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1986–1989 CREDIT RISK EVENT LOSS EXPERIENCE: COMMERCIAL MORTGAGE LOANS AND PRIVATE PLACEMENT BONDS

CREDIT RISK RESEARCH PROJECT
COORDINATING COMMITTEE*

EXECUTIVE SUMMARY

The study of the 1986 through 1989 credit risk event (CRE) loss experience of insurance company commercial mortgage loans and private placement bonds represents the first phase of an ongoing study of the economic loss resulting from credit risk events (see Appendix for definition). This study was initiated by the Society of Actuaries (SOA) in cooperation with the American Council of Life Insurance (ACLI) and represents a joint effort of actuaries and investment professionals.

Goals

The study attempts to measure incidence rates, loss severity, and expected basis-point loss associated with credit risk events. To that end, the study identifies asset characteristics believed to influence credit risk and develops a process for gathering and evaluating intercompany credit risk data according to these characteristics. It should be noted at the outset that it is not the intent of the study to evaluate the risk and reward trade-off of these asset classes, nor to analyze the relationship between credit risk experience and macro-economic forces.

The initial goals of establishing an intercompany credit risk study were:

- To establish common definitions for credit risk and credit risk events.
- To establish a common methodology for quantifying the costs of credit risk events over time.
- To better understand the asset characteristics that influence credit risk.

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The specific goals of the 1986–89 study were:

- To assess the readiness of companies to participate in an ongoing intercompany credit risk experience study.
- To gain experience in the design and implementation of an intercompany study of the economic loss associated with credit risk events.
- To provide guidance to companies on what data to collect and how to perform useful analysis of this information.
- To generate further interest and support for ongoing credit risk event loss studies within the actuarial and investment communities.
- To the extent possible, to provide information about the economic loss resulting from credit risk events that occurred in 1986 through 1989.

The Credit Risk Project Coordinating Committee is pleased to report that we have achieved all of these goals. In particular, the results of the 1986–89 study presented in this report demonstrate the ability to gather and analyze credit risk event data using a loss calculation methodology that provides insight into the economic loss due to credit risk events.

We will continue to gather credit risk and associated cost data and present the results in periodic reports in a manner similar to other Society of Actuaries experience studies.

Data

Fourteen companies contributed data to the study: 13 for commercial mortgages and 11 for private placements. The total amount of principal in the 1986–89 study is summarized in Table 1. A summary of the number of credit risk events and amount of credit risk event exposure is given in Table 2.

TABLE 1

TOTAL OUTSTANDING PRINCIPAL ($ BILLIONS)

Year-End	SOA 13 Company Commercial Mortgages Study	ACLI Total Industry Estimate	Percentage	SOA 11 Company Private Placements Study	ACLI Total Industry Estimate	Percentage
1985	$ 52.5	$145.4	36%	$49.5	N/A	N/A
1986	62.8	167.7	37	51.8	N/A	N/A
1987	88.1	187.4	47	58.5	N/A	N/A
1988	100.8	207.4	49	65.9	N/A	N/A
1989	111.2	228.2	49	70.6	$195	36%

TABLE 2

CREDIT RISK EVENTS AND EXPOSURE

Experience Year	Commercial Mortgages		Private Placements	
	CRE Number	CRE Exposure (Millions)	CRE Number	CRE Exposure (Millions)
1986	330	$1,655.3	53	$ 397.4
1987	315	1,908.6	57	707.2
1988	330	2,292.8	35	269.1
1989	281	1,811.4	34	407.3
1986–1989	1,256	7,668.2	179	1,781.1

Data Limitations

The Credit Risk Project Coordinating Committee believes the 1986–89 study makes a significant contribution to a better understanding of the economic loss resulting from credit risk events. There are, however, data limitations that should be noted to minimize possible misinterpretation and misuse of the study results.

- The data cover only the experience years 1986 through 1989.
- As is the case for other SOA experience studies, significant efforts were made to ensure the reasonableness and completeness of the contributed data, both with respect to internal consistency and with respect to consistency with external sources of information; however, the results of the study are ultimately dependent on the nature and scope of the data submitted.
- Due to practical limitations, data were not contributed by every company for each year of the study.
- Companies determined that they could not provide the required data for every sale and restructure; thus, companies were asked to submit data only for those events that were determined to be clearly credit-related.
- A long "tail" exists before the final outcomes of many credit risk events are known with certainty; the results will be updated as additional information becomes available over time.
- Data for some characteristics were limited.

Use of Results

The above limitations suggest that the results of this pilot study should be used cautiously. Although the Credit Risk Project Coordinating Committee believes the results provide a reasonably accurate picture of the credit risk loss experience during 1986 through 1989, the implications for future experience are less clear. It is anticipated that an ongoing study that builds on this study and provides results over a longer period of time will be better able to identify such implications and provide information of significant value to all financial institutions. Specifically, one should not place undue reliance on the absolute magnitude of the results, as they inevitably reflect the general market conditions of the period in question and that period represents only a portion of an economic cycle.

For those involved in product pricing, reserving, and setting investment risk margins, the trends and patterns of the results can provide a basis for comparison with assumptions currently being used. Ultimately, it is anticipated that detailed results by asset type and asset characteristic will be used in a manner similar to how companies use intercompany mortality and morbidity data.

For those involved in developing and managing investment portfolios, the trends and patterns can assist in providing a better understanding of how various asset characteristics impact risk and, ultimately, how to best set risk premiums.

Results

The disciplined analysis of intercompany results and analysis by selected characteristics are presented in this final report.

Highlights of the intercompany results include:

- For both commercial mortgages and private placement:
  - There is significant variability of results across companies and across years.
  - The year-to-year variability is significantly reduced for all companies combined, which suggests the importance of pooling intercompany data to establish credible or statistically significant experience.
  - For all companies and all years combined, the incidence rate by dollar amount is greater than the incidence rate by number, indicating that for all companies and all years combined, the average size of a CRE is greater than the average size of an exposure asset.

- Comparing commercial mortgages and private placements, for all companies and all years combined, the incidence rates by number and by dollar amount are approximately three times as high for mortgages as for bonds, while the loss severity is approximately the same, with the result that the expected "basis-point" loss is slightly less than three times as high for mortgages as it is for bonds.

This final report also includes results by the following characteristics for all companies combined:

Commercial Mortgages	Private Placements
• By year of funding	• By quality rating (most recent, earliest, National Association of Insurance Commissioners [NAIC])
• By original loan to value	• By original coupon rate
• By original interest rate	• By type of credit event
• By property type	• By funding year
• By geographic location	• By years since funding

Highlights for Commercial Mortgages

- By year of funding:
  - — Loans originated in the first half of the decade of the 1980s exhibited relatively high incidence rates, both by number and by dollar amount.
  - — Loans originated in the time period 1982 to 1984 seemed to have the greatest impact on the expected basis-point loss.
- By original loan to value:
  - — Exposure is concentrated near 75% with a number of CREs and exposure units not categorized.
  - — No clear pattern emerged for any of the loss statistics.
- By original interest rate:
  - — All four loss statistics tended to increase as the original interest rate increased.
- By property type:
  - — Consistent with ACLI survey results.
  - — The "other commercial," "hotel," and "apartment" categories exhibited significantly greater incidence rates by dollar amount than that for all categories combined; however, the "apartment" category

exhibited below-average loss severity, so that only the "other commercial" and "hotel" categories exhibited significantly above-average expected basis-point loss.

- By geographic location:
  - Consistent with ACLI survey results.
  - The "West South Central" and "Mountain" regions exhibited significantly greater incidence rates by number and by dollar amount than that for all regions combined.
  - The "Mid-Atlantic," "East North Central," and "West South Central" regions exhibited greater loss severity than that for all regions combined, but only the "West South Central" and "Mountain" regions exhibited a significantly greater expected basis-point loss than that for all regions combined.

Highlights for Private Placements

- By quality rating (most recent, earliest, NAIC):
  - A significant percentage of the amount exposed did not have quality rating information and the amount of exposure of rating categories below BBB was very limited for both "most recent" and "earliest."
  - Because only one company had data sufficient to produce results by original rating at issue, the results by earliest quality rating were very similar to the results by most recent quality rating.
  - For "most recent," the incidence rate by number increased dramatically from BBB to BB, and continued to increase steadily through B and <B.
  - For "most recent," the three other loss statistics exhibited distinct deterioration of experience for ratings through BB, but the experience seemed to improve with decrease in quality for categories BB, B, and <B; the final report discusses this point in some detail.
  - The results by NAIC rating under the previous system generally confirm intuition when all years and all companies are combined.
- By original coupon rate:
  - For each experience year, the incidence rate by number tended to increase as the original coupon rate increased.
  - When all years were combined, there was evidence of an increasing incidence rate by dollar amount for increasing original coupon rate

and both loss severity and expected basis-point loss exhibited an upward trend as the original coupon rate increased.

- By type of credit event:
  - — Because over 60% of the CREs were identified as "fail to pay," results are not particularly meaningful.
  - — Comparing "fail to pay" and "bankruptcy" groups suggests that "fail to pay" had significantly worse experience.
- By funding year:
  - — Although there was significant variability by experience year for all loss statistics, there seemed to be a generally increasing pattern as the funding year became more recent for all years combined.
- By years since funding:
  - — Excluding the one disproportionately large CRE, both the incidence rate by number and the incidence rate by dollar amount peaked at approximately two years.
  - — Although the regression line for loss severity suggests a downward trend, the expected basis-point loss also seemed to peak at approximately two years.

This report contains much more detail regarding these results as well as additional analyses.

I. INTRODUCTION

A. Background

The 1986 through 1989 study of the credit risk event (CRE) loss experience of insurance company commercial mortgage loans and private placement bonds represents the first phase of an ongoing study of the economic loss resulting from credit risk events (see Appendix for definition). This study was initiated by the Society of Actuaries (SOA) in cooperation with the American Council of Life Insurance (ACLI) and represents a joint effort of actuaries and investment professionals.

Commercial mortgage loans and private placement bonds represent a significant portion of fixed-income securities owned by life insurance companies. In 1989, such assets represented approximately 37% of the general account assets held by life insurance companies. In spite of substantial holdings, there is no published, industry-wide, direct data from which default loss experience or, more importantly, the economic loss from credit risk

events related to these securities can be assessed. Consequently, disciplined study of insurance company commercial mortgage loans and private placement bonds is important. An ongoing study is essential to reach an understanding of these asset classes as well as to provide reasonable assumptions for setting asset valuation reserves and risk-based capital standards, and to provide information of value in the portfolio management process.

The insurance business has changed and continues to do so, both with respect to the types of products sold and in the way premiums are invested. The economic environment also has been transformed and now provides substantial investment challenges. In the 1980s, real interest rates were much higher and more volatile than they were previously as inflation and later the fear of inflation plagued the economy. This interest rate environment made debt service more difficult for borrowers and the economic value of missed payments more costly to lenders. It is important to keep in mind that a significant number of loans that form the basis of this study were made in this economic environment.

To understand better the credit risk events of the 1986 through 1989, it is helpful to review the economic conditions and their impact on asset defaults. In particular, commercial mortgages were subject to an unprecedented set of circumstances. Not only was the structure of the economy changing at a rapid pace, but inflation or fear of inflation, high interest rates, the rolling recession, changes in the tax law and demographics all combined during the 1980s to impact delinquency rates.

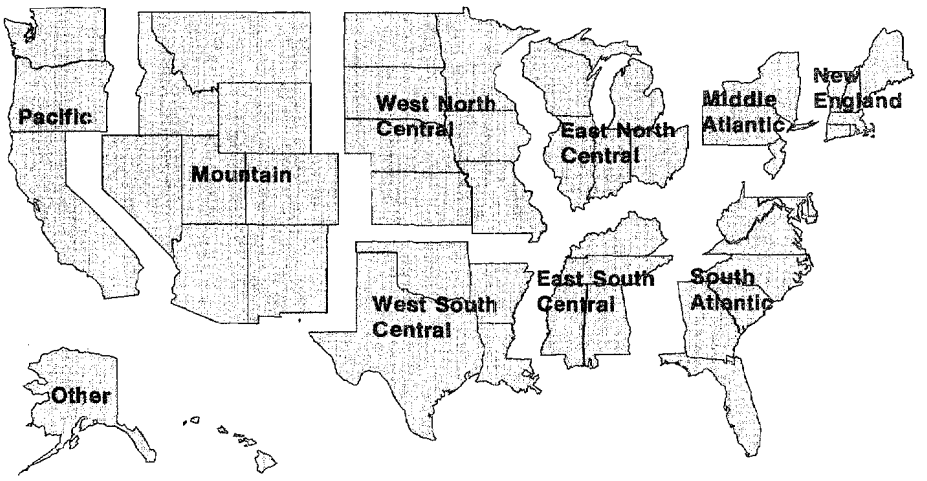
The economy of the U.S. saw dramatic changes in its structural components in the 1970s and 1980s. The manufacturing base, exemplified by the auto and steel sectors, began a long decline. The number of lower paying and, for the most part, service type jobs rose dramatically. At the same time, there was a recognition that the U.S. economy was intertwined with those of our trading partners and affected by their economic conditions. Quality issues, cheap labor and trade restrictions also became important considerations.

After a short attempt to control prices under the Nixon administration, inflation accelerated into a major dilemma for the economy. The actions of the Federal Reserve in 1981 to attempt to gain control over inflation sent interest rates to their highest levels. In fact, the yield curve became inverted with short-term rates, as evidenced by the prime rate, going over 20%. Long-term rates also were affected and went up in response to the reduction of the money supply. Mortgages of all types felt the impact and, as can be seen

in the analysis by year of funding later in this report, 1981 and 1982 clearly show a marked decrease in commercial mortgage lending activity. However, a positive aspect was that real estate investments tended to benefit from high inflation by increasing in value and making replacement costs higher.

The tightening of the money supply also had a serious effect on the economy in general. A double dip recession in the early 1980s did give way to a long expansion period. Even so, during this time of growth, a series of economic downturns hit various segments of the economy and regions of the country. The oil and gas industry was among the first sectors to feel this change due in large part to an increase in a stable supply of lower cost foreign oil. The effect on the economies of the oil- and gas-producing states (West South Central and Mountain regions by ACLI definition—Figure 1) was significant and quite pronounced in terms of a decrease in real estate values. This boom and bust cycle in the oil and gas business is not uncommon, but the seriousness of this decline was much worse than expected.

FIGURE 1
ACLI GEOGRAPHIC REGIONS FOR DELINQUENCY REPORTS



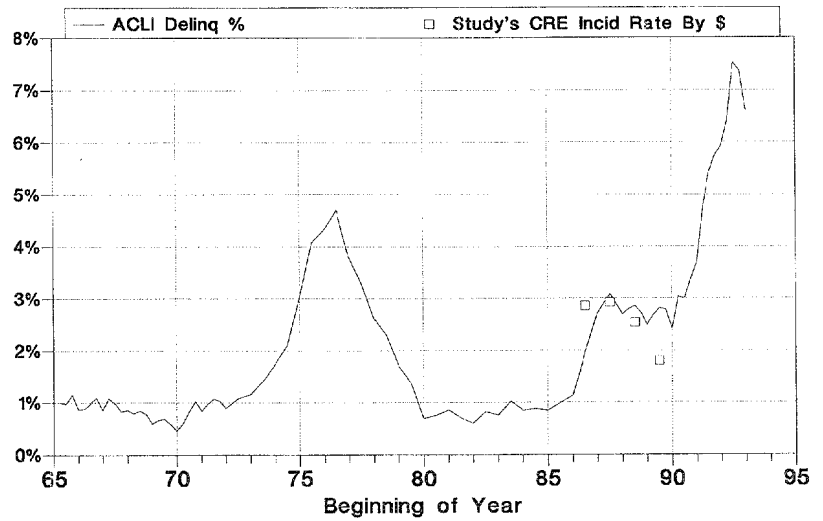
As the recovery gained strength in the middle to latter 1980s, pockets of the economy suffered slowdowns affecting areas of the country differently. This "rolling recession," as it became known, seemed to hit the high-tech companies as well as basic industries. Relatively high interest rates exacerbated the situation. One result of this rolling recession was that the longer term prospects of commercial real estate were caught up in these shorter term problems, which unfortunately were reflected in a slow but steady increase in the delinquency rates for commercial mortgages from 1985 on.

Changes in the tax code in 1986 also posed problems for real estate. Strict limits on the use of passive investment losses to offset income made some real estate partnerships less attractive going forward. The elimination of the accelerated cost recovery system (ACRS) for depreciation purposes further hampered future real estate deals.

To a certain extent, demographics also plays a role in the story of real estate. As the baby boom generation entered the labor force, the need for more office and work space increased. With the entry of those following the baby boomers, office space needs are not going to increase as rapidly due to their relatively lower numbers.

An additional piece of information on commercial mortgages is a long-term perspective on delinquencies. Figure 2 tracks delinquent loans, including those in process of foreclosure, from 1965 through 1992. Delinquencies for many years are at reasonably low rates, rising with the recession in the early 1970s and peaking in 1975–76 before returning to similar levels before the economic downturn. Again, after a number of years with relatively low delinquency rates, a noticeable increase in delinquencies begins in the 1986 time period. The important points here are that this timing coincides with the start of this pilot study on credit risk and that the commercial real estate market appears to run in fairly long economic cycles, at least greater than the four years of this report.

FIGURE 2
DELINQUENCIES FOR COMMERCIAL MORTGAGES:
1986–89 CREDIT RISK STUDY VERSUS THE 1965–92 ACLI SURVEY*



*Note that an incidence rate, which is the inception rate of a status, is not directly comparable to a prevalence rate, which is the percentage in a status at a particular time.

The four years of the incidence rates by dollar amounts from the SOA study also are plotted in Figure 2. While not strictly comparable because of definitional differences, the ACLI and SOA data do bear a striking resemblance to each other.

Weighing all these factors quite clearly complicates the picture for commercial mortgages and real estate. The continued corporate downsizing and slow job growth are still factors with which to reckon. However, with interest rates now reaching very low levels and inflation being held in check, investment opportunities pose new challenges.

With this background, credit risk is arguably the primary risk now facing life insurance companies with respect to the vast liabilities created by investment-oriented products. Moreover, insurance companies are not the only entities subject to credit risk events. Banks, pension funds and commercial credit companies encounter many of the same problems resulting from investments in commercial mortgage loans and private placement bonds.

Because the study period covers only a relatively short portion of the economic cycle, the results contained in this report must be interpreted very carefully. In particular, although the Credit Risk Project Coordinating Committee believes the results presented provide a reasonably accurate picture of the credit risk event loss experience during 1986 through 1989, the implications for future experience are less clear. It is anticipated that an ongoing study that builds on this study and provides results over a longer period of time will be better able to identify such implications and provide information of significant value to all financial institutions.

B. The 1986–89 Study

1. Goals

The specific goals of the 1986–89 study were:

a. To assess the readiness of companies to participate in an ongoing intercompany credit risk experience study.
b. To gain experience in the design and implementation of an intercompany study of the economic loss associated with credit risk events.
c. To provide guidance to companies on what data to collect and how to perform useful analysis of this information.
d. To generate further interest and support for ongoing credit risk event loss studies within the actuarial and investment communities.
e. To the extent possible, to provide information about the economic loss resulting from credit risk events that occurred in 1986 through 1989.

2. Data Contributors

Fourteen companies contributed data to the 1986–89 study. The Society of Actuaries thanks those companies for their efforts in completing this first intercompany study of the credit risk associated with investment in commercial mortgage loans and private placement bonds.

The companies that contributed data to the study are:

Aetna Life & Casualty	Prudential Insurance Co.
John Hancock Mutual Ins. Co.	SAFECO Life Insurance Co.
Metropolitan Life Ins. Co.	Sun Life of Canada
Nationwide Life Insurance Co.	TIAA/CREF
The New England	Travelers Insurance Co.*
Penn Mutual Life Ins. Co.*	Washington Square Capital†
The Principal Financial Group	Western & Southern Life Insurance Co.*

* Commercial mortgages only
† Private placements only

Of the thirteen companies that contributed commercial mortgage data, nine contributed data applicable to the entire study period; four contributed data for only the last two years of experience. Of the companies that contributed private placement data, eight contributed data applicable to the entire study period; three contributed data for only the last two years. The total amount of outstanding principal in the 1986–89 study is summarized in Table 3. The number of credit risk events and amount of credit risk event exposure are summarized in Table 4.

TABLE 3

TOTAL OUTSTANDING PRINCIPAL ($ BILLIONS)

Year-End	Commercial Mortgages Study	ACLI Industry Estimate	Percentage	Private Placements Study	ACLI Industry Estimate	Percentage
1985	$ 52.5	$145.4	36%	$49.5	N/A	N/A
1986	62.8	167.7	37	51.8	N/A	N/A
1987	88.1	187.4	47	58.5	N/A	N/A
1988	100.8	207.4	49	65.9	N/A	N/A
1989	111.2	228.2	49	70.6	$195	36%

TABLE 4

CREDIT RISK EVENTS AND EXPOSURES

	Commercial Mortgages		Private Placements	
Experience Year	CRE Number	CRE Exposure (Millions)	CRE Number	CRE Exposure (Millions)
1986	330	$1,655.3	53	$ 397.4
1987	315	1,908.6	57	707.2
1988	330	2,292.8	35	269.1
1989	281	1,811.4	34	407.3
1986-1989	1,256	7,668.2	179	1,781.1

3. Basic Model

The actuarial model used as a basis to formulate this study was that of disability insurance. The parallels between a disability policy and the life cycle of an investment are quite striking. Just as an individual is underwritten prior to the issuance of a policy, a bond or mortgage loan is underwritten at its origination. A policyholder may or may not become disabled while the policy is in effect. Likewise, a bond or loan may or may not suffer from some condition that impairs it. A person on disability may remain disabled and draw benefits, become healthy and get off of disability, or die. An investment may remain "ill" and pay off at a lesser rate, return to a healthy status and pay off at its original rate, or terminate, which will result in default or foreclosure.

For disability insurance, various parameters need to be observed in order to calculate the price to be paid for the risk assumed. For a private placement bond or commercial mortgage, a basis point spread over Treasuries for the interest rate on the loan is the price to be paid, and various parameters are important in determining that price.

By collecting a sufficient amount of experience, incidence rates, economic losses, loss severities and portfolio losses can be analyzed. The intent of the study is to follow the outflow of cash in the form of a loan until repayment is completed, "cash to cash" or "cradle to grave." Various characteristics also can be investigated to determine their relationships to problem investments and to quantify their impacts on economic losses and loss severities over the life cycle of the investments.

Studying investments in terms of a disability model is a rather novel approach. However, this model is well developed by actuaries and lends itself to investigating the variables that can be important in understanding problems related to investments. In addition, actuarial models and research have pioneered the concept of large, complex studies of intercompany experience to ascertain the information necessary to understand the mortality and morbidity associated with various insurance products.

C. Description of Appendix

The Appendix to this report gives the definition of credit risk event, the definitions of date of credit risk event and of date of loss calculation, a summary of the calculation methodology and the data validation procedures

used in the study, and a listing of the ACLI commercial property type definitions. The summary of the calculation methodology gives detail on the interest rate methodology and the calculation of economic loss, exposure and the loss statistics.

II. LIMITATIONS OF 1986–89 STUDY

Although the Credit Risk Project Coordinating Committee believes the 1986–89 study makes a significant contribution to a better understanding of the economic loss resulting from credit risk events, there are limitations to the study that should be noted to minimize possible misinterpretation and misuse of the study results.

Limitations include:

- The data cover only the experience years 1986 through 1989.
- For commercial mortgages, four of thirteen companies contributed data only for the 1988 and 1989 experience years. Similarly, for private placement bonds, three companies contributed data only for the 1988 and 1989 experience years. Thus, for both asset types, the results for 1986 and 1987 are based on data from a group of companies that is different from, and a subset of, the sets of companies that contributed for 1988 and 1989.
- Companies determined that they could not provide the required data for every sale and restructure for the 1986–89 study. Therefore, companies were asked to submit data only for those modifications, sales and other events that the company could determine were clearly credit-related. (Note: Although this approach could lead to significantly biased reporting, a comparison, by ACLI staff, of private placement bonds and commercial mortgages submitted as credit risk events and company annual financial statements indicated that the reporting of the credit risk events seemed reasonable.) Future data collection will emphasize the need to report all assets that incurred changes from the originally contracted cash flows.
- Companies provided data to the study at different times. Some companies updated their revised cash-flow files with more current information as part of the data validation and correction process.
- A long "tail" exists before the final outcomes of many credit risk events are known with certainty; the results will be updated as additional information becomes available over time. For example, the way in which a foreclosure is treated in the revised cash-flow records by companies is of considerable interest. The study calls for the tracking of the cash flows

past the point of foreclosure, to culminate in the final sale price or the most up-to-date appraised value as a proxy. Despite this stipulation, some companies have provided cash-flow projections to the foreclosure date only. In such cases, the terminal value furnished may be the book value of the mortgage at foreclosure rather than the property's appraised value, which may come closer to the present value of the expected cash flows. However, the iterative nature of this study will eventually sort out these differences as the "cash to cash" basis of this effort examines the ultimate outcomes for foreclosures over time. Future data requests will provide more detailed guidelines for handling foreclosures.

- These preliminary results do not include an explicit analysis of the impact of external economic conditions.
- The results presented do not directly take into account differences in investment underwriting practices over time or across companies.
- Data for some characteristics were limited; examples include:
  - Approximately 9% of the private placement bond asset records for which non-zero outstanding principal values were expected (for example, because there were year-end records with non-zero outstanding principal before or after) seemed to be missing; possible explanations include: movement of assets among subsidiaries, calls/prepayments, consolidation of assets and occurrence of a credit risk event.
  - The outstanding principal values were zero or missing on approximately 5% of the commercial mortgage loan records submitted.
- Some data elements that should have remained consistent from year to year appeared to vary somewhat; however, such deviations usually had reasonable explanations.
- This study does not attempt to measure the risk-reward trade-off of investments; it does not relate the relative size of these assets to the investment portfolios and strategies of different companies.
- Although significant efforts were made to ensure the reasonableness and completeness of the contributed data, the results of the study are ultimately dependent on the nature and scope of the data submitted.

An additional limitation related to the commercial mortgage loans portion is that the study is not designed to be able to aggregate, within or across companies, different loans on a single property. Thus, the incidence rate by number of credit risk events might be somewhat overstated for these cases, but the incidence rate by dollar amount and other loss statistics are not

similarly affected. These situations are thought to be relatively minor, if they exist at all. Similarly, the study is not designed to be able to aggregate, across companies or within companies, different bond issues from a single issuer or different shares of the same issue.

Additional limitations related to the private placement bonds portion of the study include:

- The relatively small number of credit risk events makes it difficult to analyze results by some characteristics.
- Comprehensive asset identification number changes during 1989 for approximately half the companies in the study made it difficult to precisely assess the completeness of the data.
- Apparent duplication of cash flows in CRE data (such duplications of original contractual cash flows were eliminated in calculations and identified for the appropriate companies).
- Multiple funding dates and/or multiple maturity dates associated with the same asset identification numbers.
- The study does not attempt to capture the gains or losses from non-debt securities even though private placement bonds, particularly those associated with leveraged buyouts, often include equity components which, on a portfolio basis, can provide substantial gains to offset losses; the study also does not attempt to capture gains or losses that result directly from calls or prepayments (for example, prepayment penalties).

