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DEFAULT RISKS

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- o How does one measure and evaluate the default risk?
 - What are the definitional and computational issues?
 - What do the public bond studies tell us?
 - What are the SOA and the insurance industry doing to get default experience on private placement bonds and commercial mortgages?

MR. GERY J. BARRY: We call it default risk in the program. I'm Gery Barry, Vice President and Actuary in Aetna's Group Pension area, and I'm the chairman of the SOA project oversight group on credit risk. I'm happy to introduce the members of our panel who are also members of this project oversight group on credit risk. They are Joe Buff from the New York office of Tillinghast, Reed Miller, corporate actuary for the Lincoln, Allan Gold, an actuarial colleague of mine from Aetna, and Warren Luckner, Research Actuary of the SOA.

Let me say a word about the purpose of the project oversight group. Our purpose is to address what many of us feel is the primitive state of the data and methodologies that are available currently to monitor and to analyze total losses on insurance company portfolios from credit risk. Since the inception of our project oversight group about a year ago, the need for focus on credit risk has become even more urgent. In my view, the single most critical issue facing the insurance industry today is the public's concern about our solvency. The solvency issue doesn't arise from foreign competition, it doesn't arise from concern about AIDS in my view, and it doesn't arise even from concerns about asset/liability cash flow mismatching. I think the primary concern is about the integrity of the invested assets in our portfolios. And why? Well, to some extent, I think the insurance companies are being painted with the same brush that the S&Ls and banks are. Also 401(k) savings plans represent a high concentration of employees' accumulated savings in GICs, and so there is added concern about the exposure to insurance company credit worthiness. But perhaps most important is today's threatening economic environment, which directly calls into question the reliability of the investment performance of asset classes in which insurance companies invest, and of which the general public has little knowledge. Specifically, some insurance companies have been heavily invested in junk bonds. Even more insurers have substantial holdings in private placement bonds, which are poorly understood by the public, and in fact, some observers have mistakenly viewed these as junk bonds. And if that weren't enough, the general weaknesses in the real estate markets and severe weaknesses in certain geographic areas have called into question just how safe the commercial mortgage investments of insurance carriers are. So is the public's concern a legitimate one? I think so, but not because I think more

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than a few, smaller companies are on the brink of insolvency. Rather the concern is justified because our tools for monitoring and analyzing the emerging portfolio-level loss experience from credit risk are primitive.

This session will explore the inadequacies of our data and our methodologies in depth, and will describe the corrective actions that are now under way. Joe Buff will begin by addressing the uses and limitations of published public bond default studies. Then, Reed Miller will describe the inadequacies of insurance companies' statutory and GAAP accounting data as a source of understanding a particular company's own credit loss experience. Next, Allan Gold will describe a disciplined actuarial methodology to serve as a foundation for calculating and monitoring the full economic losses from credit risk. Finally, armed with this actuarial methodology, Warren Luckner will describe how we are applying the Society's new process for managing research projects in order to develop a first ever intercompany study of credit risk. Because of the continuity of these presentations, I would ask to you hold your questions until the end.

MR. JOSEPH J. BUFF: In the last couple of years, there have been some number of different studies published by various academic researchers or corporations, including some of the Wall Street firms, on the whole question of default risk or credit risk. In some cases, these studies have appeared to contradict each other. You can read about another one coming out in the financial papers from time to time. You see little capsules on these things in *The Wall Street Journal*. When we were talking about putting together this panel, we thought it might be helpful to begin by presenting an overview of some of the studies.

As Gery's already indicated, there are a number of very good reasons to be concerned about credit risk, and therefore, some very good reasons to be concerned about good, useful information about credit risk, but again, sometimes it's harder to get the information that you need than at first might appear. Anyone with an actuarial or regulatory or investment background or really virtually anyone in the insurance industry, including those people with largely marketing responsibilities, needs to be concerned about the industry's real or perceived exposure to credit risk. One reason is increased market volatility. The question is, are we talking about market volatility in the capital markets? Well, yes, obviously, but on the other hand, we're also talking about market volatility in the insurance markets because the two really interact with each other. It's an important issue that the life insurance industry's total exposure to the bond market is quite substantial. I believe that life companies own about a third of the bonds outstanding in the United States, but in particular, the exposure to what we can call junk bonds or high yield bonds is pretty material. In fact, I think that in dollars of outstanding junk issues owned by the industry, the total figure may somewhat rival the total capital and surplus of the American life industry which is approximately \$80 or \$90 billion. In fact, as I'm sure some of you know, there are some companies whose individual holdings of junk bonds are comparable to or even greater in magnitude than their capital and surplus. Now probably for that reason, the National Association of Insurance Commissioners has been working gradually on changes to the MSVR and other changes known as the valuation actuary movement. Some of these are particularly designed to take a better look at what's going on in credit risk. And finally, the real issue, why did companies get into junk bonds? Looking at it from the point of view of the buy side, well, it was to a

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degree an attempt to trade off a couple of important things, maybe compromise them, or maybe have your cake and eat it too, and that's the issue of competitiveness versus profitability. If you buy a whole bunch of junk bonds, the high yield bonds because they do offer rather high yield, and if you don't have much in the way of defaults or other credit costs, then you'll find that you have actually outperformed the market for investment grade bonds. Some people say over a long period, typically, high yield bonds, if diversified, do nicely outperform investment grade bonds. So if things go well, you will be both competitive in being able to market products with more attractive credited rates or prices or whatever and you'll also be more profitable. However, if things don't go well either for the industry or for individual companies, what can happen is you may have for a while achieved significant competitiveness, but then you may find that you move into an era of troubled profitability. So the risk exposures are real.

