen any individual company do that either, at least, and reflect the results directly in its reserves.

MR. WALDRON: I would pretty much second or third that, depending on where you're coming from. On the individual side, so far, I haven't seen any company that really has a large enough database to do the separating. Companies have looked at it. I think pregnancy claims have been separated out, specifically and AIDS claims. I saw one firm trying to do something on the individual side with backs, but it was lumping a lot of stuff in the company's modification. Really the company was basically tracking the diagnoses differently. The company wasn't necessarily holding reserves separately.

MR. MITCHELL: I'd add just that the last survey I saw of practices, related to group disability reserving practices, led me to believe that about half the folks in there had some simple diagnosis-based system, maybe AIDS, maternity, mental, nervous, and all other. If they didn't have it already, the remainder were thinking of going to it within the next year or two.

MR. DAVID W. LIBBEY: I have a couple of thoughts about the classification reserves that come to mind. The first is that it is a difficult process to put in place. It requires a tremendous amount of analysis, lots of data, lots of patience, and lots of resources. The real goal, I think, from a reserving point of view is to ensure that your reserves are adequate, and there are some proxies for getting at that. You can monitor your mix of demographics by cause, for example. Monitoring closely what your experience looks like will, at least, tell you you're in the right ballpark.

I think from the appointed actuary's point of view, though, the question is, how do you (assuming you wanted to do classification as you described) put it to work? And I thought about that a little bit and I said, "Well, there are two ways you can bring it into statutory reserving and cash flow testing." One would be setting your own assumptions during the first two years of disability if you have enough data to do that in the first place. The second, for cash-flow testing, would be in setting your assumptions for the experience to be incurred in the future.

Does that make sense to you, or do you see some other opportunity from the appointed actuary's viewpoint that I haven't mentioned?

1995 VALUATION ACTUARY SYMPOSIUM

MR. MITCHELL: I think those would be the two things that occurred to me. I would also say that you should be careful to differentiate between the information you may use internally for either cash-flow testing, or any other types of internal reporting you have, from the appointed actuary's standpoint, making sure that you're satisfactory under the minimums as defined for the law.

When you're looking at these diagnoses and looking at these liabilities, you might separate those processes. There may be cases where you want to look at all claim durations for all periods based on your classifications. Cash-flow testing is a good example. There's going to be other times where you naturally want to be careful that you're meeting the requirements, and your reserves are in compliance with the applicable standards.

MR. BEAL: Regarding the statutory minimum impact, there is a common interpretation that you can satisfy the statutory minimum claimant reserve assumptions in the aggregate. You can be as sophisticated as you want and create whatever continuance table you need, provided that in the aggregate, you're satisfying the statutory minimum. You just do two separate calculations. I think that interpretation of satisfying the statutory minimum is fairly common out there.

MR. LIBBEY: Bob, shifting to your charts and graphs. I was interested at the results you were showing when you were analyzing return on GAAP capital that is by policy duration. I think one of the things that mystifies a lot of people is why return on capital starts high and decreases over the life of the block of business, as you have shown it here.

And I have some clear theories about that, one being that the numerator of the ratio is constantly dropping as the block of business runs off. And I just wanted to know if that is implicit in this chart that you showed us earlier. Are you looking at a closed block of business here?

MR. BEAL: One chart shows the asset share projection of a closed block of business. The model office that I show was a compilation of five years of growth.

MR. LIBBEY: After five years of growth, once you cut it off out here, it shows that same pattern. And what's driving that is you're building up a lot of GAAP equity early, or GAAP capital invested

in the block of business early in the business, and it comes down very slowly -- much more slowly than the profits are dropping off. So it creates this tilt by duration that you showed in the chart. That's my viewpoint of it, and it seems to be your viewpoint of it. I just want to be sure I was reading it the right way.

MR. BEAL: Certainly. I agree with you. It's also the inconsistency between the GAAP amortization that runs off in proportion to premium versus an amortization you might find in your mortgage, that runs off in a way that guarantees that there's a level interest rate every year.

I've seen a paper written a number of years ago, which tried to develop a method of amortizing and calculating reserves and doing the amortization that you would generate a constant return. It was interesting, but probably pretty impractical.