Finally, it is perhaps most important to note that a primary purpose of the 1986–89 study was to learn how to better conduct such a study. It was anticipated that much of the data described would be difficult, if not impossible, to gather, but it was expected that the experience of going through the procedures necessary to gather data for 1986–89 would identify changes necessary to conduct such a study on an ongoing basis (for example, the type of data and procedural changes needed to gather the data). In general, this hypothesis was confirmed, and many data contributors now have enhanced capabilities and management information systems to respond to internal as well as external inquiries on private placement bonds and commercial mortgage loans. An important example of what was learned is that many private placement bond data contributors were not able to easily provide quality rating at issue; having available the entire history of quality ratings would significantly enhance the value of the possible analyses.

Any interpretation of the results and analysis should keep in mind the primary purpose of the 1986–89 study and the above limitations.

Despite the many difficulties associated with recapturing historical data, contributing companies perceived that there was an important need to develop a process for obtaining relevant loss data on an ongoing basis. Without the efforts of these companies, a study of 1986–89 data would not have been possible.

III. USE OF THE RESULTS

The data and data processing limitations identified in Section II suggest that the results of this pilot study over four years are of relative rather than absolute value. One should not over-rely on the absolute magnitude of these results. They inevitably reflect market conditions of the period in question. Until a few more years of data are collected to encompass an economic cycle more fully, the value of the 1986–89 study lies in assessing the relative significance of identifiable risk factors. The approach of the study is an empirical one through the pooling of intercompany data using consistent definitions.

For those involved in pricing products, reserving, and setting investment risk margins, the trends and patterns of the results can provide a basis for comparison with assumptions currently being used. Ultimately, it is anticipated that detailed results by asset type and asset characteristic will be useful in models in a manner similar to how companies often use the intercompany mortality and morbidity data.

For those involved in developing and managing investment portfolios, the trends and patterns can assist in providing a better understanding of how various asset characteristics impact risk and, ultimately, how to best set risk premiums.

The Coordinating Committee believes that the primary value of the results based on the 1986–89 data is that the results demonstrate the ability to gather and analyze such data using a loss calculation methodology that provides a disciplined framework for analyzing credit risk and for assessing what data are needed to appropriately manage credit risk. The Committee hopes you will find this to be the case.

IV. PRESENTATION OF RESULTS

A. Background

Various tables, along with supplemental figures, are interspersed with the commentary. These tables and figures summarize the results tabulated to date.

Four loss statistics are used in the presentation of the results.

The first loss statistic, *Incidence Rate by Number*, should be interpreted carefully because:

- It does not reflect different amounts exposed for different credit risk events.
- There is possible distortion of the numerical value for that statistic, as indicated in Section II.

However, the values of the incidence rate by number do give a framework of reference for the rate at which such events were occurring in 1986 through 1989.

The *Incidence Rate by Amount* gives additional information on incidence because it accounts for differing amounts of outstanding principal for different credit risk events. It can be interpreted as the amount of potential total loss per dollar of exposure.

The *Loss Severity* is the ratio of the economic loss to the amount of exposure associated with credit risk events. This ratio gives a measure of how severe the loss is; that is, the ratio indicates for a given credit risk event what proportion of the total investment dollar (principal and interest) is estimated to be lost. The Appendix describes the calculation of the economic loss and the resulting loss severity statistic.

Multiplying the *Incidence Rate by Amount* and the *Loss Severity* yields the *Ratio of Economic Loss to All Exposures*, which could be considered an overall loss "rate." The resulting values can be interpreted as the amount of economic loss per dollar of exposure, and can be expressed as interest rate "basis points" (for example, 0.0050 is equivalent to 50 basis points).

The loss statistics and their components are defined in more detail in the Appendix.

B. Analysis

In analyzing the results, it is important to keep in mind that the study is an attempt to quantify the risk associated with possible credit risk events on

commercial mortgage loans and private placement bonds. The study is not designed to measure the trade-off between "risk" and "reward": a company with a relatively high value of any of the ratios is not necessarily in a worse financial situation because the company may be well compensated for taking on additional risk. Also, because of the limitations indicated above, it is inappropriate to place too much emphasis on the *magnitude* of the numbers. The *variability* across years, companies and characteristic categories does, however, warrant analysis.

C. Note on Exhibits

Several types of exhibits are included to assist in the review of the results presented in the tables: bar graphs, line graphs, histograms, and scatter diagrams.

In some cases, the bar graphs for the four loss statistics allocate the average annual rate (or ratio) to each of the four years. The allocation is accomplished by partitioning the four components in the numerator while keeping the common denominator:

$$\frac{C1+C2+C3+C4}{E1+E2+E3+E4} = \left(\frac{C1}{E1+E2+E3+E4} + \frac{C2}{E1+E2+E3+E4} + \frac{C3}{E1+E2+E3+E4} + \frac{C4}{E1+E2+E3+E4} \right)$$

After the partitioning, each of the four sections is coded in the bar graph to afford a visual sense of each year's contribution to the four-year average. Naturally, the effectiveness of this schematic attribution depends on roughly comparable exposures among the four years.

Some bar graphs include incidence rate by number, incidence rate by amount, and the ratio of economic loss to all exposure in one graph. The first two items are in bar graph form and the third item is in the form of a marker on the bar graphs.

The markers on the CRE exposure bar graphs indicate the amount of economic loss in the corresponding cell of data.

In some cases, line graphs are used to present the four loss statistics. Incidence rate by number, incidence rate by amount and the ratio of economic loss to all exposure are on one graph and the loss severity on another. The size of the markers on these line graphs gives an indication of the relative amount of data in the cell represented by the marker.

The numerical values on some of the line graphs and bar graphs give the number of credit risk events in the corresponding cell of data.

V. RESULTS FOR COMMERCIAL MORTGAGE LOANS

A. Overall Results by Company and Year

The following discussion utilizes information in Tables 5–8 and Figures 3–6, which illustrate the tabular data. In general, these results should be viewed as somewhat incomplete because the final outcomes of many of the 1,256 credit risk events enumerated in this study have not reached a resolution; that is, the cash-to-cash basis of this study has not been reported for all CREs. In addition, there is a tendency to have less perfect information on those CREs that have occurred closer to the end of the experience period. This condition is sometimes referred to as a right censoring problem. The correction to this dilemma is the collection of updated information on the existing CREs as well as the addition of more current CRE experience.

1. Incidence Rate by Number (Table 5 and Figure 3)

The incidence rate by number shows a large variation among the companies and even by year for a given company. But the year-to-year aggregate contribution is much more uniform for all companies combined, which indicates the importance of pooling intercompany data to establish credible experience. The four-year composite incidence rate for each company and for all companies combined probably exhibits reasonable overall levels for this period.

The number of CREs in this study varies from 330 in 1986 and 1988 to 281 in 1989. The exposure base also varies from year to year and shows a marked increase in 1988 because of the addition of four companies to the study.

The decrease in the number of CREs and resulting decrease in the incidence rate for 1989 may demonstrate the right censoring problem rather than being an actual decrease. As part of the next round of data collection for this study, data contributors will be asked to review their 1989 submissions for correctness. Some CREs may have occurred in 1989 but were recognized after the data were compiled.

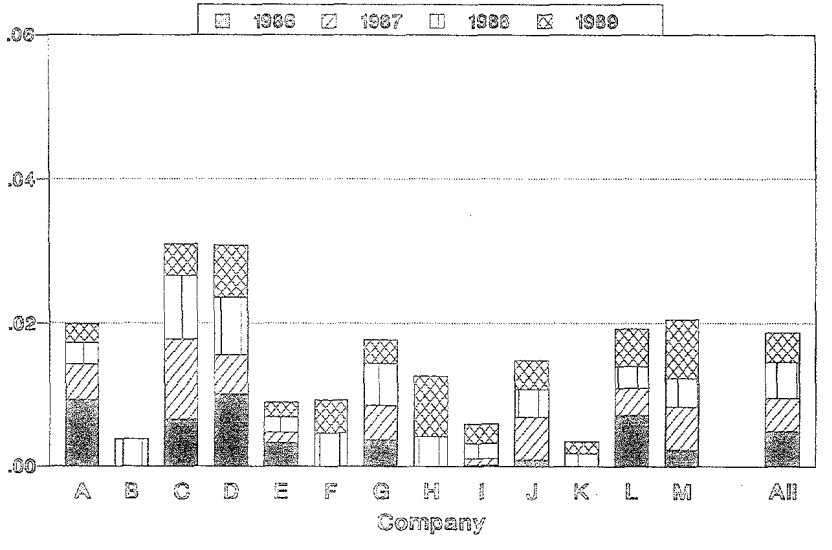
TABLE 5

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY NUMBER

Company	Ratio of No. of CREs to No. of Exposures				
	1986	1987	1988	1989	1986–89
A	0.0288	0.0186	0.0140	0.0134	0.0199
B			0.0084	0.0000	0.0038
C	0.0229	0.0413	0.0378	0.0210	0.0311
D	0.0363	0.0215	0.0340	0.0315	0.0309
E	0.0131	0.0060	0.0084	0.0082	0.0089
F			0.0094	0.0092	0.0093
G	0.0135	0.0186	0.0242	0.0151	0.0177
H			0.0082	0.0168	0.0125
I	0.0009	0.0034	0.0083	0.0101	0.0059
J	0.0037	0.0223	0.0154	0.0177	0.0147
K			0.0037	0.0033	0.0035
L	0.0275	0.0153	0.0117	0.0223	0.0193
M	0.0097	0.0252	0.0152	0.0306	0.0205
All Companies:					
No. of CREs	330	315	330	281	1,256
No. of Exposures	16,695.0	15,737.0	17,521.0	17,027.0	66,980.0
Ratio	0.0198	0.0200	0.0188	0.0165	0.0188

FIGURE 3

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY NUMBER



2. Incidence Rate by Amount (Table 6 and Figure 4)

Perhaps not surprisingly, the incidence rate by amount also shows a large dispersion among companies. In general, the incidence rate by amount will be greater than the incidence rate by number if the average outstanding principal for CREs is larger than the average outstanding principal for all exposures. In this study, 10 of the 13 companies had overall incidence rates by dollar amount that were higher than their overall incidence rates by number, albeit that two of the ten companies have essentially the same rates for incidence by number and amount. The all-companies-combined incidence rates by dollar amount by year and for the four-year total are higher than the comparable values for incidence rates by number. As with the incidence rates by number, the pooling of the data for all companies combined results in a more uniform pattern for the incidence rates by amount.

The dollar amount of CRE exposure (outstanding principal) varies by year but is in the range of $1.7 billion to $2.3 billion. The total exposure by year increases from 1986 onward, particularly with the addition of four companies in 1988.

Again, the right censoring problem should be considered as a potential explanation of the decrease in the incidence rate.

TABLE 6

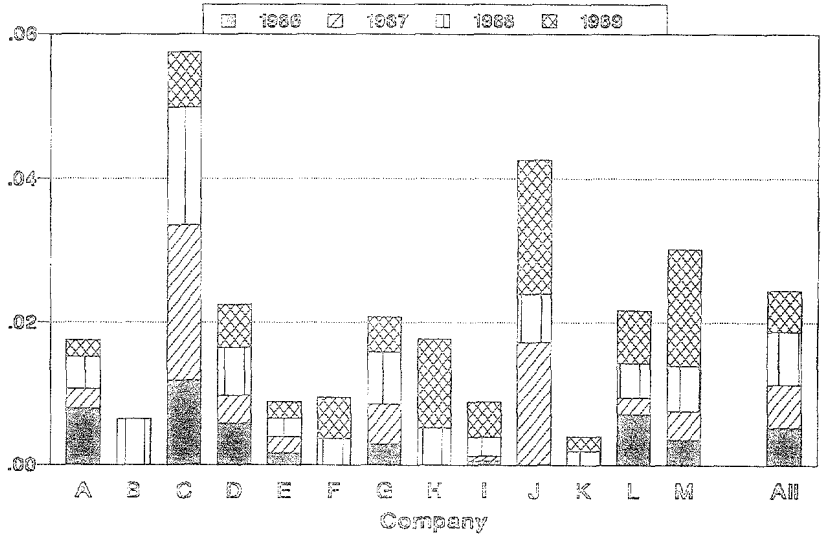
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY DOLLAR AMOUNT*

Company	Ratio of CRE Exposure to All Exposure				
	1986	1987	1988	1989	1986–89
A	0.0378	0.0133	0.0171	0.0072	0.0174
B			0.0144	0.0000	0.0065
C	0.0491	0.0827	0.0648	0.0313	0.0575
D	0.0271	0.0162	0.0259	0.0210	0.0224
E	0.0095	0.0107	0.0091	0.0069	0.0088
F			0.0080	0.0107	0.0094
G	0.0142	0.0230	0.0279	0.0171	0.0207
H			0.0106	0.0244	0.0175
I	0.0027	0.0036	0.0095	0.0164	0.0089
J	0.0004	0.0655	0.0249	0.0747	0.0426
K			0.0044	0.0038	0.0040
L	0.0372	0.0100	0.0173	0.0246	0.0217
M	0.0202	0.0183	0.0236	0.0489	0.0303
All Companies:					
CRE Exposure	$1,655,287	$1,908,636	$2,292,804	$1,811,426	$7,668,152
All Exposure	$57,876,003	$65,196,847	$90,326,775	$100,287,960	$313,687,585
Ratio	0.0286	0.0293	0.0254	0.0181	0.0245

*Dollar amounts in thousands.

FIGURE 4

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY DOLLAR AMOUNT



3. Loss Severity (Table 7 and Figure 5)

The overall loss severity for the 1986–89 period essentially falls between about 12% and 50% for each company, with the exception of one company, which demonstrated a very small loss. Only four of the thirteen companies are relatively close to the overall 1986–89 mean which illustrates the large variation among the companies. For the most part, the contribution by company by year is not constant, varying in one case from a loss severity of about 9% in one year to about 64% in the next year. In another case, a company even demonstrated a small gain for a year. However, when all companies are combined, the loss severity appears to be relatively stable at about a 25% rate overall. This loss rate is slightly less than the preliminary results of the study's private placement bonds experience.

While the loss severity tends to fluctuate from year to year, this variation may be a function of timing, for example, the results of the more recent CREs may not be known with as much certainty as the older ones and the final outcomes of many CREs may not have been resolved completely. This situation will be corrected in time as the next phase of this study updates information on these existing CREs.

TABLE 7

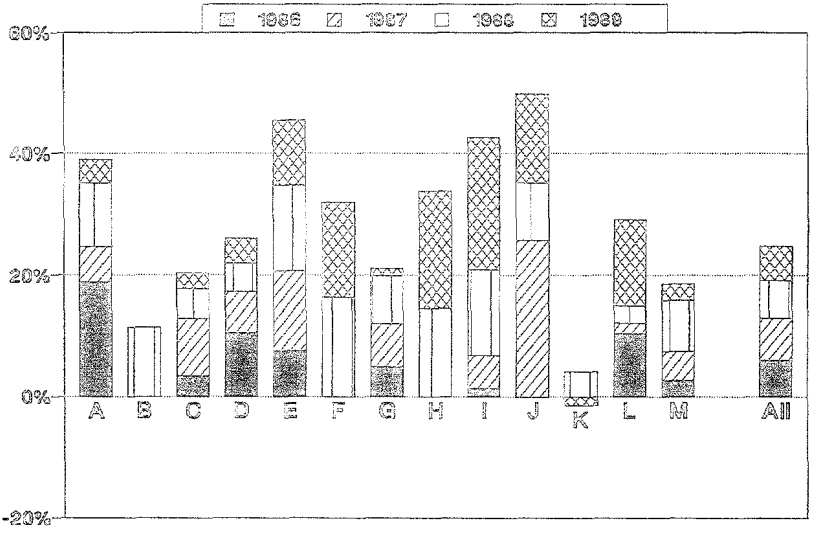
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY*

Company	Ratio of Economic Loss to CRE Exposure				
	1986	1987	1988	1989	1986–89
A	0.4172	0.3604	0.4116	0.3004	0.3912
B			0.1151	0.0000	0.1151
C	0.1689	0.2517	0.1721	0.1912	0.2040
D	0.4061	0.3873	0.1617	0.1493	0.2614
E	0.3881	0.4946	0.5053	0.4158	0.4565
F			0.4128	0.2604	0.3213
G	0.3596	0.2701	0.2172	0.0526	0.2135
H			0.4891	0.2752	0.3391
I	0.2574	0.5473	0.4921	0.3917	0.4279
J	0.0859	0.6416	0.6024	0.3334	0.4992
K			0.0845	−0.0291	0.0279
L	0.3174	0.1562	0.1302	0.4110	0.2914
M	0.2376	0.3588	0.3990	0.0493	0.1866
All Companies:					
Economic Loss	$475,958	$527,163	$481,070	$431,577	$1,915,768
CRE Exposure	$1,655,287	$1,908,636	$2,292,804	$1,811,426	$7,668,152
Ratio	0.2875	0.2762	0.2098	0.2383	0.2498

*Dollar amounts in thousands.

FIGURE 5

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY



4. Ratio of Economic Loss to All Exposure (Table 8 and Figure 6)

Table 8 suggests that there is significant variability within companies on a year-to-year basis as well as among the individual companies on an overall basis. This picture stabilizes substantially as the data are aggregated across companies. These values could be interpreted in terms of basis-point loss over the commercial mortgage portfolio as presented in this study. For comparison, these results are about three times those found for the private placement bonds portion of the study, but the relationship may well be different for a different study period.

As with loss severities, the noticeable decrease in the basis-point loss from 1986 to 1989 may be real or associated with a problem of not having sufficient information about the final outcomes of the more recent CREs. These observations will be verified or corrected as updated information is collected and analyzed. Again, the right censoring problem may be an important factor to consider in this case.

5. Considering All the Ratios

In some cases, the effects of relatively high incidence rates are mitigated by lower loss severities, resulting in a less extreme portfolio loss. The reverse also is true. However, high incidence rates coupled with high loss severities do translate to a relatively large basis-point loss for the portfolio.

B. Sensitivity Analysis (Tables 9–16)

In this section, we consider two adjustments to the data that generally take a more conservative view of the experience. This "sensitivity analysis" may be helpful in understanding the downside range of the experience represented here, and the sensitivity of the results due to reasonable filtering of the data.

TABLE 8

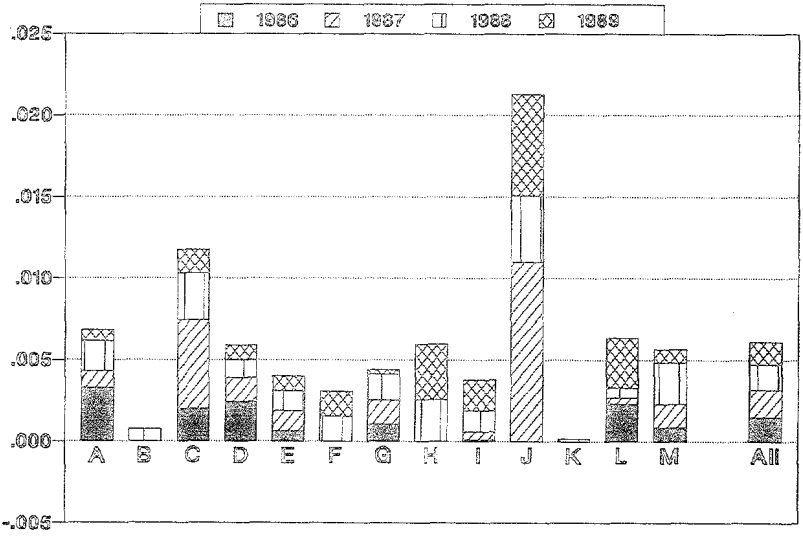
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Company	Ratio of Economic Loss to All Exposure				
	1986	1987	1988	1989	1986–89
A	0.0157	0.0048	0.0070	0.0021	0.0068
B			0.0016	0.0000	0.0007
C	0.0083	0.0208	0.0111	0.0059	0.0117
D	0.0110	0.0062	0.0041	0.0031	0.0058
E	0.0037	0.0053	0.0046	0.0028	0.0040
F			0.0033	0.0028	0.0030
G	0.0051	0.0062	0.0060	0.0009	0.0044
H			0.0051	0.0067	0.0059
I	0.0007	0.0019	0.0047	0.0064	0.0038
J	0.0000	0.0420	0.0150	0.0249	0.0212
K			0.0003	−0.0001	0.0001
L	0.0118	0.0015	0.0022	0.0101	0.0063
M	0.0048	0.0066	0.0094	0.0024	0.0056
All Companies:					
Econ. Loss	$475,958	$527,163	$481,070	$431,577	$1,915,768
All Exposure	$57,876,003	$65,196,847	$90,326,775	$100,287,960	$313,687,585
Ratio	0.0082	0.0081	0.0053	0.0043	0.0061

*Dollar amounts in thousands.

FIGURE 6

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: RATE OF ECONOMIC LOSS TO ALL EXPOSURE



With respect to the incidence rates, four data contributors included in Tables 5–8 (Companies B, F, H, and K) exhibited lower-than-average incidence rates. In fact, Company B has no CREs reported in 1989. Another reason for choosing these four is that they are matched in their years of data contribution, thereby masking or concealing the effect of the removal of only one company. The elimination of these four companies provides a database with data contributors having all four years of experience to analyze.

The elimination of these four companies has an impact on the overall incidence rates, that is, the all-companies-combined values for the 1988 and 1989 experience years. Tables 9 and 10 list the new incidence rates by number and amount, respectively. As a result, the new incidence rates by number increase slightly for 1988 and 1989 and actually become more uniform over the years of exposure. The incidence rates by amount also are affected, showing measurable increases in the 1988 and 1989 all-companies values as well as for the all-years/all-companies combined. Again, a certain uniformity from year to year appears in the incidence rates by amount. The four-year aggregate incidence rate by dollar amount increases to 2.7% for the nine company sample from the 2.5% rate for all thirteen data contributors.

Overall loss severity increases very little in the nine-company sample, as can be seen in Table 11. In fact, the annual loss severity in 1989 is actually slightly lower for the nine companies as compared to the thirteen. However, the four-year overall basis-point loss in Table 12 does go up to 67 from 61 on Table 8. Both 1988 and 1989 show higher basis-point losses for yearly results of the nine companies combined.

TABLE 9

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY NUMBER, EXCLUDING FOUR COMPANIES WITH LOWER-THAN-AVERAGE RATES

Company	Ratio of No. of CREs to No. of Exposures				
	1986	1987	1988	1989	1986–89
A	0.0288	0.0186	0.0140	0.0134	0.0199
B	0.0229	0.0413	0.0378	0.0210	0.0311
C	0.0363	0.0215	0.0340	0.0315	0.0309
D	0.0131	0.0060	0.0084	0.0082	0.0089
E	0.0135	0.0186	0.0242	0.0151	0.0177
F	0.0009	0.0034	0.0083	0.0101	0.0059
G	0.0037	0.0223	0.0154	0.0177	0.0147
H	0.0275	0.0153	0.0117	0.0223	0.0193
I	0.0097	0.0252	0.0152	0.0306	0.0205
All Companies:					
No. of CREs	330	315	308	252	1,205
No. of Exposures	16,695.0	15,737.0	14,784.0	14,146.0	61,362.0
Ratio	0.0198	0.0200	0.0208	0.0178	0.0196

TABLE 10

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY DOLLAR AMOUNT, EXCLUDING FOUR COMPANIES WITH LOWER-THAN-AVERAGE RATES*

Company	Ratio of CRE Exposure to All Exposure				
	1986	1987	1988	1989	1986–89
A	0.0378	0.0133	0.0171	0.0072	0.0174
B	0.0491	0.0827	0.0648	0.0313	0.0575
C	0.0271	0.0162	0.0259	0.0210	0.0224
D	0.0095	0.0107	0.0091	0.0069	0.0088
E	0.0142	0.0230	0.0279	0.0171	0.0207
F	0.0027	0.0036	0.0095	0.0164	0.0089
G	0.0004	0.0655	0.0249	0.0747	0.0426
H	0.0372	0.0100	0.0173	0.0246	0.0217
I	0.0202	0.0183	0.0236	0.0489	0.0303
All Companies:					
CRE Exposure	$1,655,287	$1,908,636	$2,047,950	$1,683,571	$7,295,443
All Exposure	$57,876,003	$65,196,847	$71,582,083	$78,400,783	$273,055,716
Ratio	0.0286	0.0293	0.0286	0.0215	0.0267

*Dollar amounts in thousands.

TABLE 11

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY, EXCLUDING FOUR COMPANIES WITH LOWER-THAN-AVERAGE-RATES*

	Ratio of Economic Loss to CRE Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.4172	0.3604	0.4116	0.3004	0.3912
B	0.1689	0.2517	0.1721	0.1912	0.2040
C	0.4061	0.3873	0.1617	0.1493	0.2614
D	0.3881	0.4946	0.5053	0.4158	0.4565
E	0.3596	0.2701	0.2172	0.0526	0.2135
F	0.2574	0.5473	0.4921	0.3917	0.4279
G	0.0859	0.6416	0.6024	0.3334	0.4992
H	0.3174	0.1562	0.1302	0.4110	0.2914
I	0.2376	0.3588	0.3990	0.0493	0.1866
All Companies:					
Economic Loss	$475,958	$527,163	$432,260	$396,914	$1,832,294
CRE Exposure	$1,655,287	$1,908,636	$2,047,950	$1,683,571	$7,295,443
Ratio	0.2875	0.2762	0.2111	0.2358	0.2512

*Dollar amounts in thousands.

TABLE 12

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE, EXCLUDING FOUR COMPANIES WITH LOWER-THAN-AVERAGE RATES*

	Ratio of Economic Loss to All Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.0157	0.0048	0.0070	0.0021	0.0068
B	0.0083	0.0208	0.0111	0.0059	0.0117
C	0.0110	0.0062	0.0041	0.0031	0.0058
D	0.0037	0.0053	0.0046	0.0028	0.0040
E	0.0051	0.0062	0.0060	0.0009	0.0044
F	0.0007	0.0019	0.0047	0.0064	0.0038
G	0.0000	0.0420	0.0150	0.0249	0.0212
H	0.0118	0.0015	0.0022	0.0101	0.0063
I	0.0048	0.0066	0.0094	0.0024	0.0056
All Companies:					
Economic Loss	$475,958	$527,163	$432,260	$396,914	$1,832,294
All Exposure	$57,876,003	$65,196,847	$71,582,083	$78,400,783	$273,055,716
Ratio	0.0082	0.0081	0.0060	0.0051	0.0067

*Dollar amounts in thousands.

A further examination of loss severity and the ratio of economic losses to all exposure (basis-point losses) eliminates all CREs that break even or have gains (negative losses) from consideration. In this analysis, which includes all 13 companies, the deletion of CREs that have zero or less loss severities allows one to focus only on CREs that have or are predicted to manifest economic losses. Tables 15 and 16 display the new loss severities and ratios of economic losses to all exposures, respectively. Under this scenario the four-year overall loss severity increases to 31.5% from almost 25% on Table 7, with varying increases on a year-to-year basis. The overall portfolio loss increases from 61 basis points (Table 8) to 65 basis points with reasonably consistent changes over the four years of exposure. About 22.3%, or 280, of the 1,256 CREs were deleted in this analysis.