Now partly for this reason and partly because other institutional investors are just as concerned as the life industry, there have been a number of published studies in the last couple of years especially that have commented on one or more aspects of what the risk is all about, specifically with respect to junk bonds. But in reading these studies, you need to go through the fine details, especially if you're trying to develop actuarial assumptions. You might need the assumptions, say for Reg. 126 filing or for an actuarial appraisal, but exactly what you're doing has an impact on what kind of data assumptions you need. The studies do tend to differ with respect to exactly what universe of bonds they cover. You talk about junk bonds and there are within that market questions, like for instance, are convertible bonds included within the exposure of the study, and what about bonds with equity kickers, sometimes they're included, sometimes not, and that could lead to some subtle differences. Another basic question is what's the time period of the exposure. We're all coming more and more to think of junk bond default studies, kind of like mortality studies. So again, the question of exposure years is a significant one, and the studies sometimes seem to have different conclusions simply because they've worked with different periods of exposure.

Now another very important issue which is going to be talked about in our panel is the question of what is meant by default. You notice Gery, in fact, said the panel is called default risk, but we're really talking about credit risk. What we found in the project oversight group is there's much more to credit risk than simply default. For instance, if you actively manage your asset portfolio and you do a fair amount of trading, if you sell junk bonds before they go into default but at a time when their market value has started to plummet, you may actually take realized capital losses without ever reporting a default in your annual statements. The question is then, have you lost something due to credit risk, and our answer is you certainly have. So if you only count defaults, you may be missing some of the picture of the financial risk.

Another thing which we would encourage you to think about in terms of any kind of modeling analysis or comparison between companies is whether the information provided is broken down by individual quality grade. Moody's and Standard and Poor's both have their letter grade systems for describing the quality of a bond starting with either Aaa or AAA for the highest investment grade and going down to the very low quality, but just using the Standard and Poor's letter grades, we have a little bit of data to use, so you see that the make-up of the market matters by letter grade and the make-up in an analysis

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that you might perform individually does. For instance, BB bonds, which is the highest broad category of junk bonds, comprises about 20% of the market, and some recent work done by Professor Altman, with some analysis that I applied which I'll describe shortly, indicated that for BB bonds, an annual default cost after you've achieved your salvage value might be about 75 basis points. But if you look at B bonds, that's the next step downwards, these are about 60% of the market, and the default cost jumps from 75 to 190 basis points a year, again based on a recent historical period. So that's a very significant increase for a step down and one whole letter grade. Then, if you go one letter grade further down to the CCC category which is really junky junk, that again is about 20% of the market. Those bonds recently have seemed to show default costs, net of salvage of about 265 basis points. So in other words, going from the high end to the low end of the junk bond market, and thinking about its internal relative quality, you can see that your default costs can more than triple, in fact, almost quadruple. So it is important in reading a study to see how much information it gives you on individual letter grades, and if you're reviewing your own portfolio or another company's portfolio, it's really very important to try to get as much information as possible about the letter grades of the individual holdings.

Now another thing that one should look at in reviewing various published studies that are available, is what kind of analysis has been performed on the default data. There are basic statements that could be made about the default rates once you've defined exactly what you mean by a default. However, the default rates don't give you a complete picture of the losses due to credit risk because bonds that go into default are almost never completely worthless. They usually have a salvage value, and over long periods of time, the salvage value immediately after default typically has been something like 40 cents on the dollar. So when you review a study, it's important to keep in mind the distinction between the default rates and the actual default costs. In some cases, the default costs are developed by the actual default rates and salvage values for the individual issues. In other cases, they're developed from default rate data by applying the overall default rate to a salvage value assumption.

Another important issue which sometimes is not touched on in the published studies is the whole question of the price volatility of the junk bonds. It's not simply the defaults, but actually the way their market prices behave relative to investment grade or treasury bonds which is an important source of volatility, i.e., risk to the financial performance of any entity that owns junk bonds.

Another question is the conclusions of the study. Now by this, I don't mean what would you conclude by studying the study, but what the study itself says it concludes. Some of the very fundamental observations that could be made about the junk market are, in fact, controversial in that different studies published in roughly the same time, sometimes looking at almost exactly the same data, will come to different conclusions about what to make of what's going on with defaults. Basically, the wise policy to follow in reading any published study is caveat emptor, buyer beware. Just keep in mind what the information is that you need, and see how that may differ from the information that's available in the study. It's also helpful to try to analyze the specific point of view or underlying purpose of the study because again, they vary. Caveat emptor is particularly applicable if you rely not on reviewing the primary study itself, but on some summary of it that may be

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available in the financial press because there have been some instances where reports about a junk bond study have lost accuracy when they go from the actual paper itself to what's written by the reporter in the newspaper or magazine. So this is something to be wary of.

Well, having mentioned these basic points about what to look for in reviewing a study in general, what I thought I would do is pause before we talk about some practical questions and mention what I have on four studies which aren't necessarily being endorsed relative to other studies but ones that do seem to be particularly interesting. One of them is by Professor Ed Altman from New York University. I think that Professor Altman is at this point, very well known as a researcher into default risk and related subjects, but one of his numerous papers is one that's entitled, "How 1989 Changed the Hierarchy of Fixed Income Security Performance," and it has, I believe, one of the most up-to-date tables listing default broken down by letter grade as well as by years from issue of the bond. Kind of a select and ultimate mortality table as it were for default, and this would be available from Professor Altman who teaches at the Stern School of Business at New York University. So that's one interesting study. Another one which led to some conclusions that were in some cases different from Professor Altman's is by Bloom & Kine, and this study is titled, "Realized Returns and Defaults on Low Grade Bonds, the Cohort 1977 and 1978." This is available from the Warden School. In particular you would want to get in touch with a Rodney L. White Center for Financial Research. Now as an example of two extremely well done studies that may lead to opposite conclusions between Professor Altman's work and the work by Bloom & Kine, the question was raised, does the default rate or default costs on a set of junk bonds increase as those bonds age with time from issue. In other words, you have bonds that were issued five years ago, everything else being the same, do they have lower default costs in the 50th year than comparable bonds that happen to be 10 years old? This is a useful question, especially if you think in terms of select and ultimate mortality studies. Now on the one hand, Professor Altman's data seems to suggest that there is some increase in the default costs as the bonds age, although there's a fair amount of statistical noise evident in the data that he's published. On the other hand, Bloom & Kine argue that this apparent increase with age is, in fact, a coincidence, and that if you arranged the data in the right way, you would see jumping out at you the fact that the increases are not due to age but they're due to changes in the economic environment. So here's an example of two studies that seem to interpret the same raw data differently and lead to different conclusions. So perhaps for general modeling purposes, we could get by assuming that the default costs for a particular cohort of bonds is the same regardless of how long it has been since issued.