Relatively speaking, the elimination of CREs causes a 26% increase in the loss severity, while increasing the basis-point loss only about 7%. An examination of Table 14 shows that the incidence rate by dollar amount decreased by about 16% compared to Table 6, which explains the relatively smaller increase in the basis-point loss. In addition, the ratios of the overall incidence rates for Tables 6 and 14 to Tables 5 and 13 are 1.3 and 1.4, respectively. These figures indicate an increase in the average loan size for the CREs left in this analysis. Another inference that can be made is that the loans that exhibited gains were smaller than the overall average size.

TABLE 13

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY NUMBER FOR POSITIVE LOSSES ONLY

	Ratio of No. of CREs to No. of Exposures				
Company	1986	1987	1988	1989	1986–89
A	0.0212	0.0144	0.0129	0.0109	0.0156
B			0.0084	0.0000	0.0038
C	0.0209	0.0308	0.0303	0.0173	0.0251
D	0.0281	0.0166	0.0257	0.0210	0.0230
E	0.0131	0.0060	0.0084	0.0058	0.0083
F			0.0094	0.0092	0.0093
G	0.0122	0.0119	0.0153	0.0068	0.0116
H			0.0075	0.0147	0.0111
I	0.0009	0.0034	0.0079	0.0093	0.0056
J	0.0037	0.0223	0.0116	0.0133	0.0127
K			0.0037	0.0000	0.0017
L	0.0219	0.0122	0.0107	0.0170	0.0155
M	0.0048	0.0230	0.0152	0.0266	0.0178
All Companies:					
No. of CREs	271	237	262	206	976
No. of Exposures	16,636.0	15,659.0	17,453.0	16,952.0	66,700.0
Ratio	0.0163	0.0151	0.0150	0.0122	0.0146

TABLE 14

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: INCIDENCE RATE BY DOLLAR AMOUNT FOR POSITIVE LOSSES ONLY*

	Ratio of CRE Exposure to All Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.0313	0.0116	0.0166	0.0052	0.0150
B			0.0144	0.0000	0.0065
C	0.0463	0.0641	0.0592	0.0275	0.0495
D	0.0233	0.0134	0.0186	0.0158	0.0176
E	0.0095	0.0107	0.0091	0.0065	0.0087
F			0.0080	0.0107	0.0094
G	0.0131	0.0179	0.0211	0.0087	0.0151
H			0.0101	0.0222	0.0162
I	0.0027	0.0036	0.0092	0.0158	0.0086
J	0.0004	0.0655	0.0243	0.0744	0.0424
K			0.0044	0.0000	0.0020
L	0.0329	0.0091	0.0158	0.0199	0.0188
M	0.0161	0.0168	0.0236	0.0422	0.0269
All Companies:					
CRE Exposure	$1,488,999	$1,514,280	$2,005,670	$1,425,052	$6,434,001
All Exposure	$57,709,716	$64,802,491	$90,039,641	$99,901,587	$312,453,434
Ratio	0.0258	0.0234	0.0223	0.0143	0.0206

*Dollar amounts in thousands.

TABLE 15

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY FOR POSITIVE LOSSES ONLY*

	Ratio of Economic Loss to CRE Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.5408	0.4166	0.4239	0.4214	0.4732
B			0.1151	0.0000	0.1151
C	0.1827	0.3542	0.1981	0.2231	0.2503
D	0.5091	0.4714	0.2574	0.2104	0.3572
E	0.3881	0.4946	0.5053	0.4943	0.4765
F			0.4128	0.2604	0.3213
G	0.3997	0.3742	0.3341	0.2025	0.3362
H			0.5139	0.3110	0.3740
I	0.2574	0.5473	0.5103	0.4091	0.4430
J	0.0859	0.6416	0.6238	0.3350	0.5031
K			0.0845	0.0000	0.0845
L	0.3736	0.1782	0.1574	0.5326	0.3529
M	0.3145	0.4022	0.3990	0.0687	0.2191
All Companies:					
Economic Loss	$495,810	$555,502	$511,731	$460,783	$2,023,826
CRE Exposure	$1,488,999	$1,514,280	$2,005,670	$1,425,052	$6,434,001
Ratio	0.3330	0.3668	0.2551	0.3233	0.3146

*Dollar amounts in thousands.

TABLE 16

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE, FOR POSITIVE LOSSES ONLY*

	Ratio of Economic Loss to All Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.0169	0.0048	0.0070	0.0022	0.0071
B			0.0016	0.0000	0.0007
C	0.0084	0.0227	0.0117	0.0061	0.0124
D	0.0118	0.0063	0.0047	0.0033	0.0062
E	0.0037	0.0053	0.0046	0.0032	0.0041
F			0.0033	0.0028	0.0030
G	0.0052	0.0067	0.0070	0.0017	0.0050
H			0.0052	0.0069	0.0060
I	0.0007	0.0019	0.0047	0.0064	0.0038
J	0.0000	0.0420	0.0151	0.0249	0.0213
K			0.0003	0.0000	0.0001
L	0.0123	0.0016	0.0024	0.0106	0.0066
M	0.0050	0.0067	0.0094	0.0029	0.0059
All Companies:					
Economic Loss	$495,810	$555,502	$511,731	$460,783	$2,023,826
All Exposure	$57,709,716	$64,802,491	$90,039,641	$99,901,587	$312,453,434
Ratio	0.0086	0.0086	0.0057	0.0046	0.0065

*Dollar amounts in thousands.

C. Treatment of Foreclosures

A major discussion took place among the Commercial Mortgage Working Group on how loans that were foreclosed upon were treated in terms of the presentation of their respective revised cash flows. Two distinct methods emerged as used by the study participants.

One approach projected net operating cash flows for a period of time during which the company would hold the property. An estimated or appraised value for the sale price of the property at the end of the hold period was then used as the terminal value for the revised cash flow. Updating these revised cash flows (RCFs) can be done and is important to determine the ultimate disposition of these CREs. Six companies used this method of projecting cash flows for foreclosed properties.

The second technique used to furnish revised cash-flow information on a foreclosed property typically provided data on cash flows to the point in time of submission and a market value assessment of the property at that time. This market value was usually an appraisal or transfer value of the property as it was turned over to the equity holding side of the company. Updating information on using this method was thought to be more difficult. Seven companies utilized this technique in describing the RCFs of their foreclosed mortgages.

Because of the differences in how foreclosed mortgages were treated by the participants and because they seemed to fall into two rather distinct groupings, two tables were generated to see how these two approaches fared with respect to loss severities. One point to be mentioned before the results are presented is that each of the two groups was a mix of stock and mutual companies.

Tables 17 and 18 present the findings of the split on the treatment of foreclosures. The group of six companies that projected cash flows had a loss severity of 24.95% for all years combined, while the seven-company cluster had a 25.01% loss severity. As a point of reference, the 13-company total loss severity was approximately 24.98%. For all practical purposes, there appears to be no real economic loss or loss severity differences in aggregate between the two approaches.

TABLE 17

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY FOR SIX COMPANIES USING PROJECTED CASH FLOWS*

Company	1986	Ratio of Economic Loss to CRE Exposure 1987	1988	1989	1986–89
A			0.1151	0.0000	0.1151
B	0.4061	0.3873	0.1617	0.1493	0.2614
C	0.3596	0.2701	0.2172	0.0526	0.2135
D			0.4891	0.2752	0.3391
E			0.0845	−0.0291	0.0279
F	0.3174	0.1562	0.1302	0.4110	0.2914
All Companies:					
Economic Loss	$274,719	$162,667	$217,739	$252,357	$907,482
CRE Exposure	$791,206	$611,488	$1,187,988	$1,045,901	$3,636,582
Ratio	0.3472	0.2660	0.1833	0.2413	0.2495

*Dollar amounts in thousands.

TABLE 18

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY COMPANY: LOSS SEVERITY FOR SEVEN COMPANIES USING TERMINAL VALUE FOR CASH FLOWS*

Company	1986	Ratio of Economic Loss to CRE Exposure 1987	1988	1989	1986–89
A	0.4172	0.3604	0.4116	0.3004	0.3912
B	0.1689	0.2517	0.1721	0.1912	0.2040
C	0.3881	0.4946	0.5053	0.4158	0.4565
D			0.4128	0.2604	0.3213
E	0.2574	0.5473	0.4921	0.3917	0.4279
F	0.0859	0.6416	0.6024	0.3334	0.4992
G	0.2376	0.3588	0.3990	0.0493	0.1866
All Companies:					
Economic Loss	$201,239	$364,495	$263,331	$179,220	$1,008,285
CRE Exposure	$864,081	$1,297,148	$1,104,817	$765,525	$4,031,570
Ratio	0.2329	0.2810	0.2384	0.2341	0.2501

*Dollar amounts in thousands.

The six companies accounted for 627 CREs, while the other seven had 629. However, the basis-point loss for the first group was 47, as compared to 83 for the latter. The difference is due to the incidence rates by dollar amount, rather than the loss severity. The six-company grouping had overall incidence rates by number (0.0195) and dollar amount (0.0190) that are very close. The seven companies had an overall incidence rate by dollar amount (0.0331) that is much higher than by number (0.0181).

D. Further Analysis

1. Credit Risk Event Data

Some further analytical work was completed on the quality of the data for the 1,256 CREs. The first analysis examines the present value of the original cash flows discounted at the original interest rates. When compared to their respective outstanding principals, the ratio of the two should be one (1.0). While there are reasons for this ratio to vary (for example, paydown on principal, variable interest rates), the expectation is that these ratios ought to cluster about the 100% or 1.0 value.

Figure 7 plots the ratios from the "DQ6" report. The distribution is reasonably clustered within the 0.85 (85%) to 1.15 (115%) values, which were deemed reasonable limits for this review. Another check is the fact that no points appear in the upper-left-hand part of the graph, implying large loans that resulted in large gains. While not impossible, such data points would call for verification.

Another look at the CRE data is found in Figure 8. The data points, which represent the loss severities for each CRE plotted against their respective outstanding principals, are predominantly on the right-hand side of the graph, indicating losses. Those CREs with negative or zero values (representing 280 CREs or about 22% of the total number) demonstrate gains or break-even events. But as with the previous figure, no values appear in the upper-left-hand corner.

FIGURE 7
OUTSTANDING PRINCIPAL VERSUS PVOCF/OP
AMONG ALL BUT A FEW COMMERCIAL MORTGAGE LOAN CREs

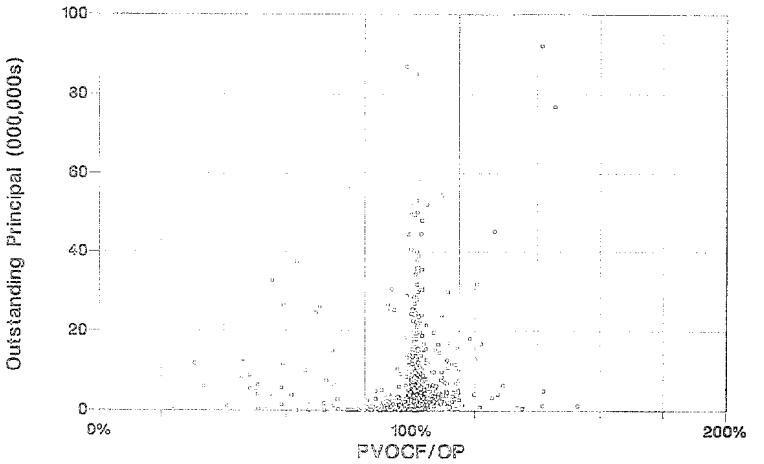


FIGURE 8
OUTSTANDING PRINCIPAL VERSUS LOSS SEVERITY
AMONG ALL BUT A FEW COMMERCIAL MORTGAGE LOAN CREs

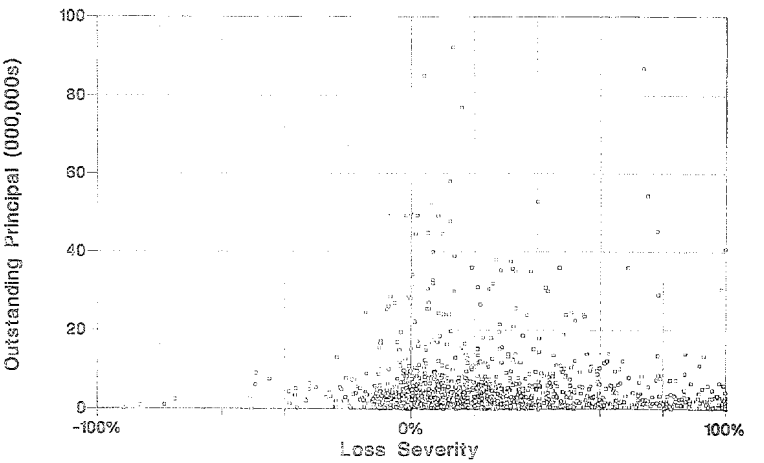
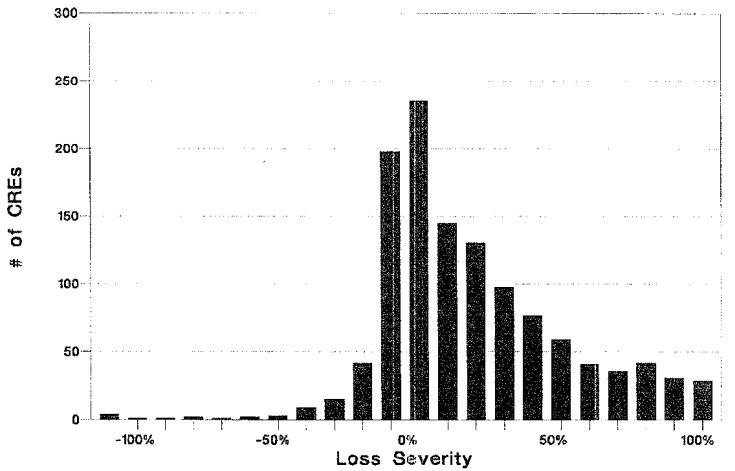


Figure 9 plots a distribution of loss severities by number. This distribution is skewed to the right, which is expected. How this distribution will change during the next few years is an interesting question for two reasons. More recent data will add more CREs to the knowledge base and updates of the revised cash flows from the 1986–89 CREs will refine the outcomes of these events, possibly changing the loss severity percentages.

FIGURE 9
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS:
HISTOGRAM OF LOSS SEVERITY BY NUMBER OF CREs



Figures 10 and 11 are graphs of loss severity. Figure 10 is a histogram showing a percentage distribution of the CREs. Figure 11 shows the cumulative distribution of the loss severities.

These series of graphs are presented as a check on the quality of the data on CREs as well as to illustrate some results on loss severity. After a number of iterations with the participating companies, reviewing and modifying their data submissions, the information seems to be representative of what the data contributors see as the outcomes of their CREs.

FIGURE 10
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS:
HISTOGRAM OF LOSS SEVERITY
BY PERCENTAGE DISTRIBUTION OF CREs

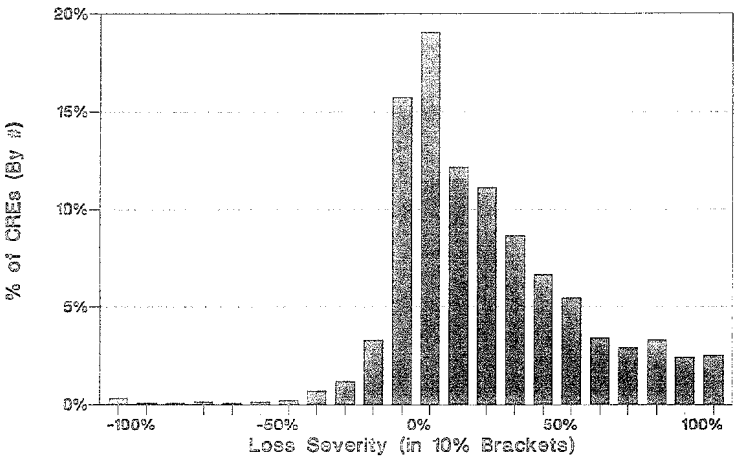
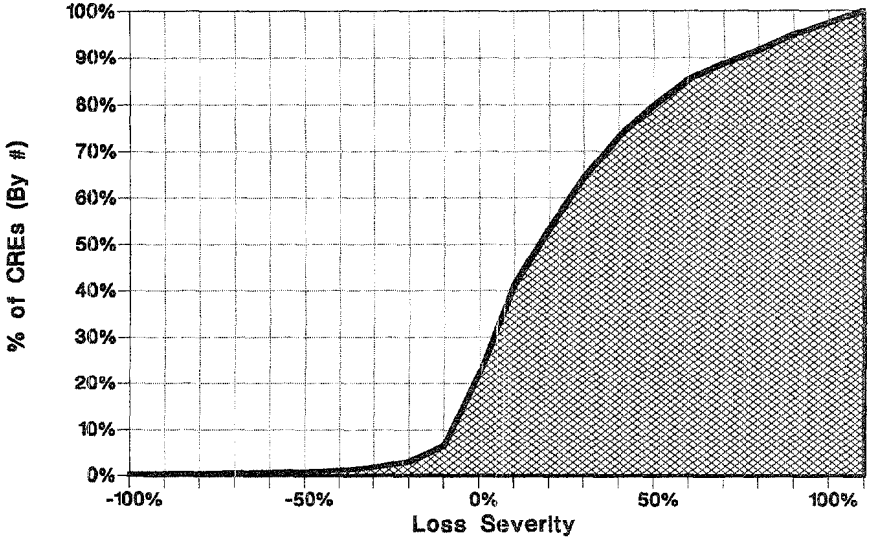


FIGURE 11
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS:
CUMULATIVE DISTRIBUTION OF LOSS SEVERITY



2. Parameters

To continue the analysis of commercial mortgages, a number of characteristics were examined to determine whether they could provide any insight into the results of credit risk events. This information should be viewed as a start to more detailed analytical work using the database assembled here. Parameters were selected based on interest expressed by some of the Commercial Mortgage Working Group members and on the completeness of the submitted data. Concerns of the Working Group were related to attempting

to extract too much information from the existing data, stretching the limits of such interpretations and relying on this information as credible for investment decisions. On the other hand, this database provides a first real basis upon which to do analytical work with a relatively large scale information system. The following parameters were investigated and reported on:

- Year of funding
- Loan to value (LTV)
- Interest rate
- Property type
- Location by ACLI region.

In terms of *Year of Funding* in Table 19, mortgages originated in the years 1980 through 1985 stand out in incidence rates by number, while 1981 through 1985 loans are high in incidence by amount as compared to their respective averages (totals). Loss severities for commercial mortgages made before 1975, in 1980, 1988, and 1989 stand out; however, relatively few loans were involved in the latter two years. However, the impact on the overall portfolio seems most pronounced for loans issued in the time period 1982 to 1984. The graphical results of these values are illustrated in Figures 12–15.

With the original *Loan to Value* (Table 20), two points should be made: (1) the exposure base is concentrated in the 75% ± 2.5% range and (2) a number of CREs and exposure units could not be categorized. The accompanying Figures 16–19 provide a visual interpretation of the data over the ranges for which the data are deemed credible. The various loss statistics do not show a clear pattern emerging with respect to original LTV.

The next variable examined is *Original Interest Rate* in Table 21. In general, the data show an increase in the four statistics as the contractual interest rates increase. In particular, the incidence rate by number, loss severity and the portfolio loss for commercial mortgages of 14% and greater exhibit large increases over loans of lesser interest rates. Figures 20–23, by original interest rate, clearly display this finding.

TABLE 19

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY YEAR OF FUNDING*

Obs.	Year of Funding	No. of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Expos.
1	Before 1975	16,484.5	195	0.011829	$ 19,370,436	$ 264,791	0.013670	$ 87,229	0.32943	0.004503
2	1975	2,254.0	28	0.012422	5,185,483	55,387	0.010681	2,984	0.05388	0.000575
3	1976	2,068.5	26	0.012569	5,109,730	94,174	0.018430	8,811	0.09356	0.001724
4	1977	3,028.5	36	0.011887	8,584,053	128,360	0.014953	15,817	0.12322	0.001843
5	1978	4,573.0	65	0.014214	9,898,299	173,759	0.017554	35,669	0.20528	0.003604
6	1979	4,598.5	85	0.018484	11,819,763	266,454	0.022543	49,902	0.18728	0.004222
7	1980	4,403.0	107	0.024302	12,531,569	322,435	0.025730	90,667	0.28119	0.007235
8	1981	2,169.5	68	0.031344	11,684,571	373,344	0.031952	89,139	0.23876	0.007629
9	1982	1,518.5	56	0.036878	9,358,572	373,521	0.039912	92,330	0.24719	0.009866
10	1983	3,185.5	111	0.034845	20,138,582	694,108	0.034467	184,648	0.26602	0.009169
11	1984	3,000.5	119	0.039660	24,565,560	1,347,602	0.054857	419,566	0.31134	0.017079
12	1985	5,909.5	193	0.032659	47,375,457	1,852,365	0.039100	362,568	0.19573	0.007653
13	1986	6,172.5	92	0.014905	53,484,182	904,650	0.016914	223,083	0.24660	0.004171
14	1987	3,678.0	44	0.011963	37,502,263	392,319	0.010461	99,173	0.25279	0.002644
15	1988	2,539.5	24	0.009451	27,915,788	346,140	0.012399	115,373	0.33331	0.004133
16	1989	747.5	4	0.005351	8,034,487	68,777	0.008560	33,217	0.48297	0.004134
17	N/A	649.0	3	0.004622	1,128,788	9,964	0.008827	5,591	0.56112	0.004953
18	Total	66,980.0	1,256	0.018752	$313,687,585	$7,668,152	0.024445	$1,915,768	0.24983	0.006107

*Dollar amounts in thousands.

FIGURE 12
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY YEAR OF FUNDING:
INCIDENCE RATES AND LOSS PER DOLLAR

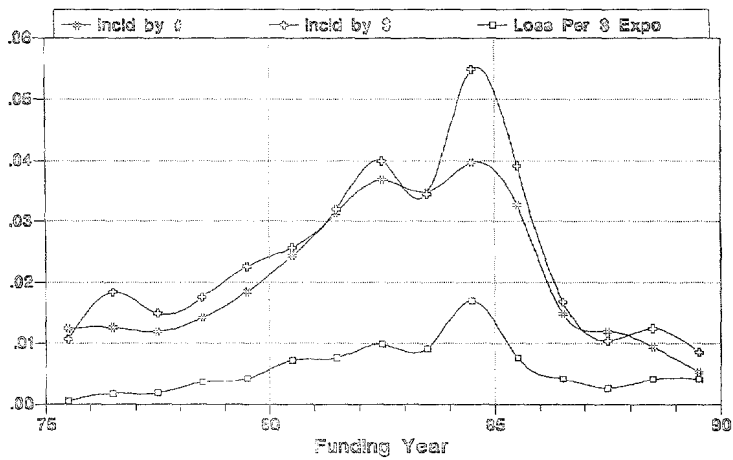


FIGURE 13
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY YEAR OF FUNDING:
LOSS SEVERITY

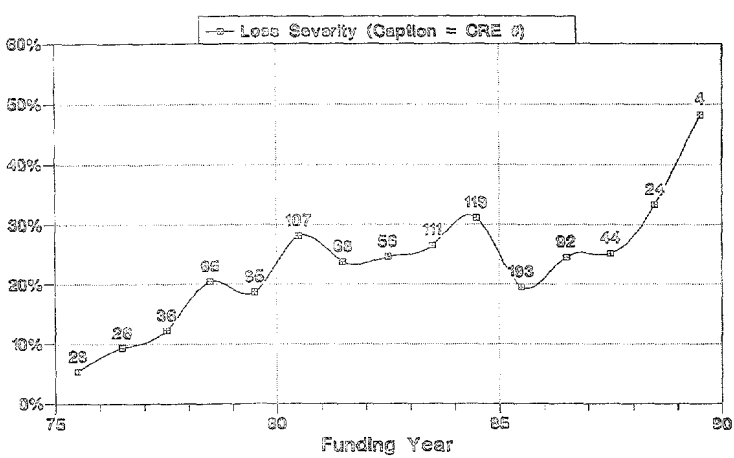


FIGURE 14
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY YEAR OF FUNDING: EXPOSURE AMOUNT (IN BILLIONS)

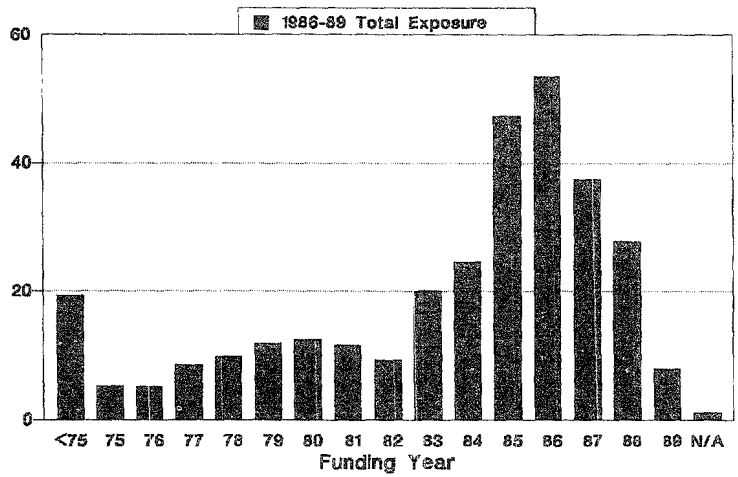


FIGURE 15
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY YEAR OF FUNDING: CRE EXPOSURE (IN MILLIONS)

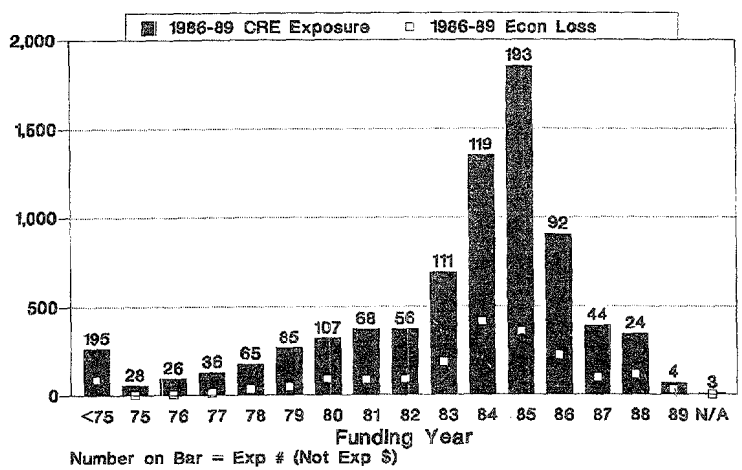


TABLE 20

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOAN-TO-VALUE RATIO*

Obs.	Loan to Value	No. of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Expos.
1	90% and above	2,118.0	27	0.012748	$ 10,553,047	$ 401,167	0.038014	$ 95,099	0.23706	.0090115
2	>82.5% to <90%	2,012.5	29	0.014410	14,120,527	169,283	0.011988	22,142	0.13080	.0015681
3	>77.5% to 82.5%	2,052.5	50	0.024361	16,117,125	382,625	0.023740	106,098	0.27729	.0065829
4	>72.5% to 77.5%	32,498.0	746	0.022955	131,150,594	3,662,141	0.027923	850,930	0.23236	.0064882
5	>65% to 72.5%	14,490.0	254	0.017529	69,542,879	1,872,755	0.026929	536,330	0.28639	.0077122
6	50% to 65%	5,934.5	89	0.014997	32,709,493	656,748	0.020078	116,797	0.17784	.0035707
7	Less than 50%	4,226.0	31	0.007336	25,557,748	270,121	0.010569	69,964	0.25901	.0027375
8	N/A	3,648.5	30	0.008223	13,936,172	253,312	0.018177	118,408	0.46744	.0084964
9	Total	66,980.0	1,256	0.018752	$313,687,585	$7,668,152	0.024445	$1,915,768	0.24983	.0061072

*Dollar amounts in thousands.

FIGURE 16
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOAN-TO-VALUE RATIO: INCIDENCE RATES AND LOSS PER DOLLAR

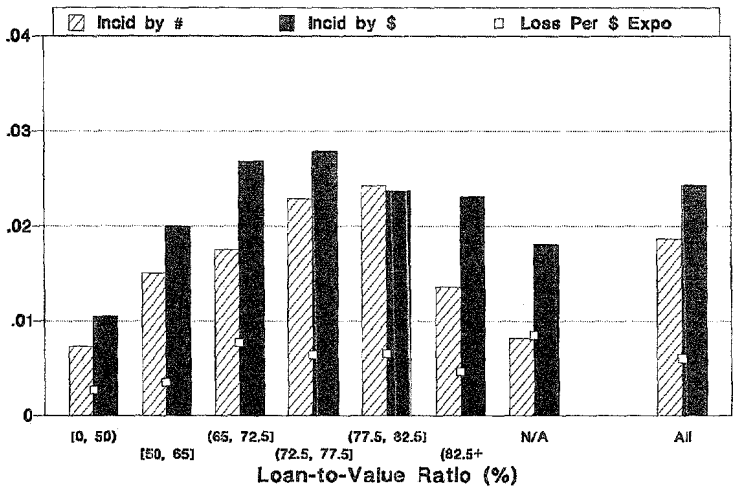


FIGURE 17
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOAN-TO-VALUE RATIO: LOSS SEVERITY

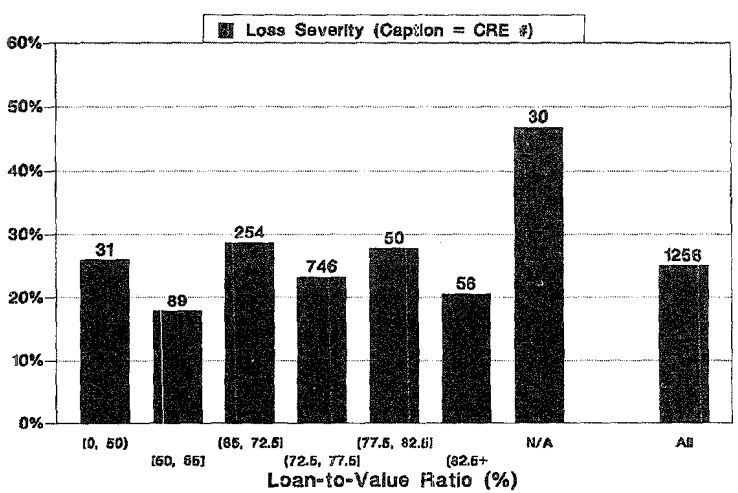


FIGURE 18
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOAN-TO-VALUE RATIO:
EXPOSURE AMOUNT (IN BILLIONS)

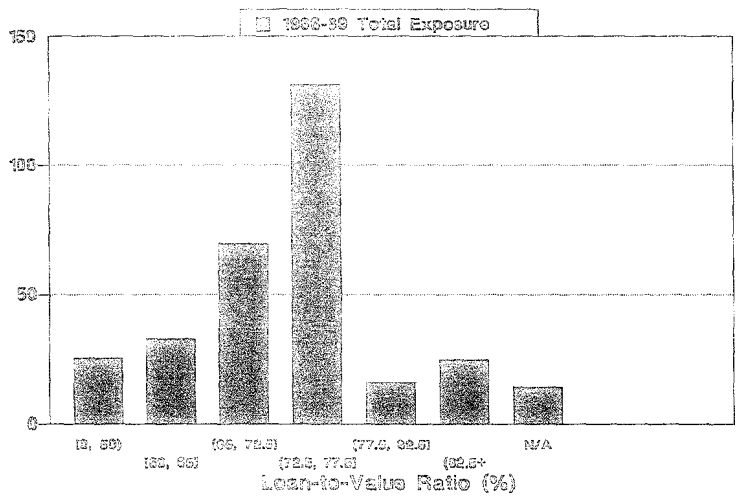


FIGURE 19
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOAN-TO-VALUE RATIO:
CRE EXPOSURE (IN MILLIONS)

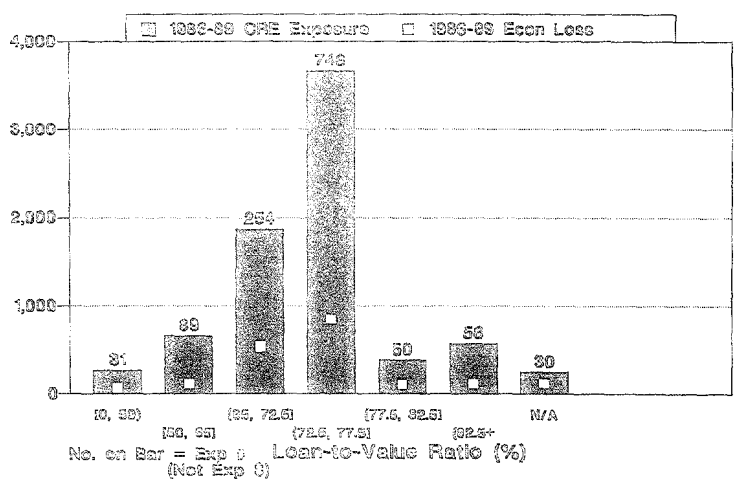


TABLE 21

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY ORIGINAL INTEREST RATE*

Obs.	Original Interest Rate	No. of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Expos.
1	Less than 6%	1,569.5	5	0.003186	$ 2,087,403	$ 9,793	0.00469	$ −807	−0.08236	−0.000386
2	6% to <7%	3,506.5	18	0.005133	2,719,111	10,541	0.00388	1,644	0.15596	0.000605
3	7% to <8%	3,402.5	47	0.013813	3,088,541	77,973	0.02525	12,537	0.16078	0.004059
4	8% to <9%	9,460.5	110	0.011627	35,141,026	368,824	0.01050	98,037	0.26581	0.002790
5	9% to <10%	21,801.5	339	0.015549	110,978,476	1,690,220	0.01523	405,735	0.24005	0.003656
6	10% to <11%	12,097.5	239	0.019756	57,314,991	1,327,067	0.02315	312,992	0.23585	0.005461
7	11% to <12%	4,852.0	132	0.027205	32,699,772	1,114,305	0.03408	221,285	0.19859	0.006767
8	12% to <13%	5,896.0	194	0.032904	40,242,165	1,539,260	0.03825	338,426	0.21986	0.008410
9	13% to <14%	2,861.0	103	0.036001	22,466,840	747,174	0.03326	187,904	0.25149	0.008364
10	14% and above	1,533.0	69	0.045010	6,949,261	782,996	0.11267	338,015	0.43169	0.048640
11	Total	66,980.0	1,256	0.018752	$313,687,585	$7,668,152	0.02445	$1,915,768	0.24983	0.006107

*Dollar amounts in thousands.

FIGURE 20
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS
BY ORIGINAL INTEREST RATE: INCIDENCE RATES
BY NUMBER AND DOLLAR AMOUNT

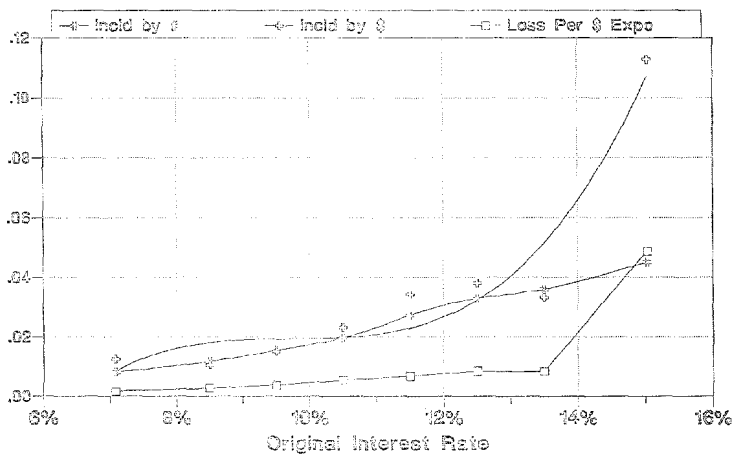


FIGURE 21
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS
BY ORIGINAL INTEREST RATE: LOSS SEVERITY

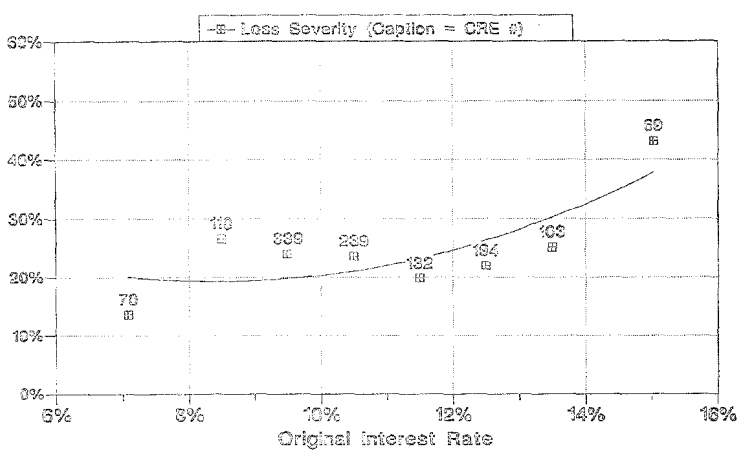


FIGURE 22
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS
BY ORIGINAL INTEREST RATE: EXPOSURE AMOUNTS (IN BILLIONS)

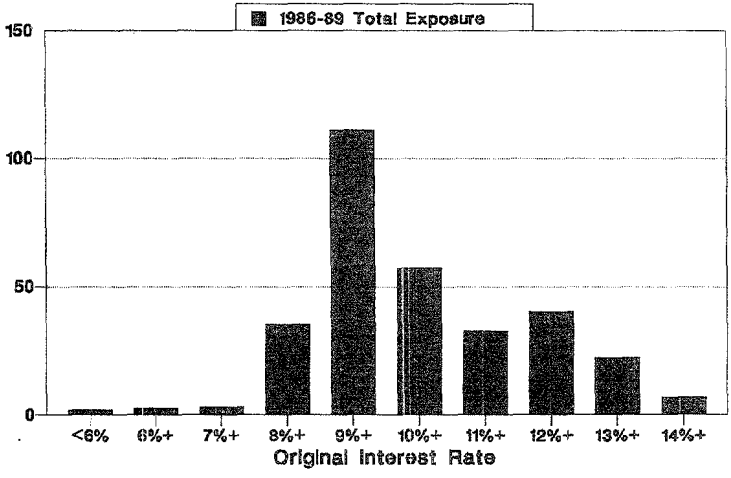
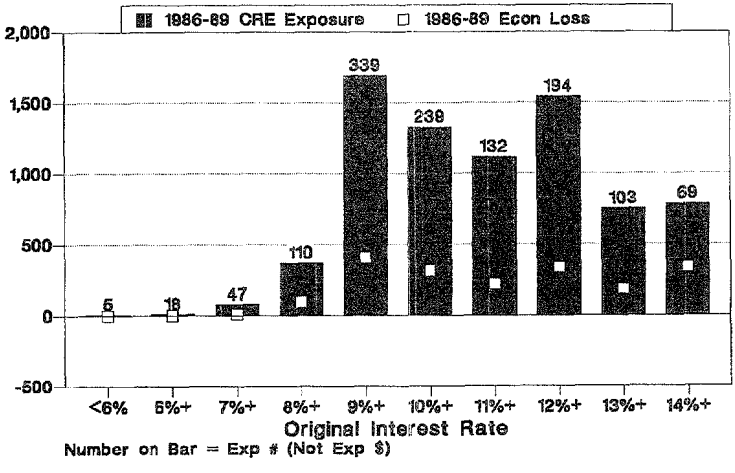


FIGURE 23
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS
BY ORIGINAL INTEREST RATE: CRE EXPOSURES (IN MILLIONS)



A look at *Property Type* (ACLI definitions; see Appendix Section E) in Table 22 probably presents no real surprises in light of the ACLI experience over the study period. Hotel/motel, apartments, and office buildings show the highest incidence rates by number; hotel/motel, other commercial, and apartments are clearly above the average incidence rates by amounts. With the exception of the other commercial category, loss severities by property type appear reasonably close to the average. Other commercial and hotel/motel groupings exhibit the largest losses to the overall portfolio relative to their exposure. A series of histograms illustrate these data in Figures 24–27.

TABLE 22

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY PROPERTY TYPE*

Obs.	Property Type	No. of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Expos.
1	Retail	11,127.5	124	0.011144	$ 65,640,983	$ 801,266	0.012207	$ 187,674	0.23422	0.002859
2	Industrial	13,000.0	111	0.008538	25,455,616	373,507	0.014673	75,990	0.20345	0.002985
3	Apartment	16,065.5	494	0.030749	45,140,207	1,738,738	0.038519	268,775	0.15458	0.005954
4	Hotel/Motel	1,917.5	79	0.041199	19,576,300	1,017,110	0.051956	247,321	0.24316	0.012634
5	Office Bldg	17,159.5	399	0.023252	134,388,672	3,221,597	0.023972	879,346	0.27295	0.006543
6	Mixed Use	4,494.5	23	0.005117	15,319,342	184,873	0.012068	49,096	0.26556	0.003205
7	Other Comml	2,181.0	23	0.010546	6,831,979	313,534	0.045892	202,110	0.64462	0.029583
8	N/A	1,034.5	3	0.002900	1,334,485	17,526	0.013133	5,456	0.31131	0.004089
9	Total	66,980.0	1,256	0.018752	$313,687,585	$7,668,152	0.024445	$1,915,768	0.24983	0.006107

*Dollar amounts in thousands.

FIGURE 24
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY PROPERTY TYPE: INCIDENCE RATES AND LOSS PER DOLLAR

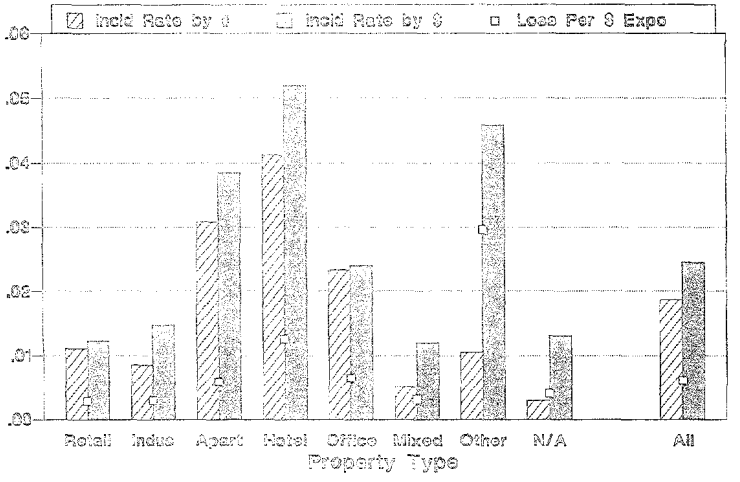


FIGURE 25
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY PROPERTY TYPE: LOSS SEVERITY

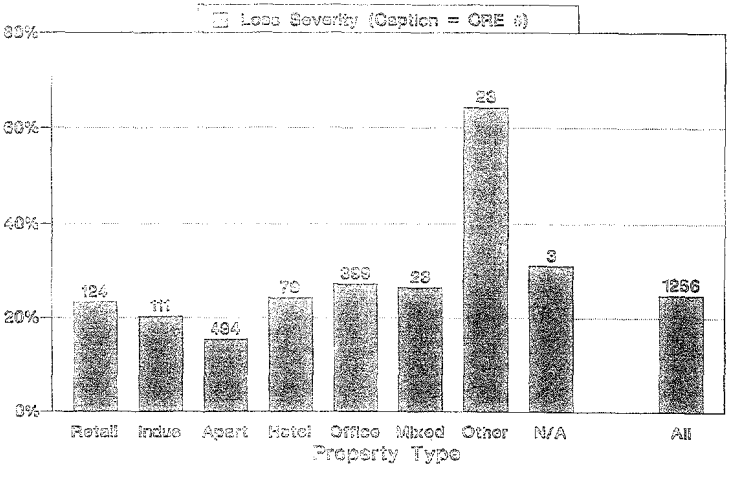


FIGURE 26
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY PROPERTY TYPE: EXPOSURE AMOUNT (IN BILLIONS)

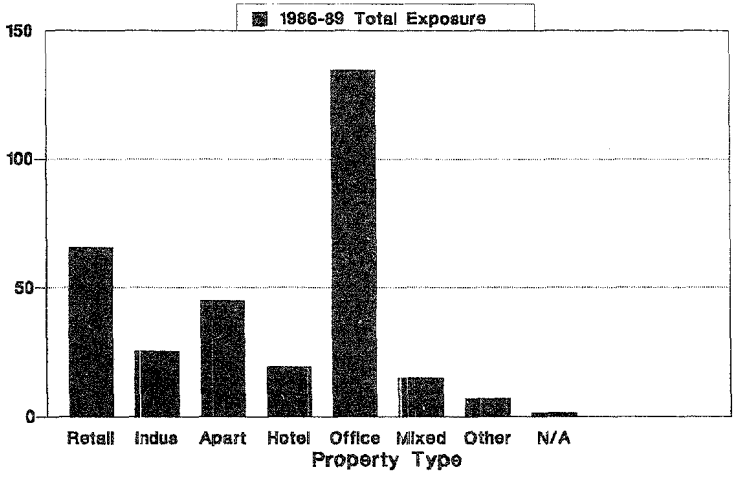
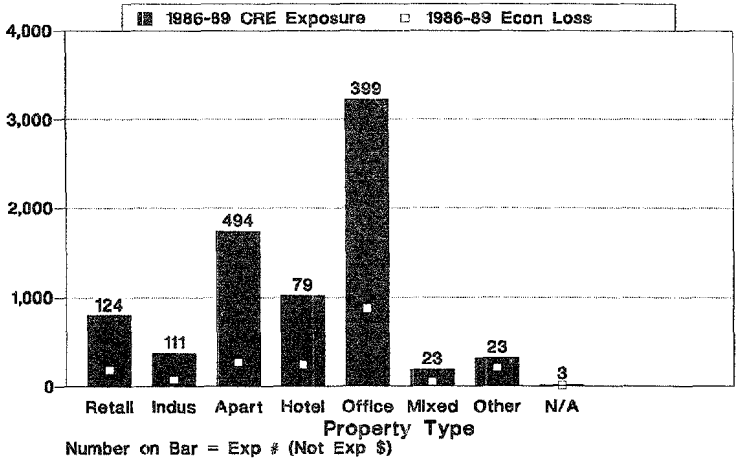
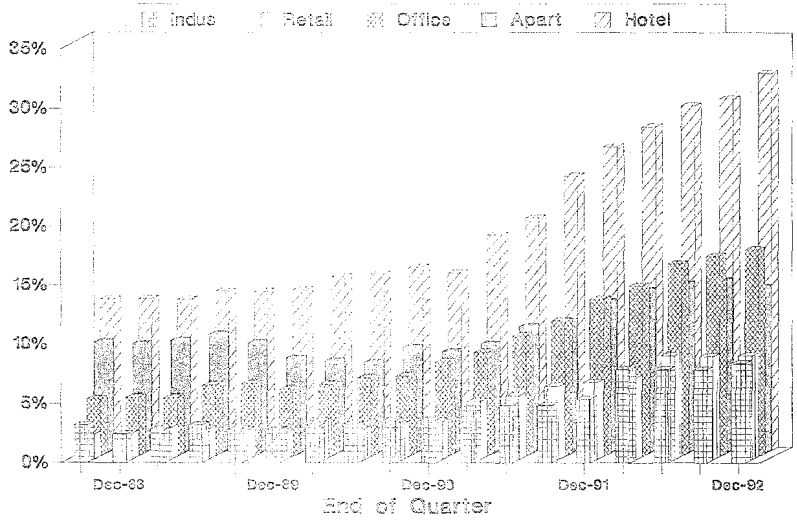


FIGURE 27
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY PROPERTY TYPE: CRE EXPOSURE (IN MILLIONS)



As a point of reference, quarterly information on delinquent and restructured commercial mortgages for some property types from ACLI data are plotted in Figure 28. While not strictly comparable to the SOA CRE definition as footnoted, the data, which are available starting September 1988, confirm the pattern by property type found by the SOA study. Furthermore, the next round of data collection through 1992 should prove to be interesting, given the trends of the ACLI data.

FIGURE 28
ACLI QUARTERLY DATA ON DELINQUENT AND RESTRUCTURED COMMERCIAL MORTGAGE LOANS FOR 9/88–12/92 BY PROPERTY TYPE



During the time period of this study, 1986–89, the *Locations* (ACLI groupings; see page 179) in Table 23 that exhibit the highest incidence rates by number and amounts are the West South Central and Mountain. Loss severities are greatest in the Mid-Atlantic and East North Central regions, while the overall portfolio loss, as expected in light of the ACLI experience over this period, is greatest in the West South Central and Mountain regions. The accompanying series of histograms (Figures 29–32) show this information visually.

TABLE 23

LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOCATION*

Obs.	Location	No. of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Expos.
1	New England	3,797.0	15	0.003950	$ 24,530,310	$ 81,672	0.00333	$ 15,688	0.19209	0.000640
2	Mid-Atlantic	6,765.5	35	0.005173	50,567,685	401,248	0.00793	142,187	0.35436	0.002812
3	East No. Central	8,584.5	93	0.010833	40,063,223	604,329	0.01508	177,808	0.29422	0.004438
4	West No. Central	3,541.5	63	0.017789	16,543,482	342,103	0.02068	82,777	0.24197	0.005004
5	South Atlantic	12,658.5	167	0.013193	58,796,491	1,180,493	0.02008	223,793	0.18958	0.003806
6	East So. Central	1,930.0	31	0.016062	5,722,873	180,588	0.03156	38,803	0.21487	0.006780
7	West So. Central	7,133.0	620	0.086920	31,000,672	3,552,049	0.11458	965,095	0.27170	0.031131
8	Mountain	3,994.5	122	0.030542	13,062,237	664,253	0.05085	141,402	0.21287	0.010825
9	Pacific	17,593.5	97	0.005513	71,530,972	621,488	0.00869	121,782	0.19595	0.001703
10	N/A	982.0	13	0.013238	1,869,639	39,929	0.02136	6,432	0.16108	0.003440
11	Total	66,980.0	1,256	0.018752	$313,687,585	$7,668,152	0.02445	$1,915,768	0.24983	0.006107

*Dollar amounts in thousands.

FIGURE 29
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOCATION:
INCIDENCE RATES AND LOSS PER DOLLAR

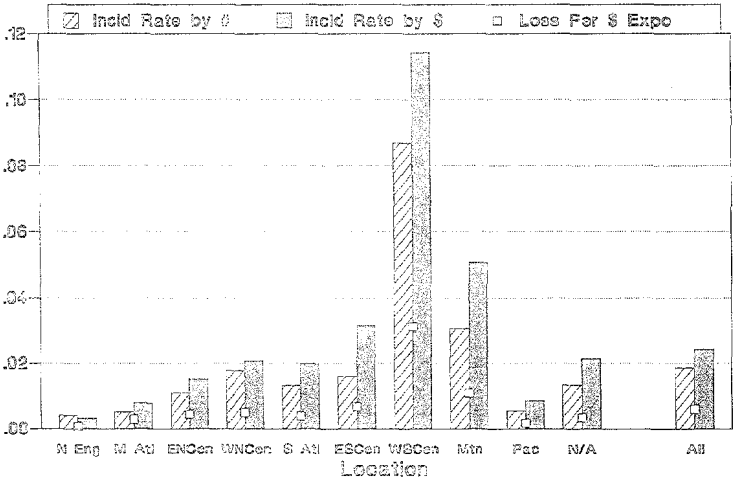


FIGURE 30
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOCATION:
LOSS SEVERITY

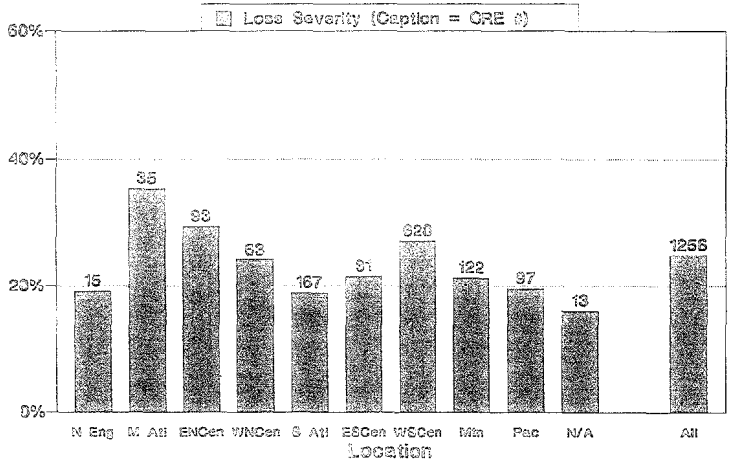


FIGURE 31
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOCATION: EXPOSURE AMOUNT (IN BILLIONS)

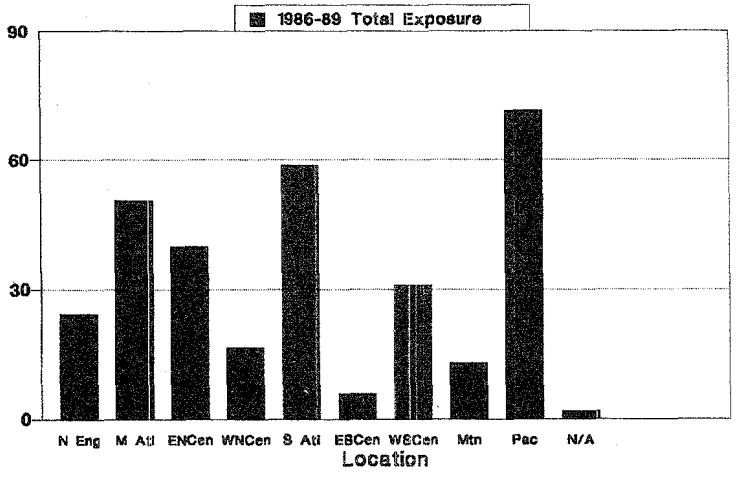
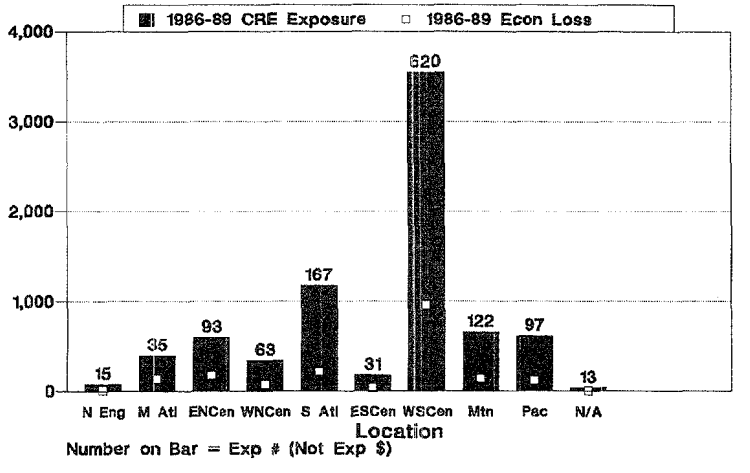


FIGURE 32
LOSS EXPERIENCE FOR COMMERCIAL MORTGAGE LOANS BY LOCATION: CRE EXPOSURE (IN MILLIONS)



As with the *Property Type* discussion, quarterly information on delinquent and restructured commercial mortgages for the ACLI regions are plotted in Figures 33 and 34. Again, the ACLI data corroborate the pattern exhibited in the SOA study. In a year-by-year examination of the SOA data, the relative stabilization of the West South Central and Mountain areas, albeit at relatively high levels of incidence, is evident as well as the slight increase from a very low level in the New England region starting in 1989. Given the changes in the ACLI rates for various regions through 1992, additional data collection and updating of existing CREs in the SOA study become more important.