Now another study which is quite useful, actually something that's put out periodically, picking something from just one of the Wall Street firms, is a series of newsletters that are put out by Merrill, Lynch. I have one here in particular that's called, "Insurance Companies' Investments and High Yield Bonds," that dates back to March 1990 and makes some rather interesting points, and this would be available by contacting one of the individuals at Merrill named Martin S. Fredson. And again, I stress I'm not endorsing these studies vis a vis any others, but this is just an interesting sample.

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Now I have one more rather interesting work which I have in draft form, and it's a paper that's called, "The Impact of Recession on High Yield Bonds." Now this paper which is dated July 11, 1989, was written by David Wiss, Christopher Proben, and Robert DeAngelis, and these individuals are from DRI McGraw-Hill located in Lexington, Massachusetts, although their paper was actually sponsored by the Alliance for Capital Access. Now what this last paper tried to do, which is again rather interesting and useful, was figure out how default costs could increase from recent levels depending on how bad a recession the economy might move into in the near future.

So having summarized some studies and mentioned some points that each of them tried to cover, let's take a look at some of the practical questions of applying somebody or other's default rate study. Well, one question is whether experience of the recent past, let's say the last four years or a longer period like the last 20 years, is relevant to develop a baseline assumption about default costs going into the future? Maybe it is, maybe it isn't. For the overall junk bond market in the last few years, default costs have been about 180 basis points. So if you compare that to the profit margin on a typical interest-sensitive product, you can see why it's important to nail this assumption down as tightly as possible. Now what was done in the DRI study has actually been done in a couple of other studies, this was to develop a structural model of the financials of the individual issuers of junk bonds, and then to simulate how those financials might change going into different simple economic scenarios of the future, such as inflation or stagflation, recession, etc., and the studies seem to imply that if we do hit hard times in the near future, the overall default costs of the entire junk bond market might increase by a quarter or a half again as much as what we have experienced in the recent past. So for instance, if you view them as increasing by half again as much, the baseline of 180 basis points default cost would become 270 basis points. In other words, 180 multiplied by 1.5.

Now another question is the relationship between fixed income investments and equity investments, especially with respect to junk bonds because the junk bond, to a certain degree, does behave almost like a common stock of the issuer. In fact, the poorer the credit rating of the issuer, the more like a common stock the bond itself becomes, and if the issuer goes into default, ultimately you end up owning the company as one of its higher category of fixed income lenders. Consequently, you sort of end up owning a stock although you started out thinking that you had bought a bond. Now that would not necessarily be such a problem if things worked the way conventional wisdom of the old days had that the fixed income market and the stock market move in opposite directions. If they did move in opposite directions, you could always hedge or get out of one and get into the other if you wanted to market time. However, we have seen instances, just in the last couple of months because of the trouble in the Mideast, where sometimes the bond market and the stock market both go down or both go up, and that's troubling because it suggests that some of the traditional hedging techniques won't necessarily work, and again, that's particularly relative for junk bonds because junk bonds are part fixed income and part equity investments. Another question in any sort of analysis of the past or the future is once more, how bad could it get, how bad is bad when viewed across the market? The rule of thumb from several different studies seems to be to view recent experience which hasn't been that great as increasing by 25% or 50% of itself. Now another important subtle point is whether the quality rating that you're talking

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about for the bond is the rating at issue, when the bond was originally underwritten, or the rating let's say as of the last year end, if you're doing a year end financial projection, because the fact is that the credit ratings of the overall bond market change as time goes by. You'll get different results, in a sense the wrong results, if you look at default costs based on a study using at issue rating, such as Altman's study, and then apply it to an inventory of your own bonds that is based on the latest quality ratings that you have which may have indeed changed. For instance, over the period 1983-87, the Standard and Poor's rating system had about 26,000 bond years of exposure, and along that exposure there were actually 3,500 changes if you counted changes of one whole letter grade, and the changes up and down were not in roughly the same proportion. The fact is that 38% of the changes were improvements in credit ratings, and 62% were reductions in credit ratings. Consequently, there's a general downward drift in the credit rating over time for the same set of bonds. If you look at default costs based on at issue ratings and then apply them to exposure today based on your assets with quality ratings today, you'll actually in the aggregate, overstate your default costs going into the future, if you're well diversified. So that's something that you do want to watch for. And again there's a question of whether the default costs for a cohort of bonds increase, decrease, or stay the same as those bonds age. This is exactly the same question as whether the mortality rates say for a group of 35-year-olds increase, decrease or remain the same as the 35-year-olds get older, and unfortunately, with respect to junk bonds, it is really not clear. It depends on how you interpret the data.

So let's take a look at some of the practical issues of what we could do, projecting ahead what, where, and when people may be going in credit risk studies. Where might we be going as the insurance industry, what are the practices for analyzing credit risk, and where might we be going, those of us who are actuaries or others who make financial projections of the technical nature with respect to credit risk. Well, for one thing, it's very important to select projection assumptions that are appropriate for your purpose. Here an important distinction has to be made between whether the data about default costs are to be based on a volume hold approach, which is typically what the published studies do, or whether you're doing an analysis portfolio of bonds, maybe your own bonds where you may be performing some credit analysis and active trading. As we mentioned earlier, if you are doing credit analysis and selling those bonds that appear to be losing credit worthiness, and you succeed in selling them before they actually default, you will not record the default events themselves. They will simply look like sales that will be listed with all of your other asset sales. They will typically generate a realized capital loss, but that number may then be buried within a net capital gain or loss number so that the impact of this credit worthiness monitoring may actually become invisible in your financial statements, but it is really there. So once more one should be cautious. If you look at a portfolio which seems to have default costs that are significantly below those of the overall market, it may very well be simply because active management is being used to unload the junkier junk bonds before they actually enter default. If that is the case, then you will want someone who uses the "actual default experience" to make financial projections because you may have significantly understated the real costs of credit risk, and you could end up adding what could amount to many tens of basis points to the real return on your junk bonds, reporting profitability of the product line which is really not there. Now another question is how diversified is your portfolio? Another study which was performed several years ago by Morgan Stanley suggested that you

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needed at least 20 different junk bond issues within the portfolio of junk bonds to be reasonably well diversified across the market. I think most companies that go into junk realize this and sometimes have 50 or 100 or 300 or more different junk issues, but that is one of the questions that you should ask when looking at an actual portfolio.

Now we mentioned before the whole problem with market value volatility of junk bonds, and to give you a sense of how serious the problem can be, just in the last couple of years, the spreads between junk bonds and treasury bonds have varied between less than 400 basis points and more than 800 basis points. That's a problem not just because you can never be sure just what your junk bonds are going to be worth, but if you're making financial projections, you need to be able to price junk bonds in the future. For instance, in a Regulation 126 filing, positive cash flows have to be reinvested, and somehow in your model, you need to show this reinvesting taking place in the seven New York scenarios as they're called. If your investment strategy includes junk bonds, you have to be reinvesting into junk bonds in the future, and you need to figure out how their yield will compare to investment grade bonds if you're going to be able to do the calculations in the scenarios. Another problem, which again would occur under Reg. 126, if you're modeling junk bonds is the regulation says at the end of the projection period to use the market value of assets to report the ending surplus on a kind of market value adjusted basis. How do you calculate the market value of junk bonds in the set of interest rate scenarios? There is another element of volatility, the spread with respect to treasuries, and the more volatile that is, the more problematic the whole process becomes. Now that then leads to the statement once again of caveat emptor. If you or anyone else is relying on a financial analysis that includes the modeling of junk bonds, if you start off by looking at the public studies to try to understand the issues, develop some experience data, maybe look at your own portfolio to see what you might get in terms of your own experience, and study the questions of how the different ratings apply, ultimately you're going to perform calculations that will lead to some conclusions that you, not the authors of these papers, have to offer to other people, Standard and Poor's or Moody's or your board of directors or the insurance departments or whomever, and really there the word is caveat emptor because everyone needs to be cautious as to what the problems are that are included in the model.

To conclude, as Professor Altman has commented, within credit risk there are certain special kinds of risks which sometimes are ignored that do deserve more attention and need more study in the future, not just the default risk itself, but liquidity risk, the fact that junk bonds are in general harder to sell at a good price than investment grade bonds. The reinvestment risk is greater because the coupons tend to be higher. That means you have more cash flow to reinvest in the future, everything else being the same. Price volatility we've mentioned, and also salvage value. Although the salvage value has averaged 40 cents on the dollar over very long periods of time, and there's no guarantee that you will be able to get 40 cents on the dollar on some collection of junk bonds that go into default that you and your company actually have to sell at any one time. I'm sure that your portfolio managers will be the first people to tell you that this is a significant concern.

What we can develop from this is that we do need more credit risk studies for all types of assets that are owned by insurance companies, not just publicly traded junk bonds, and

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the conclusions need to be stated in such a format that they are relevant to solvency standards to address some of the concerns that have already been mentioned, and also so that they're relevant to develop assumptions for the different kinds of financial projections that insurance companies have to do for their different constituencies.

MR. REED P. MILLER: The SOA project oversight group has attempted to focus attention on developing a base research project which hopefully will then become an ongoing project to evaluate, measure, and publish the credit risk statistics associated with commercial mortgages and private placement bonds. There's very little publicly available data associated with those instruments because by their nature, they tend to be privately contracted arrangements. The insurance industry is a major vehicle by which private placement bonds and commercial mortgages are actually put into the market place. And so by making use of the SOA contacts within the insurance industry, we hope to be able to put together a basis of data and risk analysis that will be useful for multiple purposes.

Two of the early areas of focus for the project oversight group when we started getting together were first of all, defining exactly what we mean by a credit risk loss, and second, what were the data needs or the data availability associated with measuring the losses and the risk of losses associated with credit risk. First of all, talking about the definition of a credit loss, much of the data that Joe has referenced was associated with defining default loss associated with public bonds. One thing we talked about early on is that just talking about purely defaults doesn't give you the total picture in terms of the loss associated with credit risk. I think Joe's examples of declines in quality and then sales in advance of actual defaults are good examples of where there is significant loss associated with credit risk that doesn't necessarily manifest itself in default statistics. So, what we've focused on is defining a credit risk loss that attempts to measure any economic loss associated with credit deterioration, and in doing that, we pick up actual defaults which I think are the classic example and the classic thing typically studied. Even under the definition of defaults, there isn't a total clarity in terms of what it means to default when you have an obligation such as a commercial mortgage or a private placement bond. Frequently, you don't wait for a default to occur before you do something about it. So an insurance company, for instance, may see significant credit decline or the debtor may actually come to the insurance company in anticipation of problems. Frequently there are restructurings or sales related to or resulting from credit problems that don't ultimately manifest themselves in defaults but which actually reflect a significant loss or potential for loss associated with credit problems. So what we tried to define as being the measure associated with these problems is really the economic loss associated with both loss of principal and loss of current income. This includes another line of distinction between the typical default studies. Those default studies tend to capture lost principal as opposed to losses associated with the curtailment of the current income flow.