FIGURE 33
ACLI QUARTERLY DATA ON DELINQUENT AND RESTRUCTURED COMMERCIAL MORTGAGES FOR 9/88-12/92 FOR REGION 1

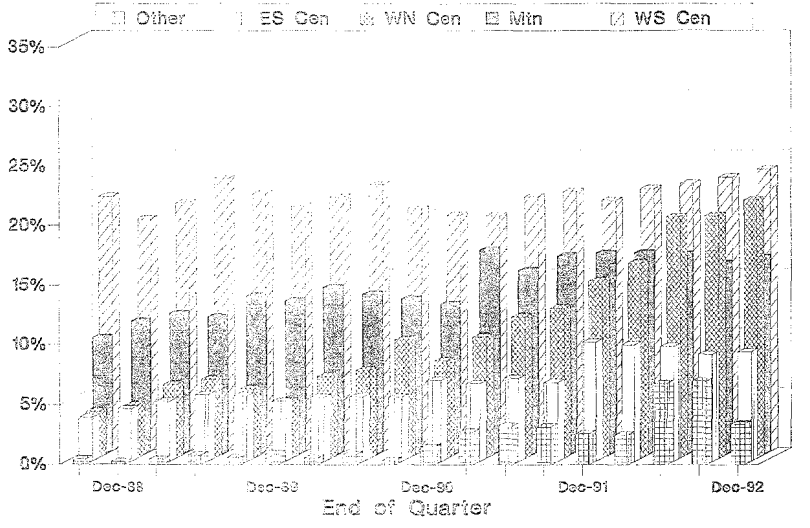
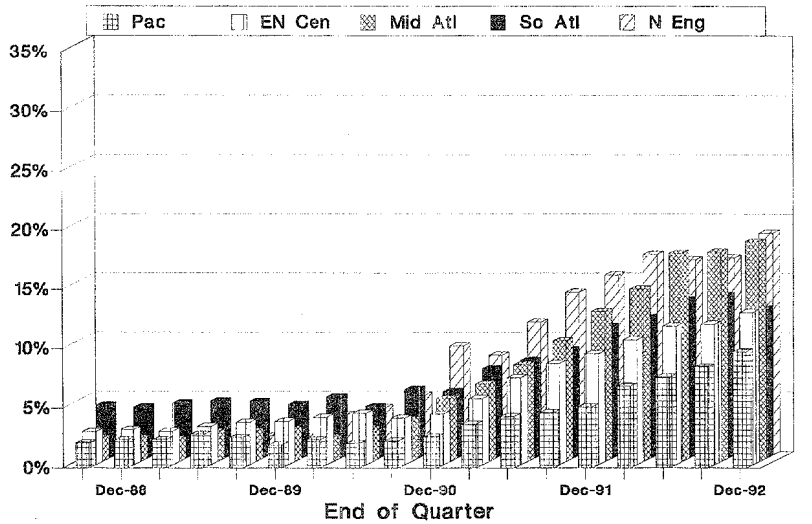


FIGURE 34
ACLI QUARTERLY DATA ON DELINQUENT AND RESTRUCTURED COMMERCIAL MORTGAGES FOR 9/88–12/92 FOR REGION 2



Tables like those described in this subsection of the report were run by exposure year (1986–89) for all companies combined. As previously mentioned, the results did show some changes occurring over the four-year period for the various parameters. Additional years of data will confirm these shifts in observations. Similar runs for all years combined and by year of experience can be produced on a company-specific basis.

Several other variables also were examined. These parameters included years since origination, years to maturity, year of maturity, location by key states, outstanding principal, and original loan amount. In addition, a cohort study of limited duration was started. The Working Group felt that the available data probably did not support conclusions and inferences that might have been reached by analyzing this information. In part, their concerns were based on the facts that only four years worth of data had been collected and that the time period of 1986–1989 was the start of a significant change in the real estate marketplace. However, analysis of data must begin somewhere, and this database provides a first real opportunity to examine compiled data on commercial mortgages.

VI. RESULTS FOR PRIVATE PLACEMENT BONDS

A. Overall Results by Company and Year (Tables 24–27 and Figures 35–42)

Tables 24–27 give the loss statistics. The results are given for each company by year and for all years combined and all companies combined. Only ratios are given for individual companies to protect the identities of the companies. The data for all companies combined are given in detail.

The following discussion, which is based on Tables 24–27 and Figures 35–42, considers each ratio separately, then combined.

1. Incidence Rate by Number

Figure 35 allocates the average annual incidence rate by number for the four years 1986–89 to each of the four years by dividing the number of credit risk events for a given year by the total of the exposure number for all four years. For the companies with multiyear exposure contributions, it can be seen that the year-by-year contribution to the incidence rate is not uniform. However, the year-by-year contribution is much more uniform for all companies combined, which indicates the importance of pooling intercompany data to establish credible or statistically significant experience. It is also worthy of note that despite the nonuniformity of the year-by-year contribution, the total rate for six of the eleven companies is quite close to the intercompany average, and that all three of the companies that contributed data for only 1988 and 1989 are among the five "outliers."

2. Incidence Rate by Amount

Perhaps not surprisingly, the incidence rate by amount (Figure 36) shows a greater dispersion among companies. In general, the incidence rate by amount will be greater than the incidence rate by number if the average outstanding principal for the credit risk events is larger than the average outstanding principal for all assets. In this study, seven of the eleven companies had an incidence rate by amount higher than the incidence rate by number, and the overall incidence rate by amount for all contributing companies is higher than the incidence rate by number. The contribution by year to the overall four-year average is fairly uneven for most companies, as is the case for the incidence rate by number.

FIGURE 35
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY:
INCIDENCE RATE BY NUMBER

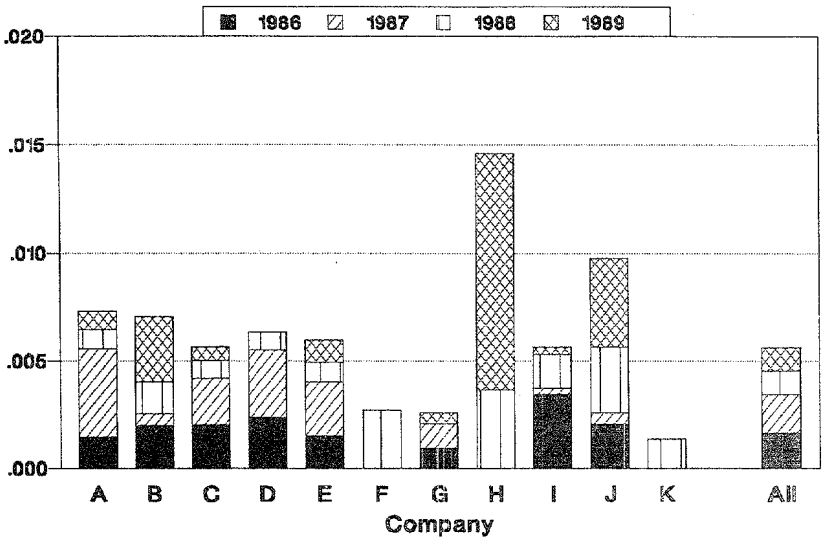
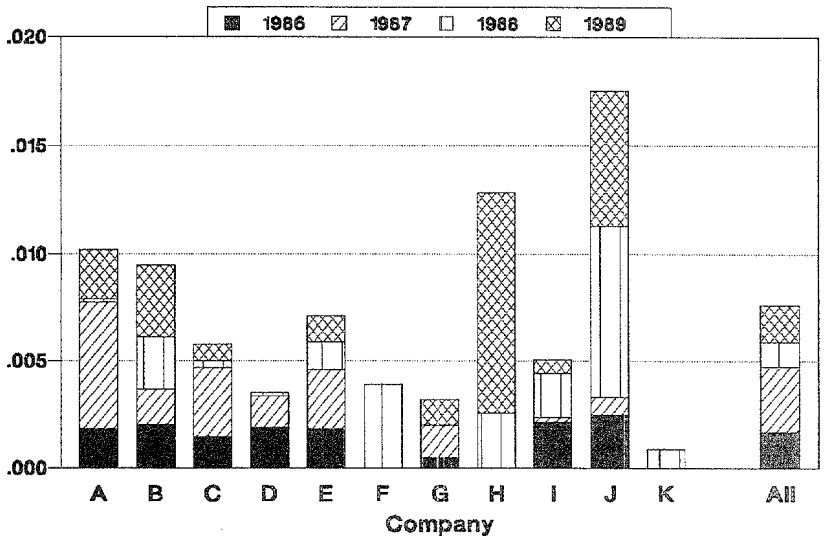


FIGURE 36
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY:
INCIDENCE RATE BY DOLLAR AMOUNT



3. Loss Severity

The loss severity for 1986–89 combined (Figure 37) falls between approximately 20% and approximately 70%, with the values for the majority of the companies relatively close to the intercompany mean of approximately 30%. Again, the contribution by year is not very stable by company, but seems fairly stable when all companies are combined.

Twenty-eight, or approximately 16%, of the CREs had a loss severity less than or equal to zero. If all CREs with loss severities less than or equal to zero are eliminated from the CRE category, the overall loss severity increases from 29.1% to 34.6%.

Despite the data limitations, the difference between these loss severity results and the corresponding results reported in studies of public bonds is significant enough to suggest that the loss severity on private placement bonds is less than that on public bonds. Possible contributing factors include a somewhat broader definition of credit risk event in this study, the methodology used to calculate economic loss, and the role of covenants in private placement bond portfolio management, as well as the procedures that companies used to estimate the size and number of payments yet to be received on credit risk events. For a given experience year, the influence of the last item will become less over time as the proportion of CREs with payments yet to be received decreases.

4. Ratio of Economic Loss to All Exposure

The economic loss can be as large as the entire credit risk event exposure (or even a bit larger if there are expenses and no revised cash flows). The economic loss can be zero (when the present value of revised cash flows exactly offsets the present value of the original cash flows) or negative (when the present value of revised cash flows exceeds the present value of original cash flows). Figure 38 suggests that there is significant variability, both from company to company and from year to year. The results for all companies combined do show a smooth progression from year to year, a stability unmatched by the results for any individual company. When all 11 companies are pooled together, there seems to be a much steadier picture of the expected economic loss from credit risk events.

FIGURE 37
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY:
LOSS SEVERITY

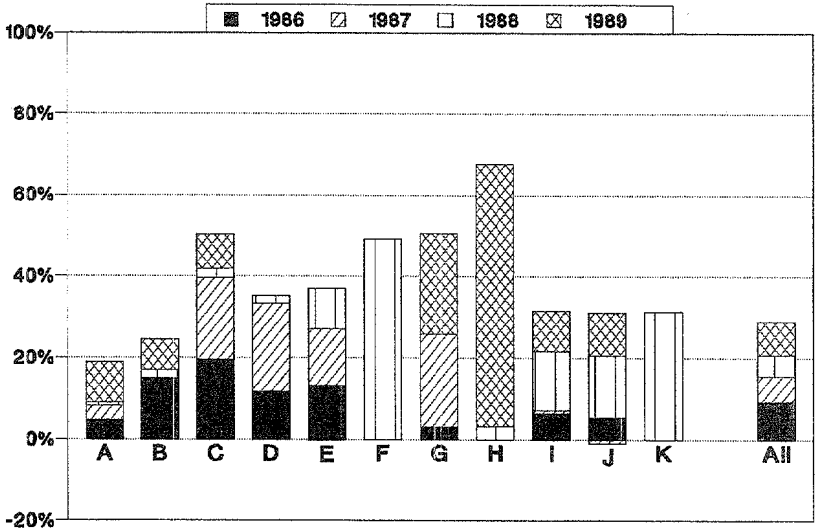
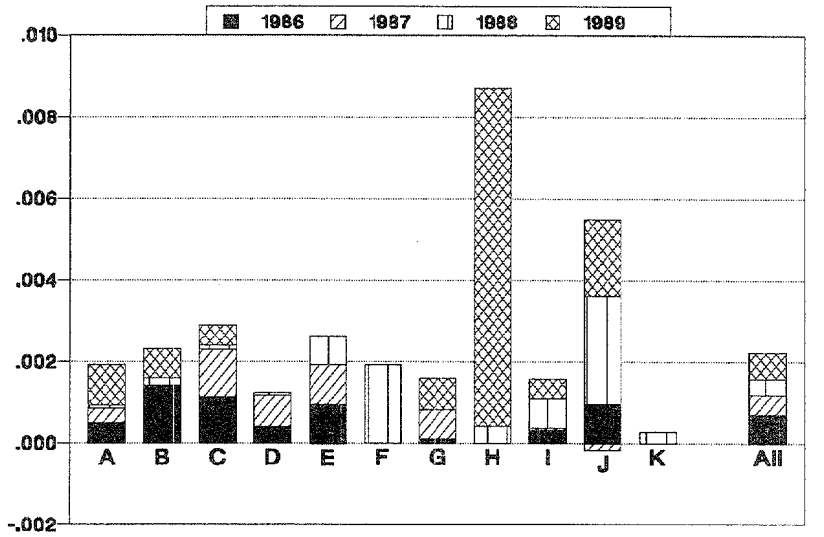


FIGURE 38
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY:
RATIO OF ECONOMIC LOSS TO ALL EXPOSURE



It is interesting to note that if all the CREs with loss severities less than or equal to zero are eliminated from the CRE category, the ratio of economic loss to all exposure increases only slightly from 22.3 basis points to 23.3 basis points, even though, as indicated in the previous section, the overall loss severity increases from 29.1% to 34.6%. The reason is that, when the CREs with loss severities less than or equal to zero are eliminated from the CRE category, the incidence rate by amount decreases by almost the same percentage as the loss severity increases.

5. Considering All the Ratios

Tables 24 (*Incidence Rate by Number*), 25 (*Incidence Rate by Amount*), and 27 (*Ratio of Economic Loss to All Exposure*) give three separate ratios relating some measure of loss to some overall measure of exposure. Each ratio indicates something different. For example, Table 24 suggests that Company A has an incidence rate by number that is approximately 30% above the intercompany average, and Table 25 suggests that the incidence rate by amount, while significantly higher than the incidence rate by number, is also approximately 30% above average. However, Table 27 indicates that Company A's ratio of economic loss to all exposure is below the intercompany average. The explanation for the difference between Table 25 and Table 27 results is given by the Table 26 results, which suggest that the severity of loss from Company A's credit risk events is well below the average for all companies and more than offsets the excess incidence indicated in Table 25. The important point of this illustration is that all the ratios add something of value and considering all the ratios is important in fully understanding the credit risk event loss experience.

Figures 39–42 compare the pattern of the ratios by experience year, with and without one large CRE. The graphs illustrate the significant impact of the elimination of the CRE on both the incidence rate by amount and the loss severity. The impacts, however, are offsetting, with the result that the ratio of economic loss to all exposure pattern is virtually unchanged. The graphs also highlight a seemingly inverse relationship between the incidence rate by amount and the loss severity for the four years, resulting in a relatively stable "loss per dollar exposed" (with or without the large CRE).

TABLE 24

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY: INCIDENCE RATE BY NUMBER

	Ratio of Number of CREs to Number of Exposures				
Company	1986	1987	1988	1989	1986–89
A	0.00526	0.01550	0.00372	0.00395	0.00731
B	0.01040	0.00235	0.00558	0.00943	0.00706
C	0.00724	0.00865	0.00338	0.00264	0.00563
D	0.00927	0.01292	0.00332	0.00000	0.00631
E	0.00552	0.01002	0.00367	0.00441	0.00596
F			0.00538	0.00000	0.00270
G	0.00345	0.00472	0.00000	0.00197	0.00258
H			0.00741	0.02166	0.01463
I	0.01304	0.00127	0.00645	0.00128	0.00564
J	0.00761	0.00206	0.01297	0.01709	0.00979
K			0.00276	0.00000	0.00139
All Companies:					
No. of CREs	53	57	35	34	179
No. of Exposures	7,740.0	7,239.5	8,428.5	8,356.0	31,764.0
Ratio	0.00685	0.00787	0.00415	0.00407	0.00564

TABLE 25

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY: INCIDENCE RATE BY DOLLAR AMOUNT*

	Ratio of CRE Exposure to All Exposure				
Company	1986	1987	1988	1989	1986–89
A	0.00719	0.02326	0.00066	0.00932	0.01020
B	0.01716	0.00950	0.00793	0.00837	0.00947
C	0.00601	0.01357	0.00140	0.00279	0.00578
D	0.00945	0.00651	0.00073	0.00000	0.00352
E	0.00726	0.01102	0.00493	0.00518	0.00712
F			0.00764	0.00000	0.00392
G	0.00255	0.00683	0.00000	0.00369	0.00318
H			0.00542	0.01958	0.01285
I	0.00970	0.00105	0.00797	0.00208	0.00504
J	0.01205	0.00378	0.03076	0.01992	0.01753
K			0.00196	0.00000	0.00090
All Companies:					
CRE Exposure	$397,438	$707,229	$269,141	$407,301	$1,781,110
All Exposure	$50,616,872	$52,908,519	$61,697,026	$67,830,999	$233,053,414
Ratio	0.00785	0.01337	0.00436	0.00600	0.00764

*Dollar amounts in thousands.

TABLE 26

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY: LOSS SEVERITY*

Company	Ratio of Economic Loss to CRE Exposure				
	1986	1987	1988	1989	1986–89
A	0.27594	0.05906	0.40367	0.44252	0.18975
B	0.69832	0.01344	0.07254	0.21391	0.24546
C	0.76626	0.36323	0.36319	0.63644	0.50258
D	0.21738	0.53018	0.32306	0.00000	0.35104
E	0.51904	0.35327	0.57208	−0.01067	0.36903
F			0.49196	0.00000	0.49196
G	0.19528	0.48255	0.00000	0.67495	0.50580
H			0.16500	0.80494	0.67695
I	0.15503	0.13733	0.35518	0.81051	0.31496
J	0.38444	−0.18820	0.33482	0.29773	0.30349
K			0.31415	0.00000	0.31415
All Companies:					
Economic Loss	$164,380	$114,495	$90,370	$149,458	$518,704
CRE Exposure	$397,438	$707,229	$269,141	$407,301	$1,781,110
Ratio	0.41360	0.16189	0.33577	0.36695	0.29123

*Dollar amounts in thousands.

TABLE 27

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY COMPANY: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Company	Ratio of Economic Loss to All Exposure				
	1986	1987	1988	1989	1986–89
A	0.00198	0.00137	0.00027	0.00412	0.00194
B	0.01198	0.00013	0.00058	0.00179	0.00232
C	0.00461	0.00493	0.00051	0.00177	0.00290
D	0.00205	0.00345	0.00023	0.00000	0.00124
E	0.00377	0.00389	0.00282	−0.00006	0.00263
F			0.00376	0.00000	0.00193
G	0.00050	0.00330	0.00000	0.00249	0.00161
H			0.00089	0.01576	0.00870
I	0.00150	0.00014	0.00283	0.00169	0.00159
J	0.00463	−0.00071	0.01030	0.00593	0.00532
K			0.00062	0.00000	0.00028
All Companies:					
Economic Loss	$164,380	$114,495	$90,370	$149,458	$518,704
All Exposure	$50,616,872	$52,908,519	$61,697,026	$67,830,999	$233,053,414
Ratio	0.00325	0.00216	0.00146	0.00220	0.00223

*Dollar amounts in thousands.

FIGURE 39
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EXPERIENCE YEAR:
INCIDENCE RATES AND LOSS OER DOLLAR
NOT EXCLUDING ONE BIG CRE

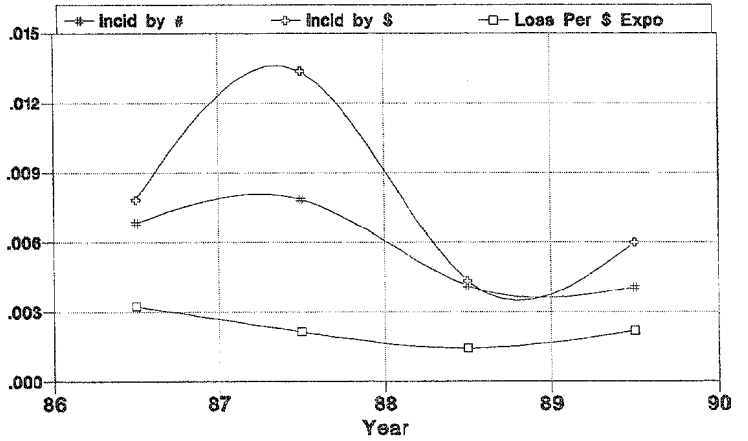


FIGURE 40
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EXPERIENCE YEAR:
LOSS SEVERITY, NOT EXCLUDING ONE BIG CRE

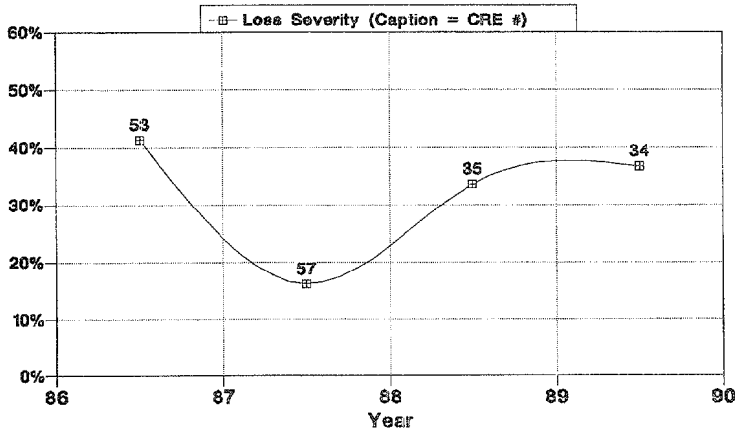


FIGURE 41
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EXPERIENCE YEAR:
INCIDENCE RATES AND LOSS PER DOLLAR
EXCLUDING ONE BIG CRE

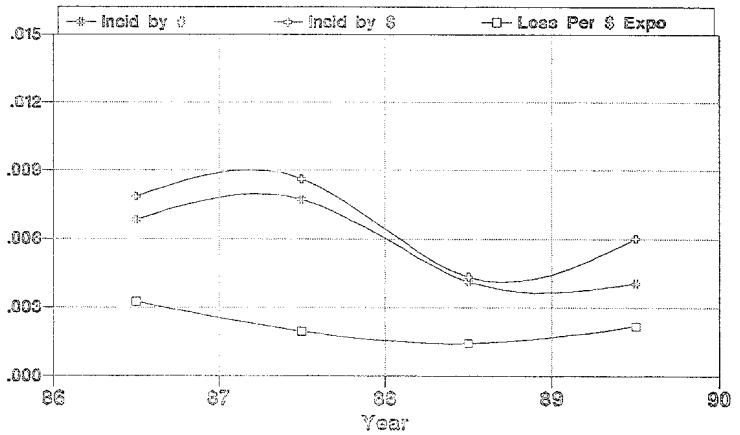
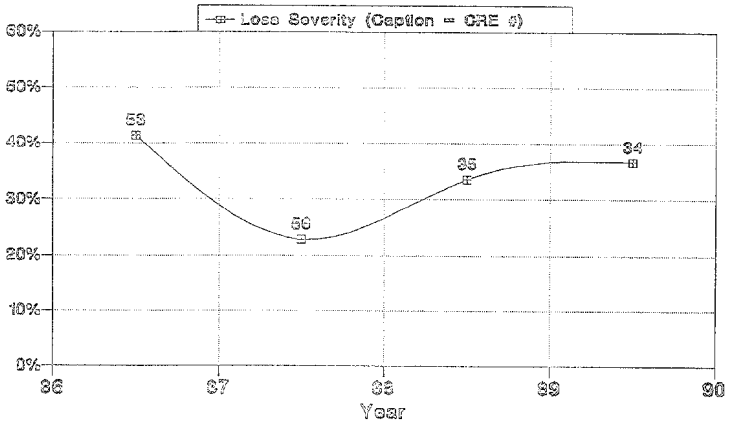


FIGURE 42
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EXPERIENCE YEAR:
LOSS SEVERITY, EXCLUDING ONE BIG CRE



B. Quality Ratings

1. Quality Rating at Issue

Because of the very limited data, it is not possible to provide analysis of results by quality rating at issue.

2. Most Recent Quality Rating

Table 28 gives an indication of the distribution of *Most Recent Quality Rating* for each company and all companies combined. In reviewing this table, it is important to keep in mind that each company assigns the quality ratings to their private placement bonds and different companies could assign different ratings to similar bonds.

TABLE 28

MEAN RATING
(BASED ON DATA FOR ALL YEARS SUBMITTED)

Company	AAA	AA	A	BBB	BB	B	<B	Median
A			x					A
B*								
C			x					A-BBB
D			x				A-BBB	
E			x					A-BBB
F				x				BBB
G*								
H			x					A
I				x				BBB
J*								
K			x					A
Overall			x					A-BBB

*Insufficient data

Although the data for the *Most Recent Quality Rating* are somewhat limited, it is possible to provide some analysis (Tables 29–32 and Figures 43–46).