What we're wanting to do then, in defining our losses associated with credit risk, is to analyze the cash flows of the underlying investments, and evaluate on a discounted cash flow basis both before and after what we're calling a credit risk event to determine the level of loss by comparing the discounted cash flows both before and after the event. Based upon this definition, the project oversight group explored the currently available

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data from insurance company financial reporting. I think it's safe to say that neither GAAP or statutory reporting really provides what we felt was adequate information in terms of either the exposure data or the economic costs associated with credit risk. In all fairness to both types of financial reporting, neither one was really developed to serve that purpose either. The principal source of financial data on bonds or private placement bonds and commercial mortgages are Schedules B and D in the statutory annual statement, and one thing we discovered in looking at those two sources is that neither one really provided an adequate database for either private placement bonds or commercial mortgages. Many of the characteristics which impact credit risk simply aren't captured in those schedules. Bonds in good standing tend to be carried at amortized cost. Troubled bonds are carried at the NAIC designated values. There's really minimal distinction that's made between different quality standards. In the bond category, Schedule D, you have your yes bonds, you have your no bonds, and beyond that, there isn't a large amount of distinction by bond rating category. The same thing is true with mortgages. If you look at Schedule B, you find a fair amount of data on different geographic location but very little data that distinguishes by quality. Some companies have their own quality rating mechanisms. Those rating mechanisms aren't necessarily general enough to cross from one company to the other. They tend to be company specific. We think that there are specific characteristics associated with mortgages or private placement bonds that we can capture to relate the level of default loss or credit risk loss back to the underlying exposure in any specific category. Hopefully, that will give us some information that will allow us to do a better job in managing the risk and understanding the risk associated with those instruments. Companies maintain discretionary control, for the most part, of the value in schedule B for commercial mortgages. Commercial mortgages tend to be carried at book value. Even after foreclosure, when mortgages flow from the mortgage category into the foreclosed real estate category, oftentimes, the value that's carried over into foreclosed real estate continues to be book value.

As I mentioned earlier, credit problems within the area of commercial mortgages and private placements frequently manifest themselves through the restructuring process. In the financial reporting process that we live with, it's hard to distinguish between restructurings which have been done for distressed reasons or nondistressed situations. The data to evaluate either of those situations really doesn't exist within the financial reporting process. When capital losses are reported associated with commercial mortgages or private placement bonds, there really isn't any way to distinguish between capital losses that have resulted from credit problems versus capital losses that have resulted because of increases in interest rates.

Another problem associated with the losses is that there really is no way to capture within the financial statements that exist right now, the lost current income. In the case of mortgages, at least based on experience that we've tended to study for our own company, lost current income from mortgages tends to far outweigh losses associated with principal. From the time you have had a credit problem until the time you resolve it, you frequently have a significant volume of lost current income that you earlier had anticipated getting, and that over that time frame you have continued to work to try and restore the principal. So lost current income is a significant component of your credit risk loss.

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Another accounting vehicle that exists is the mandatory securities valuation reserve which doesn't adequately deal with these types of assets. There are too few quality distinctions within bonds, although some work by Terry Lennon of the New York Department is going to result in the very near future, I think perhaps this year end, in the expansion of the categories of bonds as well as an acceleration of the funding towards the level of the MSVR. But in the case of mortgage loans, the MSVR doesn't have a category associated with mortgages. That has been recognized as a weakness in the MSVR process. A committee chaired by Bill Ward of the Aetna is looking at developing an expanded MSVR beyond just the work that Terry Lennon has done within the New York Department. The results of our ongoing credit risk study we hope will provide significant data that will allow further enhancements of the MSVR process, but I think that data is not going to just appear in a short time frame. This will be an ongoing process, and that's just one area where we feel that data associated with this study will be valuable.

In a GAAP accounting sense, you find a lot of the same weaknesses as in statutory. On a GAAP basis though there is typically an internal discipline process where impairment reserves for troubled assets are established. But still, this is a process that isn't necessarily supported by a lot of data, and once again, you wait until after you have a problem before dealing with this. Part of what we're hoping to do is develop data that will allow some managing and advance analysis for pricing or MSVR rather than waiting until you actually have an impaired situation.

Another struggle we addressed in trying to look at available data from insurance companies was that much of this data, at least historically, is not available in electronic format. So the transfer of data to a study like the one we're trying to pursue is difficult to capture. Over the last couple of years, there's been an increasing use of electronics for massaging and storing data, especially for exposure type data we're dealing with here. But I think even among the largest companies represented on the project oversight group, it's only been within the last couple of years that there is reasonably adequate data from an exposure perspective to try to assemble that data in a readily available form.

Historical data related to defaults or restructures tends to be captured in paper files. Trying to resurrect that data typically is going to involve significant efforts on the part of investment professionals to make sure that it's done in an appropriate way to adequately analyze what we're trying to get at.