TABLE 29

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: INCIDENCE RATE BY NUMBER

Most Recent Quality Rating	Year	No. of CREs	No. of Exposures	Ratio
AAA	1986	0	350.5	0.00000
	1987	0	338.5	0.00000
	1988	0	387.5	0.00000
	1989	0	349.5	0.00000
	1986–89	0	1,426.0	0.00000
AA	1986	0	651.5	0.00000
	1987	0	679.5	0.00000
	1988	0	895.5	0.00000
	1989	0	861.0	0.00000
	1986–89	0	3,087.5	0.00000
A	1986	0	1,336.0	0.00000
	1987	4	1,250.5	0.00320
	1988	0	1,689.0	0.00000
	1989	0	1,679.5	0.00000
	1986–89	4	5,955.0	0.00067
BBB	1986	11	1,973.0	0.00558
	1987	17	1,686.5	0.01008
	1988	4	2,311.0	0.00173
	1989	7	2,229.0	0.00314
	1986–89	39	8,199.5	0.00476
BB	1986	14	289.0	0.04844
	1987	12	325.5	0.03687
	1988	4	485.5	0.00824
	1989	6	492.0	0.01220
	1986–89	36	1,592.0	0.02261
B	1986	4	90.5	0.04420
	1987	8	127.0	0.06299
	1988	10	369.0	0.02710
	1989	5	394.5	0.01267
	1986–89	27	981.0	0.02752
<B	1986	1	126.5	0.00791
	1987	8	113.5	0.07048
	1988	8	167.0	0.04790
	1989	0	146.0	0.00000
	1986–89	17	553.0	0.03074
Not Available	1986	23	2,923.0	0.00787
	1987	8	2,718.5	0.00294
	1988	9	2,124.0	0.00424
	1989	16	2,204.5	0.00726
	1986–89	56	9,970.0	0.00562
All	1986	53	7,740.0	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356.0	0.00407
	1986–89	179	31,764.0	0.00564
% NA	1986	43.40%	37.76%	
	1987	14.04	37.55	
	1988	25.71	25.20	
	1989	47.06	26.38	
	1986–89	31.28	31.39	

TABLE 30

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: INCIDENCE RATE BY DOLLAR AMOUNT*

Most Recent Quality Rating	Year	CRE Exposure	All Exposure	Ratio
AAA	1986	$ 0	$ 3,336,471	0.00000
	1987	0	2,997,057	0.00000
	1988	0	2,991,802	0.00000
	1989	0	3,322,251	0.00000
	1986–89	0	12,647,581	0.00000
AA	1986	0	6,223,962	0.00000
	1987	0	6,579,319	0.00000
	1988	0	8,001,795	0.00000
	1989	0	7,876,216	0.00000
	1986–89	0	28,681,292	0.00000
A	1986	0	10,386,824	0.00000
	1987	268,709	10,243,848	0.02623
	1988	0	14,054,782	0.00000
	1989	0	14,823,651	0.00000
	1986–89	268,709	49,509,105	0.00543
BBB	1986	109,753	13,085,541	0.00839
	1987	211,015	12,927,405	0.01632
	1988	9,550	15,826,679	0.00060
	1989	193,643	16,872,863	0.01148
	1986–89	523,961	58,712,488	0.00892
BB	1986	127,960	1,898,091	0.06742
	1987	98,169	2,462,768	0.03986
	1988	38,701	4,203,106	0.00921
	1989	58,247	3,846,693	0.01514
	1986–89	323,077	12,410,658	0.02603
B	1986	13,590	362,664	0.03747
	1987	35,766	902,359	0.03964
	1988	83,619	2,149,840	0.03890
	1989	14,421	2,582,576	0.00558
	1986–89	147,396	5,997,439	0.02458
<B	1986	1,338	552,261	0.00242
	1987	13,115	424,457	0.03090
	1988	31,974	550,288	0.05810
	1989	0	663,259	0.00000
	1986–89	46,427	2,190,265	0.02120
Not Available	1986	144,797	14,771,058	0.00980
	1987	80,455	16,371,306	0.00491
	1988	105,298	13,918,735	0.00757
	1989	140,991	17,843,490	0.00790
	1986–89	471,541	62,904,589	0.00750
All	1986	397,438	50,616,872	0.00785
	1987	707,229	52,908,519	0.01337
	1988	269,142	61,697,027	0.00436
	1989	407,302	67,830,999	0.00600
	1986–89	1,781,111	233,053,417	0.00764
% NA	1986	36.43%	29.18%	
	1987	11.38	30.94	
	1988	39.12	22.56	
	1989	34.62	26.31	
	1986–89	26.47	26.99	

*Dollar amounts in thousands.

TABLE 31

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: LOSS SEVERITY*

Most Recent Quality Rating	Year	Economic Loss	CRE Exposure	Ratio
AAA	1986	$ 0	$ 0	
	1987	0	0	
	1988	0	0	
	1989	0	0	
	1986–89	0	0	
AA	1986	0	0	
	1987	0	0	
	1988	0	0	
	1989	0	0	
	1986–89	0	0	
A	1986	0	0	
	1987	13,443	268,709	0.05003
	1988	0	0	
	1989	0	0	
	1986–89	13,443	268,709	0.05003
BBB	1986	36,637	109,753	0.33381
	1987	40,978	211,015	0.19419
	1988	2,061	9,550	0.21581
	1989	72,239	193,643	0.37305
	1986–89	151,915	523,961	0.28994
BB	1986	63,576	127,960	0.49684
	1987	36,698	98,169	0.37382
	1988	28,405	38,701	0.73396
	1989	26,132	58,247	0.44864
	1986–89	154,811	323,077	0.47918
B	1986	8,628	13,590	0.63488
	1987	8,911	35,766	0.24915
	1988	29,636	83,619	0.35442
	1989	9,888	14,421	0.68567
	1986–89	57,063	147,396	0.38714
>B	1986	683	1,338	0.51046
	1987	2,464	13,115	0.18788
	1988	11,680	31,974	0.36530
	1989	0	0	
	1986–89	14,827	46,427	0.31936
Not Available	1986	54,856	144,797	0.37885
	1987	12,000	80,455	0.14915
	1988	18,589	105,298	0.17654
	1989	41,200	140,991	0.29222
	1986–89	126,645	471,541	0.26858
All	1986	164,380	397,438	0.41360
	1987	114,494	707,229	0.16189
	1988	90,371	269,142	0.33577
	1989	149,459	407,302	0.36695
	1986–89	518,704	1,781,111	0.29122
% NA	1986	33.37%	36.43%	
	1987	10.48	11.38	
	1988	20.57	39.12	
	1989	27.57	34.62	
	1986–89	24.42	26.47	

*Dollar amounts in thousands.

TABLE 32

LOSS EXPERIENCE FOR PRIVATE BONDS BY MOST RECENT QUALITY RATING: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Most Recent Quality Rating	Year	Economic Loss	All Exposure	Ratio
AAA	1986	$ 0	$ 3,336,471	0.00000
	1987	0	2,997,057	0.00000
	1988	0	2,991,802	0.00000
	1989	0	3,322,251	0.00000
	1986–89	0	12,647,581	0.00000
AA	1986	0	6,223,962	0.00000
	1987	0	6,579,319	0.00000
	1988	0	8,001,795	0.00000
	1989	0	7,876,216	0.00000
	1986–89	0	28,681,292	0.00000
A	1986	0	10,386,824	0.00000
	1987	13,443	10,243,848	0.00131
	1988	0	14,054,782	0.00000
	1989	0	14,823,651	0.00000
	1986–89	13,443	49,509,105	0.00027
BBB	1986	36,637	13,085,541	0.00280
	1987	40,978	12,927,405	0.00317
	1988	2,061	15,826,679	0.00013
	1989	72,239	16,872,863	0.00428
	1986–89	151,915	58,712,488	0.00259
BB	1986	63,576	1,898,091	0.03349
	1987	36,698	2,462,768	0.01490
	1988	28,405	4,203,106	0.00676
	1989	26,132	3,846,693	0.00679
	1986–89	154,811	12,410,658	0.01247
B	1986	8,628	362,664	0.02379
	1987	8,911	902,359	0.00988
	1988	29,636	2,149,840	0.01379
	1989	9,888	2,582,576	0.00383
	1986–89	57,063	5,997,439	0.00951
>B	1986	683	552,261	0.00124
	1987	2,464	424,457	0.00581
	1988	11,680	550,288	0.02123
	1989	0	663,259	0.00000
	1986–89	14,827	2,190,265	0.00677
Not Available	1986	54,856	14,771,058	0.00371
	1987	12,000	16,371,306	0.00073
	1988	18,589	13,918,735	0.00134
	1989	41,200	17,843,490	0.00231
	1986–89	126,645	62,904,589	0.00201
All	1986	164,380	50,616,872	0.00325
	1987	114,494	52,908,519	0.00216
	1988	90,371	61,697,027	0.00146
	1989	149,459	67,830,999	0.00220
	1986–89	518,704	233,053,417	0.00223
% NA	1986	33.37%	29.18%	
	1987	10.48	30.94	
	1988	20.57	22.56	
	1989	27.57	26.31	
	1986–89	24.42	26.99	

*Dollar amounts in thousands.

FIGURE 43
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: INCIDENCE RATES AND LOSS PER DOLLAR, EXCLUDING ONE BIG CRE

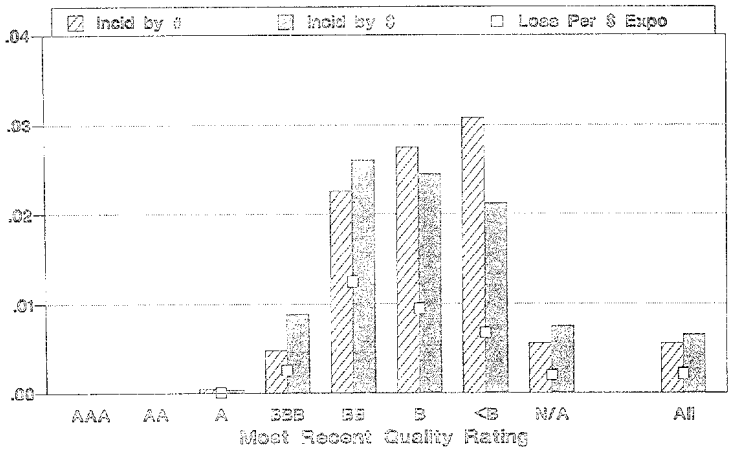


FIGURE 44
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: LOSS SEVERITY, EXCLUDING ONE BIG CRE

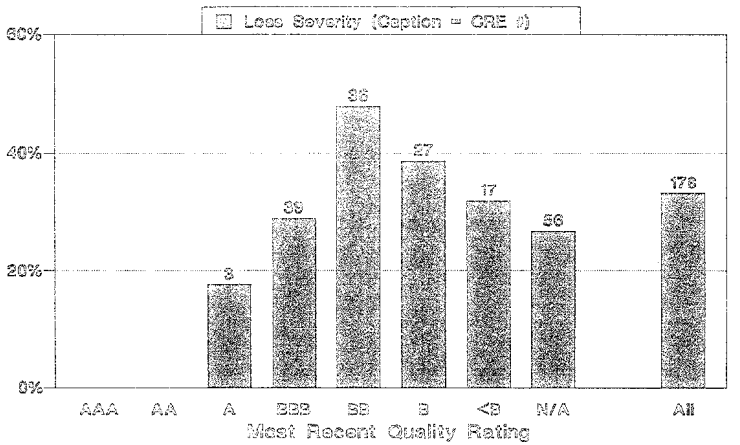


FIGURE 45
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: EXPOSURE AMOUNT (IN BILLIONS BY YEAR), NOT EXCLUDING ONE BIG CRE

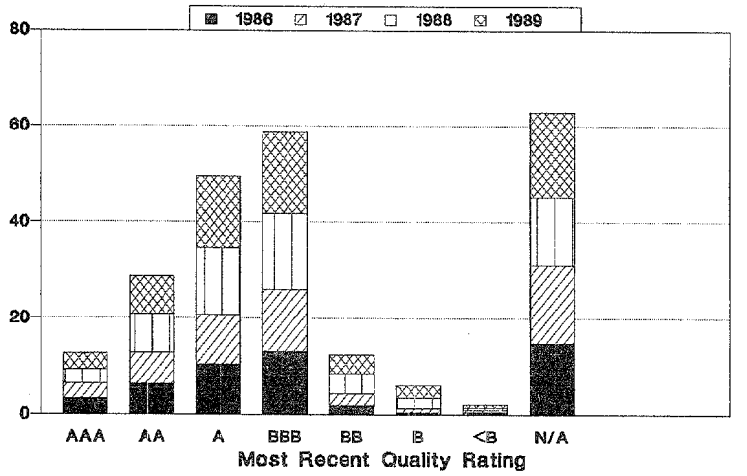
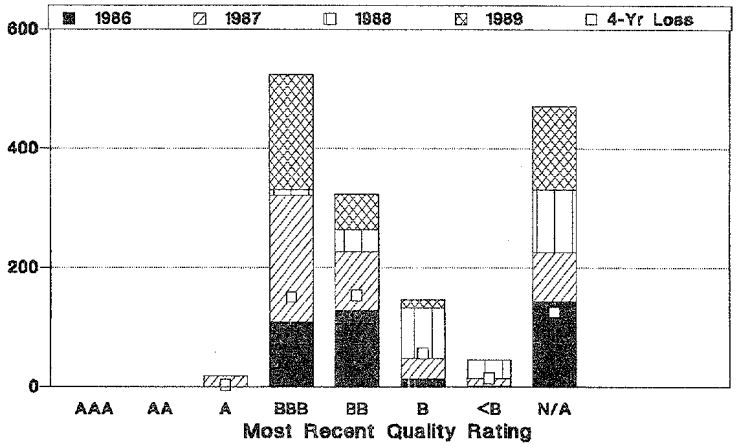


FIGURE 46
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



Highlights of the results by *Most Recent Quality Rating* include:

- Approximately 27% of the amount exposed does not have a *Most Recent Quality Rating* and approximately 9% of the exposure is for rating categories below BBB (compared to an ACLI estimate of 20% in NAIC rating categories 3 through 6 at year-end 1990); also, the CRE data for individual experience years are very sparse.
- The incidence rate by number increases dramatically from BBB to BB and continues to increase steadily through B and <B.
- For the three other loss statistics, there seems to be distinct deterioration of experience for ratings through BB, although the experience seems to improve with decrease in quality for categories BB, B, and <B. The sparsity of data for ratings categories below BBB precludes any meaningful analysis for those categories and is likely one of the primary reasons for the surprising pattern. If BB, B, and <B are grouped together, the ratio of economic loss to all exposure is 0.0110.

The last point warrants further comment. Although the sparsity of the data is likely one of the primary reasons for the surprising pattern, there are other possible explanations. Some explanations are related to the data submission and the data processing: for example, errors in data submission or data processing, the impact of data adjustments made, or the impact of the interest rate used in the economic loss calculation. Other explanations are related to investment practices: for example, company internal rating systems or practices, prior restructures resulting in low ratings but good experience, or closer monitoring of low-rated bonds. To further investigate possible reasons for this surprising pattern of results, the following analyses were completed:

- Calculation of the loss statistics excluding two companies that required special adjustments because of unusual patterns of most recent quality ratings.
- Calculation of the loss statistics excluding the two companies mentioned above and the three companies that contributed for only two years.

The elimination of the five companies reduces the total exposure amount by approximately 36%.

Although the resulting values for the incidence rate by number for the <B category are more in line with intuition (that is, more dramatic increase), the relationship between the BB and B categories becomes counterintuitive. Also, the incidence rate by amount and loss severity remain high for the BB category with the result that the basis-point loss still follows a somewhat unexpected pattern by quality rating category. Table 33 summarizes the results.

3. Earliest Quality Rating

In an attempt to provide some information about the impact of quality rating at issue, earliest quality rating is defined as the quality rating at issue if it is available or the earliest quality rating available (from the *Most Recent Quality Rating* fields), if quality rating at issue is not available (Tables 34–37 and Figures 47–50).

Highlights of the results by *Earliest Quality Rating* include:

- Of the amount exposed, 21.5% does not have an earliest quality rating and approximately 9% is rated below BBB.
- Because only one company had data sufficient to produce results by original rating at issue, the results by earliest quality rating are very similar to the results by most recent quality rating. In particular, the pattern of results by rating category is similar, although the incidence rates exhibit some differences for categories B and <B. Again, the sparsity of the data precludes meaningful analysis for rating categories below BBB. If BB, B, and <B are grouped together, the economic loss divided by all exposure is 0.0091, as compared to the 0.0110 for the most recent quality rating.

TABLE 33

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY MOST RECENT QUALITY RATING, 1986–89 COMBINED

	Most Recent Quality Rating								
	AAA	AA	A	BBB	BB	B	<B	NA	All
Incidence Rate by Number									
All 11 Cos.	0.0000	0.0000	0.0007	0.0048	0.0226	0.0275	0.0307	0.0056	0.0056
Excl. 2 Cos.	0.0000	0.0000	0.0003	0.0043	0.0312	0.0269	0.0634	0.0052	0.0055
Excl. 5 Cos.	0.0000	0.0000	0.0003	0.0052	0.0353	0.0304	0.0818	0.0053	0.0059
Incidence Rate by Amount									
All 11 Cos.	0.0000	0.0000	0.0054	0.0089	0.0260	0.0246	0.0212	0.0075	0.0076
Excl. 2 Cos.	0.0000	0.0000	0.0071	0.0099	0.0344	0.0201	0.0326	0.0080	0.0083
Excl. 5 Cos.	0.0000	0.0000	0.0077	0.0106	0.0354	0.0192	0.0386	0.0081	0.0086
Loss Severity									
All 11 Cos.	—	—	0.0500	0.2899	0.4792	0.3871	0.3194	0.2686	0.2912
Excl. 2 Cos.	—	—	0.0405	0.2822	0.4175	0.4223	0.3125	0.2915	0.2698
Excl. 5 Cos.	—	—	0.0405	0.2765	0.4175	0.3529	0.3125	0.2915	0.2632
Economic Loss/All Exposure									
All 11 Cos.	0.0000	0.0000	0.0003	0.0026	0.0125	0.0095	0.0068	0.0020	0.0022
Excl. 2 Cos.	0.0000	0.0000	0.0003	0.0028	0.0144	0.0085	0.0102	0.0023	0.0022
Excl. 5 Cos.	0.0000	0.0000	0.0003	0.0029	0.0148	0.0068	0.0121	0.0024	0.0023

TABLE 34

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: INCIDENCE RATE BY NUMBER

Earliest Quality Rating	Year	No. of CREs	No. of Exposures	Ratio
AAA	1986	0	366.5	0.00000
	1987	0	361.5	0.00000
	1988	0	435	0.00000
	1989	0	398.5	0.00000
	1986–89	0	1,561.5	0.00000
AA	1986	0	730.5	0.00000
	1987	3	736.5	0.00407
	1988	0	865	0.00000
	1989	0	830	0.00000
	1986–89	3	3,162	0.00095
A	1986	0	1,476	0.00000
	1987	3	1,384.5	0.00217
	1988	0	1,743.5	0.00000
	1989	2	1,727.5	0.00116
	1986–89	5	6,331.5	0.00079
BBB	1986	14	2,170.5	0.00645
	1987	27	2,017	0.01339
	1988	7	2,358.5	0.00297
	1989	10	2,280.5	0.00439
	1986–89	58	8,826.5	0.00657
BB	1986	12	380	0.03158
	1987	6	381	0.01575
	1988	6	438	0.01370
	1989	2	424	0.00472
	1986–89	26	1,623	0.01602
B	1986	4	128.5	0.03113
	1987	6	136	0.04412
	1988	8	300	0.02667
	1989	4	344.5	0.01161
	1986–89	22	909	0.02420
<B	1986	6	194	0.03093
	1987	5	178	0.02809
	1988	5	172	0.02907
	1989	0	149.5	0.00000
	1986–89	16	693.5	0.02307
Not Available	1986	17	2,294	0.00741
	1987	7	2,045	0.00342
	1988	9	2,116.5	0.00425
	1989	16	2,201.5	0.00727
	1986–89	49	8,657	0.00566
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	32.08%	29.64%	
	1987	12.28	28.25	
	1988	25.71	25.11	
	1989	47.06	26.35	
	1986–89	27.37	27.25	

TABLE 35

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: INCIDENCE RATE BY AMOUNT*

Earliest Quality Rating	Year	CRE Exposure	All Exposure	Ratio
AAA	1986	$ 0	$ 3,427,590	0.00000
	1987	0	3,361,878	0.00000
	1988	0	3,495,972	0.00000
	1989	0	3,690,681	0.00000
	1986–89	0	13,976,131	0.00000
AA	1986	0	7,070,171	0.00000
	1987	18,402	7,597,407	0.00242
	1988	0	8,505,761	0.00000
	1989	0	8,230,968	0.00000
	1986–89	18,402	31,404,307	0.00059
A	1986	0	12,058,591	0.00000
	1987	262,259	12,019,270	0.02182
	1988	0	13,591,293	0.00000
	1989	39,547	14,669,560	0.00270
	1986–89	301,806	52,338,714	0.00577
BBB	1986	123,751	15,234,834	0.00812
	1987	259,596	15,530,160	0.01672
	1988	28,380	16,290,563	0.00174
	1989	179,796	16,827,873	0.01068
	1986–89	591,523	63,883,430	0.00926
BB	1986	125,602	2,631,855	0.04772
	1987	49,625	2,866,686	0.01731
	1988	44,274	3,317,300	0.01335
	1989	35,000	3,637,326	0.00962
	1986–89	254,501	12,453,167	0.02044
B	1986	13,590	695,052	0.01955
	1987	31,553	1,114,038	0.02832
	1988	75,244	1,981,316	0.03798
	1989	11,968	2,380,953	0.00503
	1986–89	132,355	6,171,359	0.02145
<B	1986	47,935	841,121	0.05699
	1987	13,340	713,737	0.01869
	1988	15,946	614,059	0.02597
	1989	0	551,101	0.00000
	1986–89	77,221	2,720,018	0.02839
Not Available	1986	86,560	8,657,657	0.01000
	1987	72,455	9,705,342	0.00747
	1988	105,298	13,900,761	0.00757
	1989	140,991	17,842,535	0.00790
	1986–89	405,304	50,106,295	0.00809
All	1986	397,438	50,616,871	0.00785
	1987	707,230	52,908,518	0.01337
	1988	269,142	61,697,025	0.00436
	1989	407,302	67,830,997	0.00600
	1986–89	1,781,112	233,053,411	0.00764
% NA	1986	21.78%	17.10%	
	1987	10.24	18.34	
	1988	39.12	22.53	
	1989	34.62	26.30	
	1986–89	22.76	21.50	

*Dollar amounts in thousands.

TABLE 36

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: LOSS SEVERITY*

Earliest Quality Rating	Year	Economic Loss	CRE Exposure	Ratio
AAA	1986	$ 0	$ 0	
	1987	0	0	
	1988	0	0	
	1989	0	0	
	1986–89	0	0	
AA	1986	0	0	
	1987	5,885	18,402	0.31980
	1988	0	0	
	1989	0	0	
	1986–89	5,885	18,402	0.31980
A	1986	0	0	
	1987	12,271	262,259	0.04679
	1988	0	0	
	1989	958	39,547	0.02422
	1986–89	13,229	301,806	0.04383
BBB	1986	38,487	123,751	0.31100
	1987	63,777	259,596	0.24568
	1988	9,890	28,380	0.34848
	1989	72,475	179,796	0.40310
	1986–89	184,629	591,523	0.31212
BB	1986	62,928	125,602	0.50101
	1987	13,115	49,625	0.26428
	1988	28,094	44,274	0.63455
	1989	24,822	35,000	0.70920
	1986–89	128,959	254,501	0.50671
B	1986	8,628	13,590	0.63488
	1987	7,887	31,553	0.24996
	1988	28,171	75,244	0.37440
	1989	10,004	11,968	0.83590
	1986–89	54,690	132,355	0.41321
<B	1986	4,624	47,935	0.09646
	1987	657	13,340	0.04925
	1988	5,626	15,946	0.35282
	1989	0	0	
	1986–89	10,907	77,221	0.14124
Not Available	1986	49,713	86,560	0.57432
	1987	10,902	72,455	0.15047
	1988	18,589	105,298	0.17654
	1989	41,200	140,991	0.29222
	1986–89	120,404	405,304	0.29707
All	1986	164,380	397,438	0.41360
	1987	114,494	707,230	0.16189
	1988	90,370	269,142	0.33577
	1989	149,459	407,302	0.36695
	1986–89	518,703	1,781,112	0.29122
% NA	1986	30.24%	21.78%	
	1987	9.52	10.24	
	1988	20.57	39.12	
	1989	27.57	—	
	1986–89	23.21	22.76	

*Dollar amounts in thousands.

TABLE 37

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Earliest Quality Rating	Year	Economic Loss	All Exposure	Ratio
AAA	1986	$ 0	$ 3,427,590	0.00000
	1987	0	3,361,878	0.00000
	1988	0	3,495,972	0.00000
	1989	0	3,690,681	0.00000
	1986–89	0	13,976,121	0.00000
AA	1986	0	7,070,171	0.00000
	1987	5,885	7,597,407	0.00077
	1988	0	8,505,761	0.00000
	1989	0	8,230,968	0.00000
	1986–89	5,885	31,404,307	0.00019
A	1986	0	12,058,591	0.00000
	1987	12,271	12,019,270	0.00102
	1988	0	13,591,293	0.00000
	1989	958	14,669,560	0.00007
	1986–89	13,229	52,338,714	0.00025
BBB	1986	38,487	15,234,834	0.00253
	1987	63,777	15,530,160	0.00411
	1988	9,890	16,290,563	0.00061
	1989	72,475	16,827,873	0.00431
	1986–89	184,629	63,883,430	0.00289
BB	1986	62,928	2,631,855	0.02391
	1987	13,115	2,866,686	0.00457
	1988	28,094	3,317,300	0.00847
	1989	24,822	3,637,326	0.00682
	1986–89	128,959	12,453,167	0.01036
B	1986	8,628	695,052	0.01241
	1987	7,887	1,114,038	0.00708
	1988	28,171	1,981,316	0.01422
	1989	10,004	2,380,953	0.00420
	1986–89	54,690	6,171,359	0.00886
<B	1986	4,624	841,121	0.00550
	1987	657	713,737	0.00092
	1988	5,626	614,059	0.00916
	1989	0	551,101	0.00000
	1986–89	10,907	2,720,018	0.00401
Not Available	1986	49,713	8,657,657	0.00574
	1987	10,902	9,705,342	0.00112
	1988	18,589	13,900,761	0.00134
	1989	41,200	17,842,535	0.00231
	1986–89	120,404	50,106,295	0.00240
All	1986	164,380	50,616,871	0.00325
	1987	114,494	52,908,518	0.00216
	1988	90,370	61,697,025	0.00146
	1989	149,459	67,830,997	0.00220
	1986–89	518,703	233,053,411	0.00223
% NA	1986	30.24%	17.10%	
	1987	9.52	18.34	
	1988	20.57	22.53	
	1989	27.57	26.30	
	1986–89	23.21	21.50	

*Doliar amounts in thousands.

FIGURE 47
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: INCIDENCE RATES AND LOSS PER DOLLAR EXCLUDING ONE BIG CRE

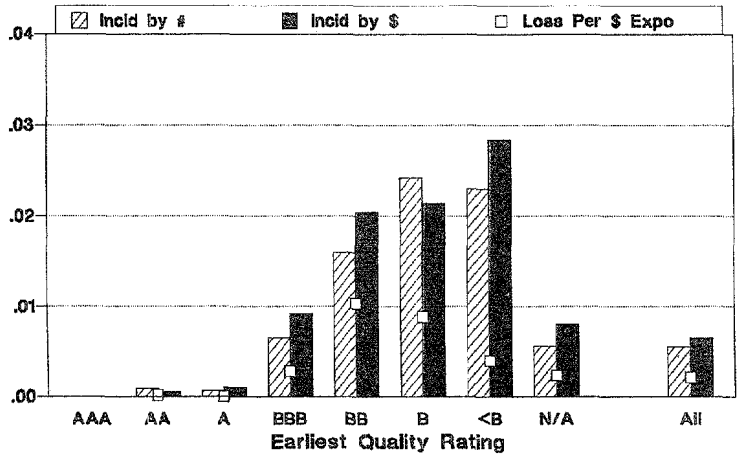


FIGURE 48
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: LOSS SEVERITY, EXCLUDING ONE BIG CRE

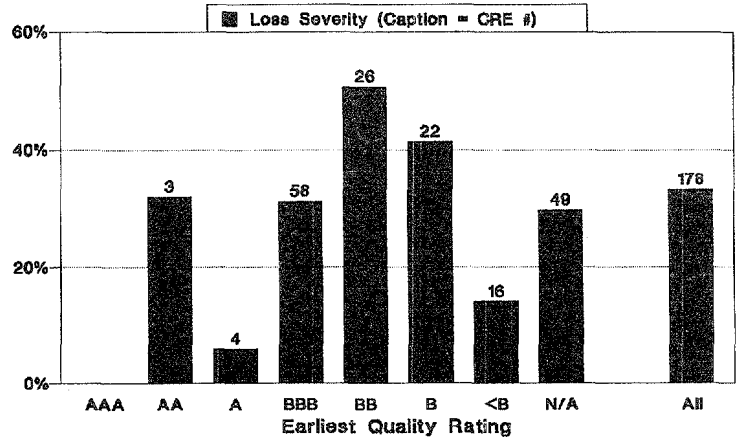


FIGURE 49
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: EXPOSURE AMOUNT (IN BILLIONS BY YEAR), NOT EXCLUDING ONE BIG CRE

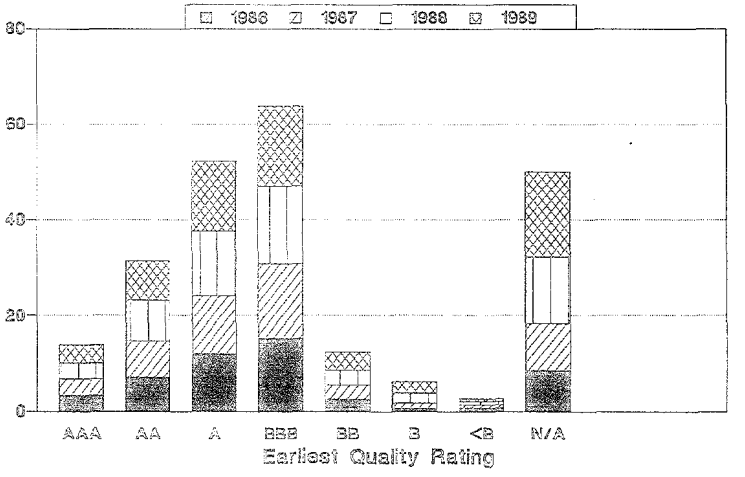
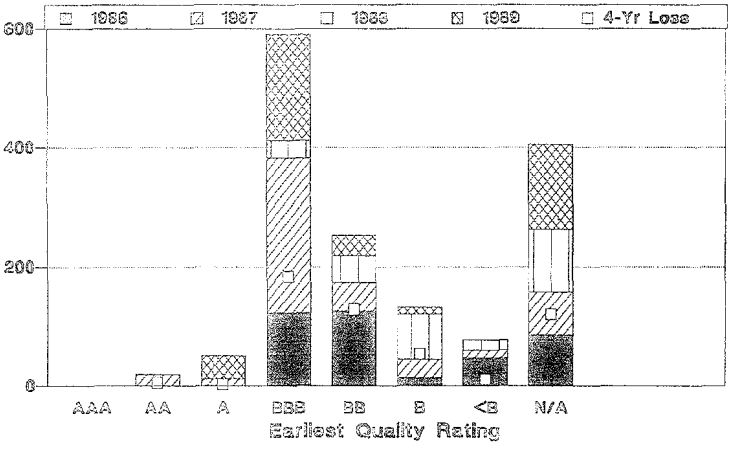


FIGURE 50
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY EARLIEST QUALITY RATING: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



4. NAIC Rating (Tables 38–41 and Figures 51–54)

Although the rating system used by the NAIC has changed, the results by NAIC rating under the previous system generally confirm intuition—the poorer the rating, the higher the value of the loss statistics—when all years are combined for all data contributors. The one exception is that the "yes" category has a loss severity greater than both the "no*" and "no**" categories. It should be noted that "yes" bonds contributed 90% of the exposure that had an NAIC rating, which is slightly greater than the values in ACLI surveys regarding "yes" bond holdings during the 1986 through 1989 period. This is consistent with the disproportionate amount of "not available" exposure for CRE assets as compared to all exposure.

TABLE 38

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: INCIDENCE RATE BY NUMBER

NAIC Rating	Year	No. of CREs	No. of Exposures	Ratio
Yes	1986	13	5,763.5	0.00226
	1987	13	5,339.5	0.00243
	1988	10	6,942.5	0.00144
	1989	13	7,229.5	0.00180
	1986–89	49	25,275	0.00194
No*	1986	4	168.5	0.02374
	1987	2	182.5	0.01096
	1988	4	292	0.01370
	1989	1	334.5	0.00299
	1986–89	11	977.5	0.01125
No**	1986	11	385	0.02857
	1987	15	425	0.03529
	1988	8	529.5	0.01511
	1989	11	472	0.02331
	1986–89	45	1,811.5	0.02484
No	1986	1	130	0.00769
	1987	19	143.5	0.13240
	1988	3	138.5	0.02166
	1989	0	117.5	0.00000
	1986–89	23	529.5	0.04344
Not Available	1986	24	1,293	0.01856
	1987	8	1,149	0.00696
	1988	10	526	0.01901
	1989	9	202.5	0.04444
	1986–89	51	3,170.5	0.01609
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	45.28%	16.71%	
	1987	14.04	15.87	
	1988	28.57	6.24	
	1989	26.47	2.42	
	1986–89	28.49	9.98	

TABLE 39

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: INCIDENCE RATE BY DOLLAR AMOUNT[a]

NAIC Rating	Year	CRE Exposure	All Exposure	Ratio
Yes	1986	$ 76,101	$ 36,494,581	0.00209
	1987	73,316	36,753,129	0.00199
	1988	74,065	48,769,106	0.00152
	1989	147,802	58,725,665	0.00252
	1986–89	371,284	180,742,481	0.00205
No*	1986	15,907	871,854	0.01825
	1987	253,181	1,897,301	0.13344
	1988	30,250	2,612,021	0.01158
	1989	40,000	2,740,759	0.01459
	1986–89	339,338	8,121,935	0.04178
No**	1986	104,421	2,056,037	0.05079
	1987	207,044	2,139,465	0.09677
	1988	68,951	2,613,508	0.02638
	1989	69,193	2,662,532	0.02599
	1986–89	449,609	9,471,542	0.04747
No	1986	5,739	538,626	0.01065
	1987	92,468	450,161	0.20541
	1988	10,425	354,581	0.02940
	1989	0	263,783	0.00000
	1986–89	108,632	1,607,151	0.06759
Not Available	1986	195,270	10,655,773	0.01833
	1987	81,219	11,668,463	0.00696
	1988	85,450	7,347,810	0.01163
	1989	150,307	3,438,260	0.04372
	1986–89	512,246	33,110,306	0.01547
All	1986	397,438	50,616,871	0.00785
	1987	707,228	52,908,519	0.01337
	1988	269,141	61,697,026	0.00436
	1989	407,302	67,830,999	0.00600
	1986–89	1,781,109	233,053,415	0.00764
% NA	1986	49.13%	21.05%	
	1987	11.48	22.05	
	1988	31.75	11.91	
	1989	36.90	5.07	
	1986–89	28.76	14.21	

[a]Dollar amounts in thousands.

TABLE 40

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: LOSS SEVERITY[a]

NAIC Rating	Year	Economic Loss	CRE Exposure	Ratio
Yes	1986	$ 32,589	$ 76,101	0.42823
	1987	29,690	73,316	0.40496
	1988	25,597	74,065	0.34560
	1989	41,586	147,802	0.28136
	1986–89	129,462	371,284	0.34869
No*	1986	12,099	15,907	0.76061
	1987	10,017	253,181	0.03956
	1988	14,432	30,250	0.47709
	1989	11,240	40,000	0.28100
	1986–89	47,788	339,338	0.14083
No**	1986	52,439	104,421	0.50219
	1987	27,169	207,044	0.13122
	1988	38,546	68,951	0.55903
	1989	6,201	69,193	0.08962
	1986–89	124,355	449,609	0.27658
No	1986	3,285	5,739	0.57240
	1987	33,908	92,468	0.36670
	1988	4,085	10,425	0.39185
	1989	0	0	
	1986–89	41,278	108,632	0.37998
Not Available	1986	63,968	195,270	0.32759
	1987	13,711	81,219	0.16882
	1988	7,710	85,450	0.09023
	1989	90,431	150,307	0.60164
	1986–89	175,820	512,246	0.34323
All	1986	164,380	397,438	0.41360
	1987	114,495	707,228	0.16189
	1988	90,370	269,141	0.33577
	1989	149,458	407,302	0.36695
	1986–89	518,703	1,781,109	0.29122
% NA	1986	38.91%	49.13%	
	1987	11.98	11.48	
	1988	8.53	31.75	
	1989	60.51	36.90	
	1986–89	33.90	28.76	

[a]Dollar amounts in thousands.

TABLE 41

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE[a]

NAIC Rating	Year	Economic Loss	All Exposure	Ratio
Yes	1986	$ 32,589	$ 36,494,581	0.00089
	1987	29,690	36,753,129	0.00081
	1988	25,597	48,769,106	0.00052
	1989	41,586	58,725,665	0.00071
	1986–89	129,462	180,742,481	0.00072
No*	1986	12,099	871,854	0.01388
	1987	10,017	1,897,301	0.00528
	1988	14,432	2,612,021	0.00553
	1989	11,240	2,740,759	0.00410
	1986–89	47,788	8,121,935	0.00588
No**	1986	52,439	2,056,037	0.02550
	1987	27,169	2,139,465	0.01270
	1988	38,546	2,613,508	0.01475
	1989	6,201	2,662,532	0.00233
	1986–89	124,355	9,471,542	0.01313
No	1986	3,285	538,626	0.00610
	1987	33,908	450,161	0.07532
	1988	4,085	354,581	0.01152
	1989	0	263,783	0.00000
	1986–89	41,278	1,607,151	0.02568
Not Available	1986	63,968	10,655,773	0.00600
	1987	13,711	11,668,463	0.00118
	1988	7,710	7,347,810	0.00105
	1989	90,431	3,438,260	0.02630
	1986–89	175,820	33,110,306	0.00531
All	1986	164,380	50,616,871	0.00325
	1987	114,495	52,908,519	0.00216
	1988	90,370	61,697,026	0.00146
	1989	149,458	67,830,999	0.00220
	1986–89	518,703	233,053,415	0.00223
% NA	1986	38.91%	21.05%	
	1987	11.98	22.05	
	1988	8.53	11.91	
	1989	60.51	5.07	
	1986–89	33.90	14.21	

[a]Dollar amounts in thousands.

FIGURE 51
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING:
INCIDENCE RATE AND LOSS PER DOLLAR EXCLUDING ONE BIG CRE

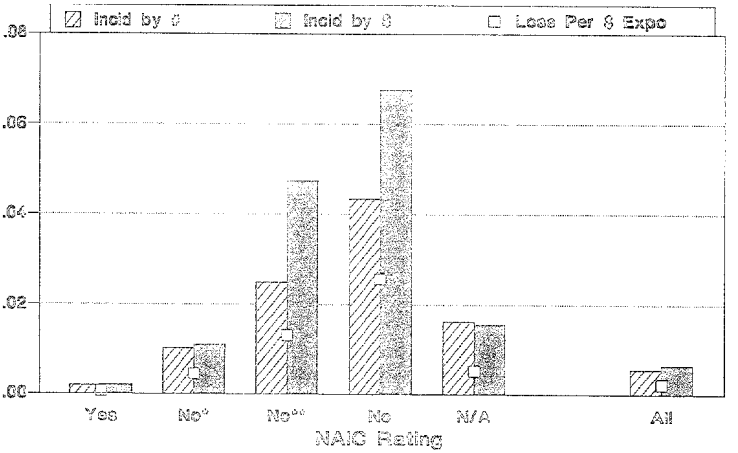


FIGURE 52
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING:
LOSS SEVERITY, EXCLUDING ONE BIG CRE

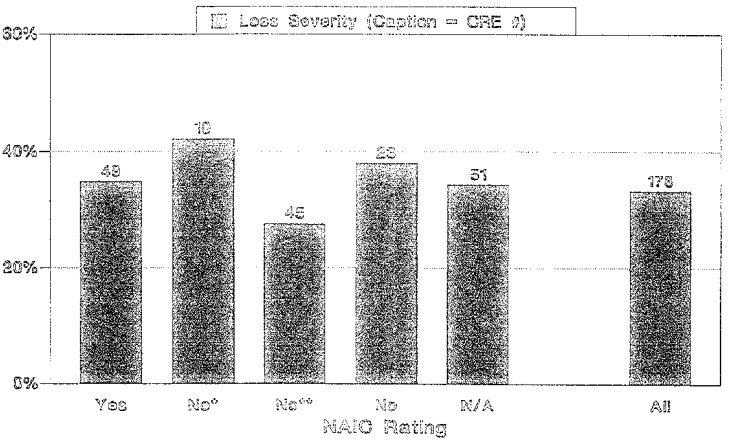


FIGURE 53
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

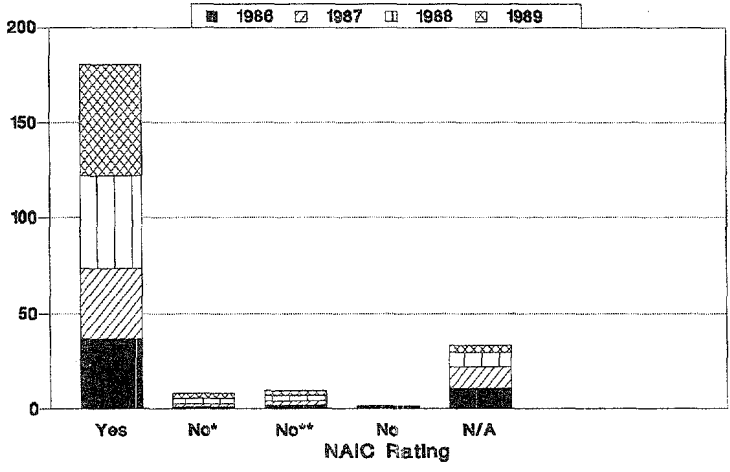
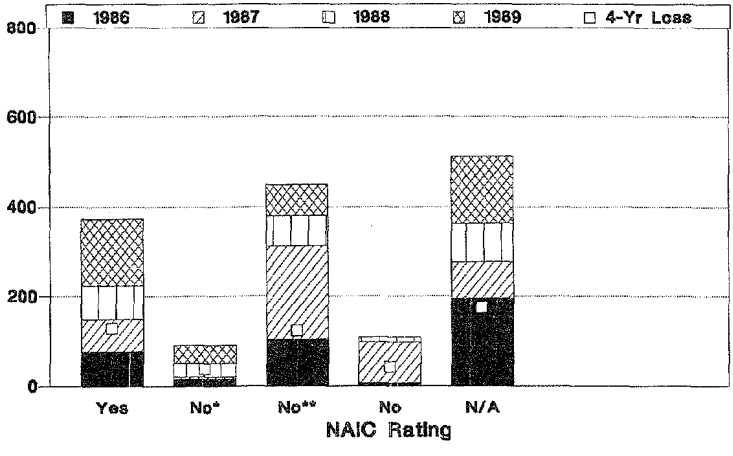


FIGURE 54
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY NAIC RATING: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



C. Results by Categories of Various Other Characteristics

Results are provided in this report for the following additional characteristics:

- Original coupon rate (Tables 42–45 and Figures 55–58, 60, and 61)
- Type of credit risk event (Tables 46–49 and Figures 62–64)
- Funding year (Tables 50–53 and Figures 65–72, 74 and 75)
- Years since funding (Tables 54–57 and Figures 76–82).

Highlights of the results by *Original Coupon Rate* include:

- Although there are a few exceptions, for each experience year, the incidence rate by number generally increased as the original coupon rate increased, consistent with the idea that the greater the debt service (in the form of a coupon payment), the higher the probability of a credit risk event; likewise, all things being equal, the higher the coupon rate, the lower the quality rating and therefore the greater the likelihood of a credit risk event.
- For individual experience years, the incidence rate by amount does *not* exhibit a consistent pattern across original coupon rate groups, although there is evidence of an increasing incidence rate by amount for increasing original coupon rate when all experience years are combined.
- For all experience years combined, both the loss severity and the economic loss divided by all exposure exhibit an upward trend as the original coupon rate increases.
- The results for all four statistics for all experience years combined suggests that the 9% to <11% and the 11% to <13% groups exhibit similar behavior, as do the 13% to <15% and the ≥15% groups to a somewhat lesser extent.

In comparison to Tables 42–45, Figures 55–58 for experience by *Original Coupon Rate* illustrate the impact of one large CRE in the <9% category.

TABLE 42

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: INCIDENCE RATE BY NUMBER

Original Coupon Rate	Year	No. of CREs	No. of Exposures	Ratio
<9%	1986	9	2,548	0.00353
	1987	11	2,416.5	0.00455
	1988	7	2,715	0.00258
	1989	2	2,520	0.00079
	1986–89	29	10,199.5	0.00284
9% to <11%	1986	13	2,306.5	0.00564
	1987	19	2,270.5	0.00837
	1988	12	2,924.5	0.00410
	1989	9	3,298.5	0.00273
	1986–89	53	10,800	0.00491
11% to <13%	1986	8	1,454.5	0.00550
	1987	12	1,316.5	0.00912
	1988	8	1,570.5	0.00509
	1989	10	1,464.5	0.00683
	1986–89	38	5,806	0.00654
13% to <15%	1986	15	812	0.01847
	1987	10	717	0.01395
	1988	4	741	0.00540
	1989	8	685	0.01168
	1986–89	37	2,955	0.01252
≥15%	1986	8	531.5	0.01505
	1987	5	425	0.01176
	1988	4	401	0.00998
	1989	5	337	0.01484
	1986–89	22	1,694.5	0.01298
Not Available	1986	0	87.5	0.00000
	1987	0	94	0.00000
	1988	0	76.5	0.00000
	1989	0	51	0.00000
	1986–89	0	309	0.00000
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	0.00%	1.13%	
	1987	0.00	1.30	
	1988	0.00	0.91	
	1989	0.00	0.61	
	1986–89	0.00	0.97	

TABLE 43

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: INCIDENCE RATE BY DOLLAR AMOUNT*

Original Coupon Rate	Year	CRE Exposure	All Exposure	Ratio
<9%	1986	$ 43,216	$ 12,732,195	0.00339
	1987	285,866	14,681,880	0.01947
	1988	59,368	16,212,686	0.00366
	1989	700	16,184,016	0.00004
	1986–89	389,150	59,810,777	0.00651
9% to <11%	1986	160,692	15,428,966	0.01041
	1987	257,755	17,942,363	0.01437
	1988	45,125	24,969,118	0.00181
	1989	213,690	32,264,545	0.00662
	1986 89	677,262	90,604,992	0.00747
11% to <13%	1986	47,597	11,552,538	0.00412
	1987	36,636	11,398,696	0.00321
	1988	118,936	12,619,005	0.00943
	1989	137,313	12,348,748	0.01112
	1986–89	340,482	47,918,987	0.00711
13% to <15%	1986	73,883	6,388,023	0.01157
	1987	96,196	5,352,561	0.01797
	1988	25,562	5,029,462	0.00508
	1989	33,730	4,849,386	0.00696
	1986–89	229,371	21,619,432	0.01061
≥15%	1986	72,049	4,370,031	0.01649
	1987	30,776	3,263,986	0.00943
	1988	20,151	2,609,925	0.00772
	1989	21,868	2,038,787	0.01073
	1986–89	144,844	12,282,729	0.01179
Not Available	1986	0	145,120	0.00000
	1987	0	269,033	0.00000
	1988	0	256,830	0.00000
	1989	0	145,517	0.00000
	1986–89	0	816,500	0.00000
All	1986	397,437	50,616,873	0.00785
	1987	707,229	52,908,519	0.01337
	1988	269,142	61,697,026	0.00436
	1989	407,301	67,830,999	0.00600
	1986–89	1,781,109	233,053,417	0.00764
% NA	1986	0.00%	0.29%	
	1987	0.00	0.51	
	1988	0.00	0.42	
	1989	0.00	0.21	
	1986–89	0.00	0.35	

TABLE 44

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: LOSS SEVERITY*

Original Coupon Rate	Year	Economic Loss	CRE Exposure	Ratio
<9%	1986	$ 25,428	$ 43,216	0.58839
	1987	18,655	285,866	0.06526
	1988	(4,084)	59,368	−0.06879
	1989	2	700	0.00286
	1986–89	40,001	389,150	0.10279
9% to <11%	1986	38,112	160,692	0.23717
	1987	34,087	257,755	0.13225
	1988	20,620	45,125	0.45695
	1989	105,236	213,690	0.49247
	1986–89	198,055	677,262	0.29243
11% to <13%	1986	17,360	47,597	0.36473
	1987	5,182	36,636	0.14145
	1988	57,520	118,936	0.48362
	1989	26,548	137,313	0.19334
	1986–89	106,610	340,482	0.31311
13% to <15%	1986	41,750	73,883	0.56508
	1987	38,731	96,196	0.40263
	1988	9,916	25,562	0.38792
	1989	8,765	33,730	0.25986
	1986–89	99,162	229,371	0.43232
≥15%	1986	41,730	72,049	0.57919
	1987	17,841	30,776	0.57970
	1988	6,397	20,151	0.31745
	1989	8,907	21,868	0.40731
	1986–89	74,875	144,844	0.51694
Not Available	1986	0	0	
	1987	0	0	
	1988	0	0	
	1989	0	0	
	1986–89	0	0	
All	1986	164,380	397,437	0.41360
	1987	114,496	707,229	0.16189
	1988	90,369	269,142	0.33577
	1989	149,458	407,301	0.36695
	1986–89	518,703	1,781,109	0.29122
% NA	1986	0.00%	0.00%	
	1987	0.00	0.00	
	1988	0.00	0.00	
	1989	0.00	0.00	
	1986–89	0.00	0.00	

*Dollar amounts in thousands.

TABLE 45

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Original Coupon Rate	Year	Economic Loss	All Exposures	Ratio
<9%	1986	$ 25,428	$ 12,732,195	0.00200
	1987	18,655	14,681,880	0.00127
	1988	(4,084)	16,212,686	−0.00025
	1989	2	16,184,016	0.00000
	1986–89	40,001	59,810,777	0.00067
9% to <11%	1986	38,112	15,428,966	0.00247
	1987	34,087	17,942,363	0.00190
	1988	20,620	24,969,118	0.00083
	1989	105,236	32,264,545	0.00326
	1986–89	198,055	90,604,992	0.00219
11% to <13%	1986	17,360	11,552,538	0.00150
	1987	5,182	11,398,696	0.00045
	1988	57,520	12,619,005	0.00456
	1989	26,548	12,348,748	0.00215
	1986–89	106,610	47,918,987	0.00222
13% to <15%	1986	41,750	6,388,023	0.00654
	1987	38,731	5,352,561	0.00724
	1988	9,916	5,029,462	0.00197
	1989	8,765	4,849,386	0.00181
	1986–89	99,162	21,619,432	0.00459
≥15%	1986	41,730	4,370,031	0.00955
	1987	17,841	3,263,986	0.00547
	1988	6,397	2,609,925	0.00245
	1989	8,907	2,038,787	0.00437
	1986–89	74,875	12,282,729	0.00610
Not Available	1986	0	145,120	0.00000
	1987	0	269,033	0.00000
	1988	0	256,830	0.00000
	1989	0	145,517	0.00000
	1986–89	0	816,500	0.00000
All	1986	164,380	50,616,873	0.00325
	1987	114,496	52,908,519	0.00216
	1988	90,369	61,697,026	0.00146
	1989	149,458	67,830,999	0.00220
	1986–89	518,703	233,053,417	0.00223
% NA	1986	0.00%	0.29%	
	1987	0.00	0.51	
	1988	0.00	0.42	
	1989	0.00	0.21	
	1986–89	0.00	0.35	

*Dollar amounts in thousands.

FIGURE 55
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: INCIDENCE RATE AND LOSS PER DOLLAR EXCLUDING ONE BIG CRE

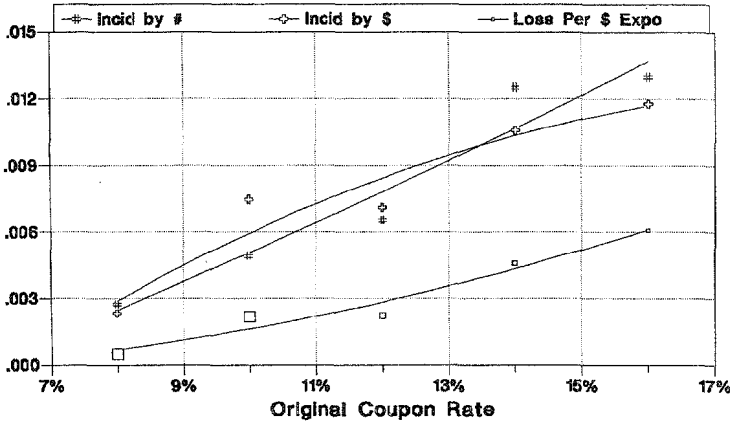


FIGURE 56
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: LOSS SEVERITY, EXCLUDING ONE BIG CRE

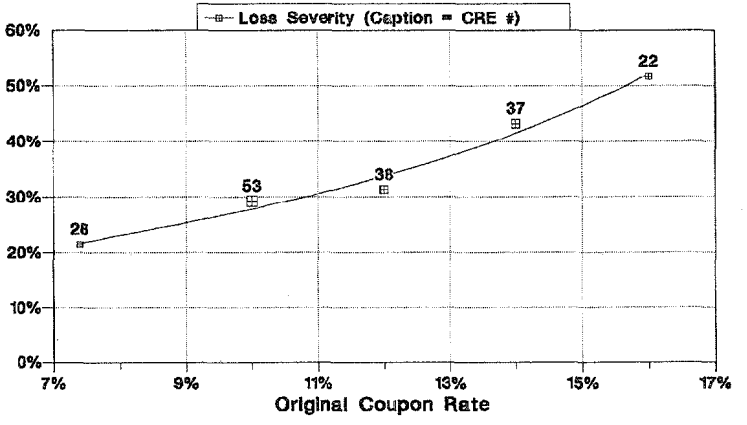


FIGURE 57
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

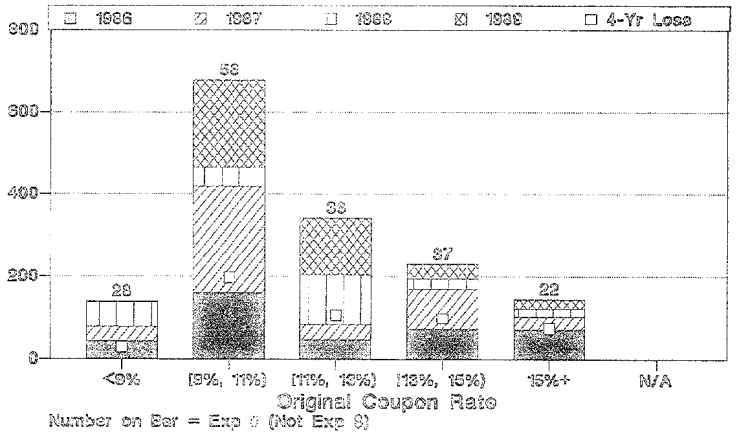


FIGURE 58
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE

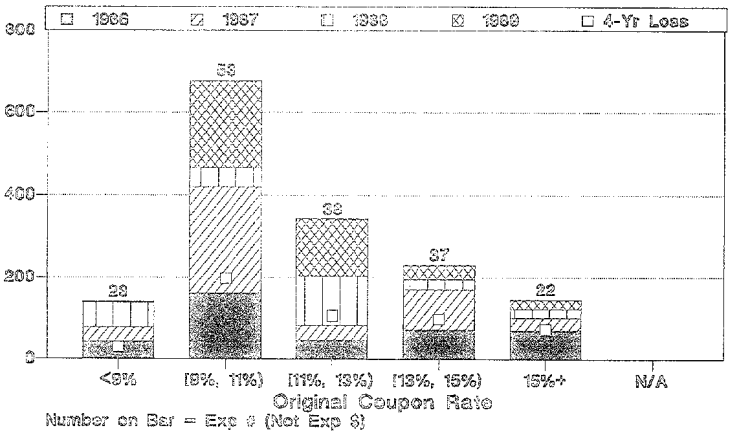


Figure 59 illustrates the dispersion of the loss severity values. The grouped data result in a regression line that suggests a stronger positive relationship between loss severity and original coupon rate. However, the extent of the dispersion shown in the scatter diagram suggests that a relatively small proportion of the variance is explained by either regression line.