Following these early discussions about the definition of credit risk loss and availability of data, we came to a quick conclusion that what we needed to do was expand the group that was dealing with this particular project beyond actuaries, and actively involve investment professionals within our own companies, as well as others within the industry. We also sought to involve the ACLI through its investment research committee, and making use of its mortgage subcommittee and the private placement subcommittee. We were hoping to coordinate with the ACLI to facilitate data collection partly to avoid duplication of efforts knowing that companies were already submitting mortgage data to the ACLI. We felt it would be inappropriate to be adding one more source of data collection, so we specifically tried to concentrate our efforts on dealing with the ACLI to

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make sure that we were collecting data in the most useful and meaningful way possible. Another reason we wanted to involve the investment professionals was that if this data collection and this study that we're hoping to get started was going to be most useful, it was going to need to be data that were useful to both actuaries and investment professionals alike. One thing you find when you're dealing with the investment professionals and actuaries is that they don't always talk in the same terminology. Their evaluation techniques aren't always the same. So hopefully, by involving both the actuaries and investment professionals, we can create a commonality of terminology and commonality of evaluation techniques which will enhance the value of what we're trying to do. Also, in terms of trying to collect the data, it was simply based on available data through financial reporting and so forth. It was quickly obvious to us that you had to have the investment professionals involved to simply have access to the data. The group of actuaries on the project oversight group and the investment professionals who are now working closely with the project oversight group put together what we thought was a good laundry list of data specifications for both measuring the exposure of the entire invested asset base, as well as a loss measurement. Data were specifically identified for the historical study. The historical study has been focused on the last four complete calendar years, 1986 through 1989. Knowing the difficulty in recapturing certain historical data, we divided data specifications into what we're calling a mandatory or a minimum set of data that we'd really like to have to have meaningful results, and an additional set of data that we would like to have on the ongoing prospective study but that we know might be difficult to try to capture. So we've categorized data into those two categories, a minimum or mandatory category, and an extended or as available type category. For the historical study, the mandatory or minimum level of data was really focused more on what presumably we have a chance of collecting from an electronic sort of way without a lot of extra effort. The measure of the loss event once we capture these data will be calculated using the discounted cash flow analysis that I mentioned earlier. That will be done by collecting the cash flow data from the companies. There will be a centralized compilation of the data by the Society working through the MIB.

I thought I'd highlight examples of data requested for both the exposure and the loss event measurement so you'd at least have a flavor for the types of data that we're collecting. For the exposure base for private placement bonds, first of all, we're dealing with an asset identifier, calendar year end associated with the particular period in time, the currency indicator, original funding date, original maturity date, original coupon rate, principal outstanding at the end of the calendar year, and NAIC rating at the end of the calendar year. Those are categories of data within the minimum data items. Under the extended data items, we're talking about some kind of an indicator as to whether it's a restructure or not, SIC code information, quality rating at issue, most recent quality rating, and date of the most recent quality rating. We understand that there are differences in quality ratings from company to company, but we're hoping to capture enough information there so that we can then relate back to try and quantify based on original quality or most recent quality rating of the bond. Tax status indicator, LBO indicator, rate commitment date, loan amount at issue, average life at issue, and bond equivalent yield at issue are also examples within the private placement category for exposure. Under the category of trying to capture enough information to evaluate the loss, we have identified a loss calculation date, the earliest full call date subsequent to the date of credit event, the call price, quality rating at issue, most recent quality rating

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prior to the event, date of most recent quality rating, and then the whole category of cash flow items that I think each of you could probably think of as being representative of what it would take to measure the loss associated with both current income and principal.

On the mortgage loan side, we capture a lot of the same types of data. For the exposure base, once again, an asset identifier, calendar year and approved loan amount, original appraisal value, outstanding principal, original funding year, original maturity date, original interest rate, property type, and property location, are included as information. Under the extended data items, we're talking about data that would relate to restructure, rate commitment date, first funding date, internal rate of return at issue, the average life of the issue, the loan type, amortization type, zip codes, the types of the borrower, occupancy at origination, financial strength of the borrower, and others. For measuring the actual credit loss associated with commercial mortgages, we're dealing with identifying a date of the credit event, the date of the original scheduled payment on and after the credit event, and then a whole series of cash flow items that would be needed to capture or quantify on a discounted cash flow basis the loss associated with a mortgage credit problem. Finally, when you're dealing with commercial mortgages, one significant expense that flows from having a credit problem is the expense associated with managing a commercial mortgage out of a problem situation potentially into a foreclosed real estate situation. We have a series of items that try to capture some of that sort of data.

That hopefully gives a flavor for some of the considerations we took into account in trying to consider the data as well as the definition of a credit loss.

MR. ALLAN GOLD: Now that you've heard a bit about public bond studies and about the state of insurance company data, and a bit about what kind of data we want to get, I'd like to talk a little bit about the methodology of the intercompany study of credit risk, credit risk events, and the exposure base. The goal of the study is to design and implement a process for collecting and analyzing credit risk information both routinely and consistently. As Reed has said, we have focused the first phase on private placement bonds and commercial mortgage loans primarily to keep the scope of the project manageable, and because there's not much data in these two areas. The things about the study I'm going to talk about are the definition of a credit risk event, the loss calculation methodology and the exposure base. We have defined a credit risk event to mean any situation where a fixed income asset has been exchanged for another asset of lesser economic value where that exchange was not allowed under the terms of a contract. Specifically, there are three events. The first one is failure to make payments of interest or principal under the terms of a contract. Specifically for private placement bonds, we also include Chapter 7 and Chapter 11 bankruptcy of the borrower. Second, modification of the principal and/or interest terms where the lender agrees to these new terms in order to avoid expected future losses from the failure to pay interest and/or principal. And the third one is sale of the investment before maturity because of concerns of deteriorated credit if the purpose of the sale is again to avoid expected future losses from the failure to pay interest and/or principal under the terms of the contract.

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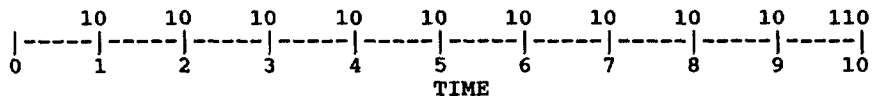
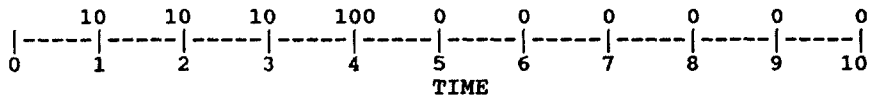
Now that we have defined the credit risk events, let's examine the loss calculation methodology. Traditional studies of asset default have either looked at the incidence of default or losses of par value of the bonds. As we've said before, we think that these don't adequately account for credit risk losses because they fail to take into account the market value of the asset and the lost interest. So the way the Society is proposing to calculate the losses associated with credit risk events is to compare the present value of the remaining cash flows of the original investment to the present value of the actual cash flows. If we do this, we will produce a market value loss as of the credit risk event date. The present value calculation will be based on the interest rates as of the date of the credit risk event, and we intend to determine those interest rates separately for private placement bonds and for commercial loans. The credit risk event date will be the earliest of the date of the first missed payment, the date of the modification, or the date of the sale.

Once we have the market value loss determined, we will convert that into an adjusted book value loss by multiplying the market value loss by the ratio of the book value of the original unimpaired asset to the market value of the original unimpaired asset. When I talk about the exposure base, you will see why we have to convert the market value loss into a book value loss.

For the purposes of doing our calculation, we have had to define the actual cash flows. There are three situations. The first one is when the original asset is restructured into a new fixed income asset. In this case the actual cash flows are just those cash flows of interest and principal of the new restructured asset. The second situation is when the asset is exchanged for either cash or marketable assets. In this case, we will know all we need to know about the actual cash flows either on the date of the exchange or shortly thereafter. In the case where the asset is exchanged for cash, we don't have a problem, the cash is the cash. In the case where it's exchanged for a marketable asset such as common stock, we have defined the actual cash flows to be equal to the market value of the stock on the day of the exchange, plus any net realized gain or loss from the sale of the stock during the next six months. We defined the cost flow in this manner because the company that gets the stock may want to actually have cash, but it can't sell it all on the day of the exchange. The third situation is when the asset is exchanged for a nonmarketable asset such as foreclosed real estate. In this case, we may not know what the market value is, or if we do, it may be artificially depressed, so we determine that the actual cash flows would be any net income received, such as rents, plus the actual net sales proceeds when the property is sold.

Now you can see that since we are going to calculate the present value on actual cash flows, we can't know what the true economic loss is until all the cash flows are known, and in some cases, this could take quite a while. But we want to get information about credit risk on an ongoing basis. So in order to get usable information about a credit risk on an ongoing basis, the submitting companies will provide actual cash flows plus any updates to estimates of the losses associated with credit risk events each year, until all the cash flows are finally known.

Two extremely simplified examples (see Charts 1 and 2) will show how the concepts work. The first one is a 10 year \$100 bond that pays annual coupons of \$10. Right

EXAMPLE 1BOND EXCHANGED FOR CASHORIGINAL CASH FLOW:ACTUAL CASH FLOW:

INTEREST RATE TIME 0: 10%

MARKET VALUE TIME 4, ORIGINAL CASH FLOW: \$129.67

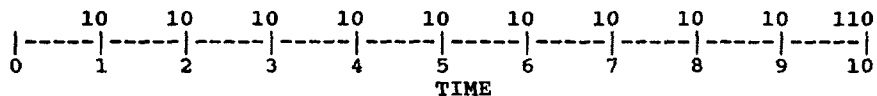
INTEREST RATE TIME 4: 6%

MARKET VALUE TIME 4, ACTUAL CASH FLOW: \$ 100.0

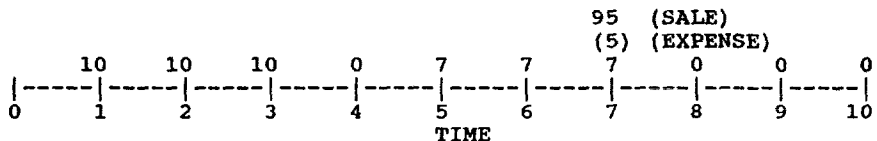
EXAMPLE 2

MORTGAGE LOAN FORECLOSURE

ORIGINAL CASH FLOW:



ACTUAL CASH FLOW:



INTEREST RATE TIME 0: 10%

MARKET VALUE TIME 4, ORIGINAL CASH FLOW: \$129.67

INTEREST RATE TIME 4: 6%

MARKET VALUE TIME 4, ACTUAL CASH FLOW: \$ 94.28

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before the end of time four, the lender agrees to accept early repayment of the principal due to credit concerns, even though early payment wasn't allowed under the terms of the contract. In this case, the actual cash flows ended at time four. If we look at the present value at time four of the original cash flows, and if we assume that the interest rate at that time has dropped to 6%, the market value of the original unimpaired cash flows is \$129.67. The market value of the actual cash flows is obviously \$100, so the economic loss is \$29.67, even though there was no actual loss of principal. The adjusted book value loss is \$22.88. The second example is a 10 coupon \$100 commercial mortgage loan where the principal is again payable in full at the end of the tenth year. In this case, the borrower misses the payment at time four, the lender forecloses at time five, and collects net rents of \$7 per year until time seven at which time the property is sold for \$95. There was \$5 of selling expense. In this case, the actual cash flows are zero at time four, \$7 in net rents for the next three years, and the net sales proceeds are \$90. Again, the present value of the original unimpaired cash flows would have been \$129.67. The present value of the actual cash flows was \$94.28, for a total economic loss of \$35.39.

The exposure base represents the book value holdings of the company that are subject to credit risk. It is the fact that the exposure will be the book value of the holdings that necessitates the conversion of the market value loss into an adjusted book value loss. We will calculate the exposure base for any calendar year as follows: for those assets that were in good standing at the beginning of the calendar year and remained in good standing throughout the calendar year, the exposure will be the mean of the two year end book values. For assets that were in good standing at the beginning of the year but experiencing credit risk event some time during the year, the exposure will be the beginning of year book value. And finally, for assets that were issued during the calendar year regardless of whether they remained in good standing or not, the exposure will be one half the issue date book value. Once an asset has experienced a credit risk event, it is forever excluded from the exposure base. This is a result of our methodology which says that any one asset can have one and only one credit risk event. Subsequent modifications are considered adjustments to the original modification.

MR. WARREN R. LUCKNER: There are three main volunteer groups involved in the new research management process. The first is the Research Policy Committee (RPC) which is a Board level committee chaired by the SOA Vice President for Research. That Committee is responsible for soliciting ideas about research projects from various SOA constituencies, for example, sections and committees. The RPC prioritizes the projects to be funded and forwards those projects to the Research Management Committee (RMC). The chairperson of the Research Policy Committee, in consultation with the RMC chairperson and with input from the project sponsor, appoints the project oversight group. The Research Policy Committee obviously has a lot of other responsibilities; this is just their role in the research project management process.

The RMC is responsible for the overall management of all projects that are approved by the RPC. The RMC approves the project definition for each project, selects researchers, and reports to the RPC on the status of all projects. The RMC is particularly concerned about coordination with the Committee on Experience Studies (CES). Many of the research projects will result in ongoing experience studies. Also, it's possible that a

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particular experience study committee, in the process of doing its experience study, may come up with an idea for a research project.

For each specific project, there is a project oversight group. That group is made up of people who have some particular expertise and/or interest in the subject of the project. The project oversight group finalizes the definition of the project. Initially, the project is submitted to the RPC in a somewhat general form; for example, the credit risk project was suggested by the Financial Reporting Section with a one page general description of the possible research, and the project oversight group has defined the project more thoroughly. The project oversight group is to provide guidance to the researchers, to monitor progress, and to report to the RMC.

The final group that's involved with the research management process is SOA staff. The staff supports the efforts of all the groups that are involved in the research, the policy committee, the management committee, the oversight group, and the researchers themselves, and arranges ultimately for the distribution of results.

Currently, there are 13 projects in different phases of this process. The credit risk project is a very important project, but it is only one of 13 that we're currently trying to manage through this process. One aspect of the credit risk project that I don't think has been mentioned is that there's a need for coordination with two other groups within the SOA: the Committee on Valuation and Related Areas (COVARA), and the SOA project oversight group for junk bonds research. The distinction between the work of COVARA and the work of the credit risk group is that COVARA is focusing on creating methodologies and approaches to implement the results of a study such as this one in the pricing and valuation processes for insurance companies. The chairperson of the project oversight group for junk bonds research is a liaison member of the coordinating committee for the credit risk project.

With respect to where we are, I'd like to make two comments, one about participants and one about data collected. Based on the expression of commitment and interest, we anticipate that we will have 10-15 different companies participating in each asset category of the study, although not exactly the same companies in each category. The two asset categories are private placements and commercial mortgages. The companies that submitted commercial mortgage data are estimated to cover about 55% of the commercial mortgage assets held by life insurance companies in the United States. We also have a couple of companies from Canada. The companies submitting private placement data are estimated to cover about 45% of the private placement assets for life insurance companies in the United States. Thus, the companies expected to submit data do represent an important and substantial amount of the assets held by life insurance companies for those two asset categories.

MIB, the central compiler for the data, has already received four submissions for the private placement study, and one submission for the commercial mortgage study.

With respect to where we're going, I would note that the original target date for collection of data was October 15. We anticipate that by the end of November, we'll have all the data that we expect to have in. We hope to have the approaches for

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analysis, the types of things we're going to analyze and all the technical details, finalized by the end of this year, and hope to have a final report produced by the end of March 1991. Coincidentally, there is a conference of AFIR, the investment section of the International Actuarial Association scheduled for April in England, and we're hoping that we can have a representative from this project present the results of the project for the benefit of the international community.

As we mentioned, the study is split into two phases, a historical study for the years 1986 through 1989, and then an ongoing study which we hope to implement. We hope to have the data specifications for the 1990 experience year distributed by the end of March. We do have available data specifications for the historical study. Even if you're not participating in the historical study, this may be of some interest and value to you if you might be interested in participating in the ongoing study because it gives you an idea of the types of things that we'll be asking about. There obviously will be some changes in the specifications for the ongoing study, but the current set of specifications does give you a good starting point. That's all I have to say right now; I certainly would appreciate your comments or suggestions on how to improve this study.

FROM THE FLOOR: I had a question that came up in Joseph Buff's talk. Is there a study that talks about how often ratings are changed and in what direction, so that we can piece together the different studies that do just an initial rating basis?

MR. BUFF: Yes. I'm not sure if there's something in the literature, but I think you can get this information by calling Standard and Poor's or Moody's. During my talk I mentioned the 26,000 bond years of experience with the 3,500 of rating changes. One thing maybe worth mentioning is that for some purposes, we've done the kind of adjustment that you've mentioned translating back and forth between one basis and the other. Remember I said if you use Professor Altman's style default costs and apply them to an inventory that's based on current ratings, there will be a tendency to overstate the default costs. It appears that if you reduce Professor Altman's at issue basis default costs by 20%, in other words, multiply them by a factor of .8, you get results which seem to work in the aggregate reasonably well for current basis ratings. I don't want to say that this .8 is a magic number, but it has been used in some major studies, and people who've had to rely on the results have thought that it was a useful way to adjust between the two rating bases. Does that essentially answer your question?

MR. WILLIAM M. HOUSE JR.: I'm wondering if any of you in your looking at this issue from the insurance company perspective have gotten any sense as to how these reserves are being held for companies with segregated accounts? Are they keeping them within the line of business, or are they buying insurance protection from the surplus line, or do you have any sense of how this is being handled in practice?

MR. MILLER: I guess we haven't specifically talked about that level of detail. I can talk a little bit about what we do. Within our segmented accounts, we would have situations where you have troubled private placement bonds or troubled mortgages, and for the most part, we maintain the troubled situations in a corporate account until the loss is actually realized, at which time we amortize the loss back into the product line through their investment income.