Figures 60 and 61 showing *Original Coupon Rate* give a more complete picture of the distribution of exposure, CRE exposure, and economic loss by original coupon rate.

Over 60% of the credit risk events were identified as Fail to Pay. Thus, the results by *Type of Credit Risk Event* (Tables 46–49 and Figures 62–64) are not particularly helpful in identifying the influence of credit risk event type on the ratios. However, comparing the Fail to Pay and Bankruptcy groups, which combined accounted for approximately 86% of the CREs and 83% of the CRE exposure, suggests that in terms of both incidence rates (Tables 46 and 47) and basis-point loss (Table 49), the Fail to Pay group has significantly worse experience than the Bankruptcy group.

FIGURE 59
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
LOSS SEVERITY VERSUS ORIGINAL COUPON RATE, EXCLUDING ONE BIG CRE

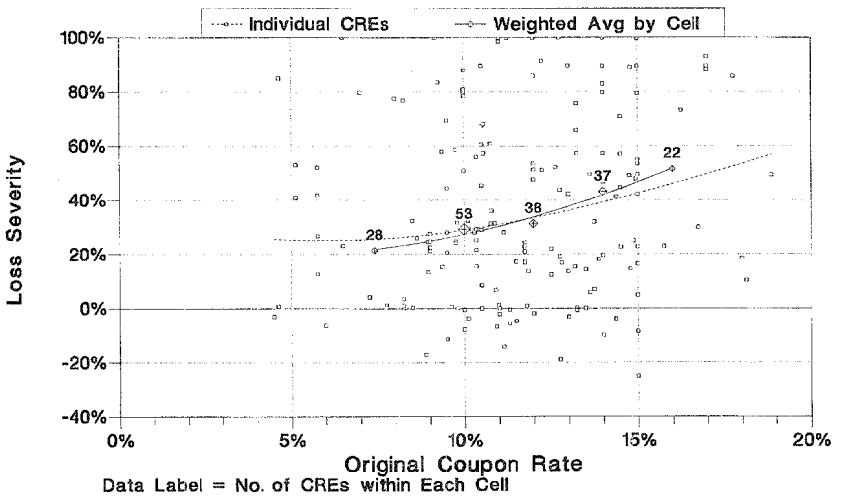


FIGURE 60
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: EXPOSURE AMOUNT (IN BILLIONS BY YEAR) NOT EXCLUDING ONE BIG CRE

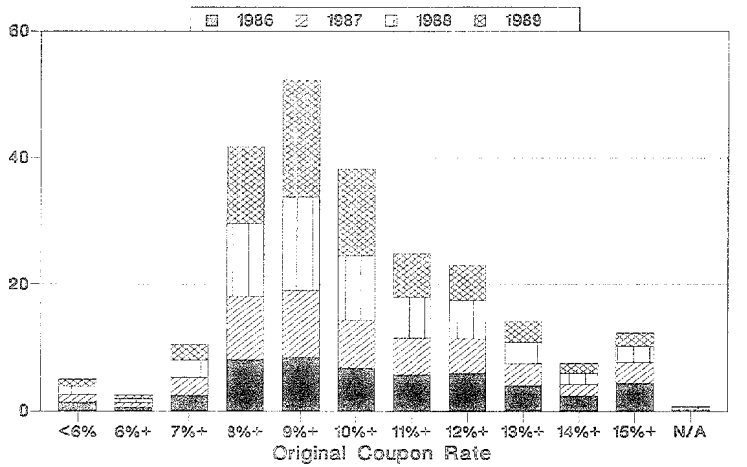


FIGURE 61
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY ORIGINAL COUPON RATE: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE

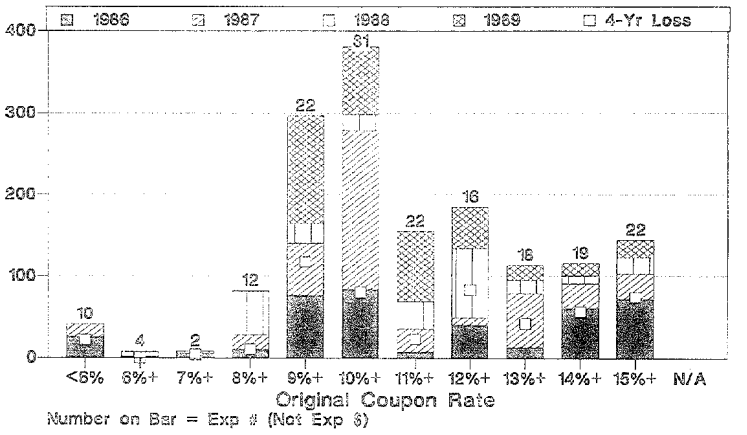


TABLE 46

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: INCIDENCE RATE BY NUMBER

Type of CRE	Year	No. of CREs	No. of Exposures	Ratio
Fail to Pay	1986	37	7,740	0.00478
	1987	36	7,239.5	0.00497
	1988	22	8,428.5	0.00261
	1989	18	8,356	0.00215
	1986–89	113	31,764	0.00356
Bankruptcy	1986	9	7,740	0.00116
	1987	10	7,239.5	0.00138
	1988	11	8,428.5	0.00131
	1989	11	8,356	0.00132
	1986–89	41	31,764	0.00129
Terms Modification	1986	3	7,740	0.00039
	1987	6	7,239.5	0.00083
	1988	2	8,428.5	0.00024
	1989	2	8,356	0.00024
	1986–89	13	31,764	0.00041
Sale	1986	4	7,740	0.00052
	1987	2	7,239.5	0.00028
	1988	0	8,428.5	0.00000
	1989	1	8,356	0.00012
	1986–89	7	31,764	0.00022
Not Available	1986		7,740	0.00000
	1987	3	7,239.5	0.00041
	1988	0	8,428.5	0.00000
	1989	2	8,356	0.00024
	1986–89	5	31,764	0.00016
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	0.00%		
	1987	5.26		
	1988	0.00		
	1989	5.88		
	1986–89	2.79		

TABLE 47

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: INCIDENCE BY DOLLAR AMOUNT*

Type of CRE	Year	CRE Exposure	All Exposure	Ratio
Fail to Pay	1986	$ 201,559	$ 50,616,872	0.00398
	1987	229,153	52,908,519	0.00433
	1988	173,792	61,697,026	0.00282
	1989	193,061	67,830,999	0.00285
	1986–89	797,565	233,053,416	0.00342
Bankruptcy	1986	133,209	50,616,872	0.00263
	1987	302,764	52,908,519	0.00572
	1988	90,389	61,697,026	0.00147
	1989	157,672	67,830,999	0.00232
	1986–89	684,034	233,053,416	0.00294
Terms Modification	1986	29,103	50,616,872	0.00057
	1987	95,224	52,908,519	0.00180
	1988	4,961	61,697,026	0.00008
	1989	38,500	67,830,999	0.00057
	1986–89	167,788	233,053,416	0.00072
Sale	1986	33,567	50,616,872	0.00066
	1987	14,476	52,908,519	0.00027
	1988	0	61,697,026	0.00000
	1989	10,000	67,830,999	0.00015
	1986 89	58,043	233,053,416	0.00025
Not Available	1986		50,616,872	0.00000
	1987	65,612	52,908,519	0.00124
	1988	0	61,697,026	0.00000
	1989	8,068	67,830,999	0.00012
	1986–89	73,680	233,053,416	0.00032
All	1986	397,438	50,616,872	0.00785
	1987	707,229	52,908,519	0.01337
	1988	269,142	61,697,026	0.00436
	1989	407,301	67,830,999	0.00600
	1986–89	1,781,110	233,053,416	0.00764
% NA	1986	0.00%		
	1987	9.28		
	1988	0.00		
	1989	1.98		
	1986–89	4.14		

*Dollar amounts in thousands.

TABLE 48

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: LOSS SEVERITY*

Type of CRE	Year	Economic Loss	CRE Exposure	Ratio
Fail to Pay	1986	$ 90,769	$ 201,559	0.45033
	1987	84,952	229,153	0.37072
	1988	64,760	173,792	0.37263
	1989	34,018	193,061	0.17620
	1986–89	274,499	797,565	0.34417
Bankruptcy	1986	35,482	133,209	0.26636
	1987	11,905	302,764	0.03932
	1988	25,249	90,389	0.27934
	1989	84,590	157,672	0.53649
	1986–89	157,226	684,034	0.22985
Terms Modification	1986	13,642	29,103	0.46875
	1987	18,678	95,224	0.19615
	1988	362	4,961	0.07297
	1989	24,330	38,500	0.63195
	1986–89	57,012	167,788	0.33979
Sale	1986	24,487	33,567	0.72950
	1987	4,753	14,476	0.32834
	1988	0	0	
	1989	5,750	10,000	0.57500
	1986–89	34,990	58,043	0.60283
Not Available	1986	0	0	
	1987	(5,792)	65,612	−0.08828
	1988	0	0	
	1989	772	8,068	0.09569
	1986–89	(5,020)	73,680	−0.06813
All	1986	164,380	397,438	0.41360
	1987	114,496	707,229	0.16189
	1988	90,371	269,142	0.33577
	1989	149,460	407,301	0.36695
	1986–89	518,707	1,781,110	0.29123
% NA	1986	0.00%	0.00%	
	1987	−5.06	9.28	
	1988	0.00	0.00	
	1989	0.52	1.98	
	1986–89	−0.97	4.14	

*Dollar amounts in thousands.

TABLE 49

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Type of CRE	Year	Economic Loss	All Exposure	Ratio
Fail to Pay	1986	$ 90,769	$ 50,616,872	0.00179
	1987	84,952	52,908,519	0.00161
	1988	64,760	61,697,026	0.00105
	1989	34,018	67,830,999	0.00050
	1986–89	274,499	233,053,416	0.00118
Bankruptcy	1986	35,482	50,616,872	0.00070
	1987	11,905	52,908,519	0.00023
	1988	25,249	61,697,026	0.00041
	1989	84,590	67,830,999	0.00125
	1986–89	157,226	233,053,416	0.00067
Terms Modification	1986	13,642	50,616,872	0.00027
	1987	18,678	52,908,519	0.00035
	1988	362	61,697,026	0.00001
	1989	24,330	67,830,999	0.00036
	1986–89	57,012	233,053,416	0.00024
Sale	1986	24,487	50,616,872	0.00048
	1987	4,753	52,908,519	0.00009
	1988	0	61,697,026	0.00000
	1989	5,750	67,830,999	0.00008
	1986–89	34,990	233,053,416	0.00015
Not Available	1986	0	50,616,872	0.00000
	1987	(5,792)	52,908,519	−0.00011
	1988	0	61,697,026	0.00000
	1989	772	67,830,999	0.00001
	1986–89	(5,020)	233,053,416	−0.00002
All	1986	164,380	50,616,872	0.00325
	1987	114,496	52,908,519	0.00216
	1988	90,371	61,697,026	0.00146
	1989	149,460	67,830,999	0.00220
	1986–89	518,707	233,053,416	0.00223
% NA	1986	0.00%		
	1987	−5.06		
	1988	0.00		
	1989	0.52		
	1986–89	−0.97		

*Dollar amounts in thousands.

FIGURE 62
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: INCIDENCE RATE AND LOSS PER DOLLAR EXCLUDING ONE BIG CRE

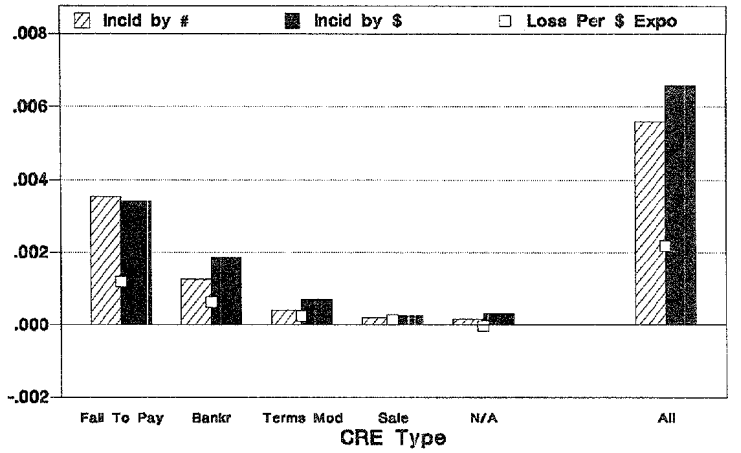


FIGURE 63
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE: LOSS SEVERITY, EXCLUDING ONE BIG CRE

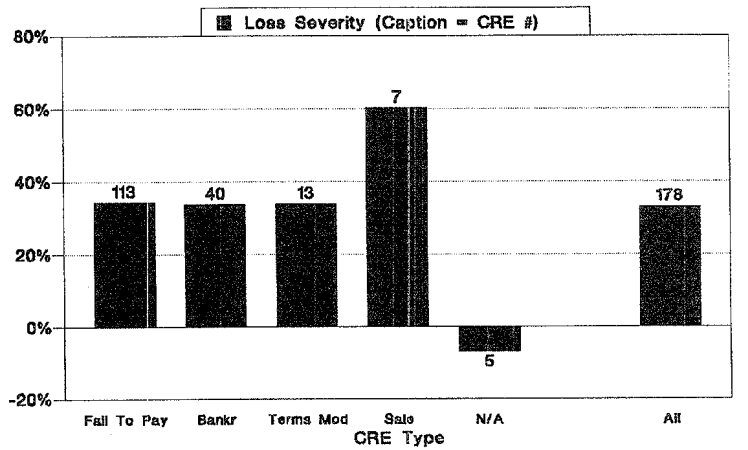
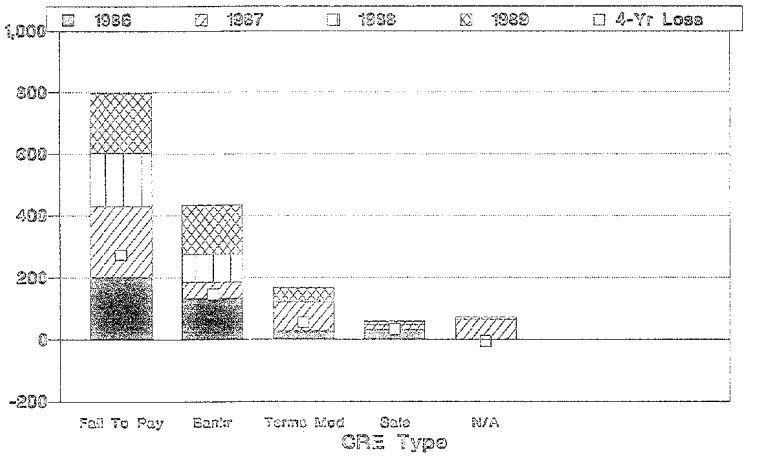


FIGURE 64
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY TYPE OF CRE:
CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



Despite the limited number of CREs in the Sale category, it is interesting to note that the Sale category had the highest loss severity, perhaps reflecting the optimism with which the number and amount of revised cash flows yet to be received on other types of CREs, has been estimated. Another factor could be the motivation for the sale (for example, tax considerations).

The data request for 1990 and later has been changed in an attempt to make a clearer distinction among the types of CREs.

In an attempt to identify the proper economic context in which the investment was made, this study defines the *Funding Year* (Tables 50–53 and Figures 65–72) to be the earliest of the year of the interest rate commitment and the year funds were distributed. Usually these years are the same. Highlights of the results by *Funding Year* include:

- For all funding year groups, except 1985–89, the incidence rate by number exhibits significant variability by experience year, likely due to the

sparsity of the data. For the 1985–89 grouping, which includes the largest number of CREs, results by experience year are fairly stable with a slight downward trend.

- For all experience years combined, the incidence rate by number exhibits a definite increasing pattern as the funding year becomes more recent.
- For the 1985–89 group, the incidence rate by amount exhibits a similar stability by experience year; for the other funding year groups, the incidence rate by amount exhibits even greater variability by experience year than the incidence rate by number.
- The loss severity exhibits significant variability by funding group as well as by year with no consistent pattern, although there is some evidence, for all experience years combined, of an increasing loss severity as the funding year group becomes more recent.
- For the economic loss divided by all exposure, there is considerable variability and no consistent pattern, although there is, for all years combined, evidence of an increasing pattern as funding year becomes more recent for funding years after 1975.
- Finally, the value of each of the four ratios is the highest in the "not available" category, suggesting that, although the percentage not available is low, there is a disproportionately large representation of CREs in the "not available" category.

TABLE 50

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: INCIDENCE RATE BY NUMBER

Year of Funding	Year	No. of CREs	No. of Exposures	Ratio
Before 1975	1986	3	1,600.5	0.00187
	1987	10	1,320.5	0.00757
	1988	2	1,267	0.00158
	1989	2	982	0.00204
	1986–89	17	5,170	0.00329
1975–79	1986	6	1,886	0.00318
	1987	15	1,636	0.00917
	1988	8	1,686	0.00474
	1989	1	1,541.5	0.00065
	1986–89	30	6,749.5	0.00444
1980–84	1986	29	2,394	0.01211
	1987	13	2,101.5	0.00619
	1988	2	2,113.5	0.00095
	1989	9	1,772.5	0.00508
	1986–89	53	8,381.5	0.00632
1985–89	1986	10	1,225	0.00816
	1987	15	1,952	0.00768
	1988	23	3,350	0.00687
	1989	22	4,056.5	0.00542
	1986–89	70	10,583.5	0.00661
Not Available	1986	5	634.5	0.00788
	1987	4	229.5	0.01743
	1988	0	12	0.00000
	1989	0	3.5	0.00000
	1986–89	9	879.5	0.01023
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	9.43%	8.20%	
	1987	7.02	3.17	
	1988	0.00	0.14	
	1989	0.00	0.04	
	1986–89	5.03	2.77	

TABLE 51

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: INCIDENCE RATE BY DOLLAR AMOUNT*

Year of Funding	Year	CRE Exposure	All Exposure	Ratio
Before 1975	1986	$ 25,259	$ 4,083,265	0.00619
	1987	265,774	3,231,090	0.08226
	1988	3,102	2,338,131	0.00133
	1989	700	1,819,896	0.00038
	1986–89	294,835	11,472,382	0.02570
1975–79	1986	57,875	12,223,011	0.00473
	1987	187,682	9,868,698	0.01902
	1988	78,323	8,086,648	0.00969
	1989	2,453	6,685,321	0.00037
	1986–89	326,333	36,863,678	0.00885
1980–84	1986	201,288	18,599,709	0.01082
	1987	90,883	15,465,853	0.00588
	1988	13,623	12,965,603	0.00105
	1989	32,345	10,191,165	0.00317
	1986–89	338,139	57,222,330	0.00591
1985–89	1986	81,970	13,138,754	0.00624
	1987	139,530	23,523,734	0.00593
	1988	174,093	38,296,634	0.00455
	1989	371,804	49,130,662	0.00757
	1986–89	767,397	124,089,784	0.00618
Not Available	1986	31,045	2,572,133	0.01207
	1987	23,360	819,142	0.02852
	1988	0	10,010	0.00000
	1989	0	3,955	0.00000
	1986–89	54,405	3,405,240	0.01598
All	1986	397,437	50,616,872	0.00785
	1987	707,229	52,908,517	0.01337
	1988	269,141	61,697,026	0.00436
	1989	407,302	67,830,999	0.00600
	1986–89	1,781,109	233,053,414	0.00764
% NA	1986	7.81%	5.08%	
	1987	3.30	1.55	
	1988	0.00	0.02	
	1989	0.00	0.01	
	1986–89	3.05	1.46	

*Dollar amounts in thousands.

TABLE 52

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: LOSS SEVERITY*

Year of Funding	Year	Economic Loss	CRE Exposure	Ratio
Before 1975	1986	$ 16,769	$ 25,259	0.66388
	1987	15,703	265,774	0.05908
	1988	197	3,102	0.06351
	1989	2	700	0.00286
	1986–89	32,671	294,835	0.11081
1975–79	1986	17,185	57,875	0.29693
	1987	20,558	187,682	0.10954
	1988	12,593	78,323	0.16078
	1989	(117)	2,453	−0.04770
	1986–89	50,219	326,333	0.15389
1980–84	1986	64,724	201,288	0.32155
	1987	44,518	90,883	0.48984
	1988	5,788	13,623	0.42487
	1989	3,868	32,345	0.11959
	1986–89	118,898	338,139	0.35162
1985–89	1986	49,681	81,970	0.60609
	1987	27,771	139,530	0.19903
	1988	71,793	174,093	0.41238
	1989	145,705	371,804	0.39189
	1986–89	294,950	767,397	0.38435
Not Available	1986	16,021	31,045	0.51606
	1987	5,946	23,360	0.25454
	1988	0	0	
	1989	0	0	
	1986–89	21,967	54,405	0.40377
All	1986	164,380	397,437	0.41360
	1987	114,496	707,229	0.16189
	1988	90,371	269,141	0.33578
	1989	149,458	407,302	0.36695
	1986–89	518,705	1,781,109	0.29123
% NA	1986	9.75%	7.81%	
	1987	5.19	3.30	
	1988	0.00	0.00	
	1989	0.00	0.00	
	1986–89	4.23	3.05	

*Dollar amounts in thousands.

TABLE 53

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: RATIO OF ECONOMIC LOSS TO ALL EXPOSURE*

Year of Funding	Year	Economic Loss	All Exposure	Ratio
Before 1975	1986	$ 16,769	$ 4,083,265	0.00411
	1987	15,703	3,231,090	0.00486
	1988	197	2,338,131	0.00008
	1989	2	1,819,896	0.00000
	1986–89	32,671	11,472,382	0.00285
1975–79	1986	17,185	12,223,011	0.00141
	1987	20,558	9,868,698	0.00208
	1988	12,593	8,086,648	0.00156
	1989	(117)	6,685,321	−0.00002
	1986–89	50,219	36,863,678	0.00136
1980–84	1986	64,724	18,599,709	0.00348
	1987	44,518	15,465,853	0.00288
	1988	5,788	12,965,603	0.00045
	1989	3,868	10,191,165	0.00038
	1986–89	118,898	57,222,330	0.00208
1985–89	1986	49,681	13,138,754	0.00378
	1987	27,771	23,523,734	0.00118
	1988	71,793	38,296,634	0.00187
	1989	145,705	49,130,662	0.00297
	1986–89	294,950	124,089,784	0.00238
Not Available	1986	16,021	2,572,133	0.00623
	1987	5,946	819,142	0.00726
	1988	0	10,010	0.00000
	1989	0	3,955	0.00000
	1986–89	21,967	3,405,240	0.00645
All	1986	164,380	50,616,872	0.00325
	1987	114,496	52,908,517	0.00216
	1988	90,371	61,697,026	0.00146
	1989	149,458	67,830,999	0.00220
	1986–89	518,705	233,053,414	0.00223
% NA	1986	9.75%	5.08%	
	1987	5.19	1.55	
	1988	0.00	0.02	
	1989	0.00	0.01	
	1986–89	4.23	1.46	

*Dollar amounts in thousands.

FIGURE 65
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING WITH FIRST CATEGORY AS BEFORE 1975: INCIDENCE RATES AND LOSS PER DOLLAR, EXCLUDING ONE BIG CRE

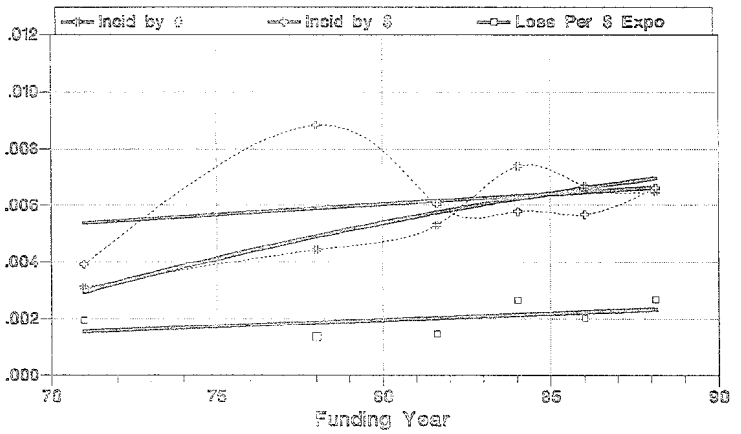


FIGURE 66
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING WITH FIRST CATEGORY AS BEFORE 1975: LOSS SEVERITY, EXCLUDING ONE BIG CRE

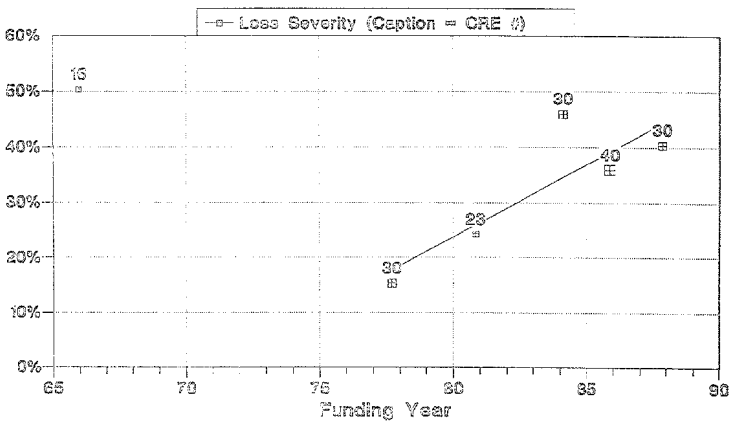


FIGURE 67
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING WITH FIRST CATEGORY AS BEFORE 1975: EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

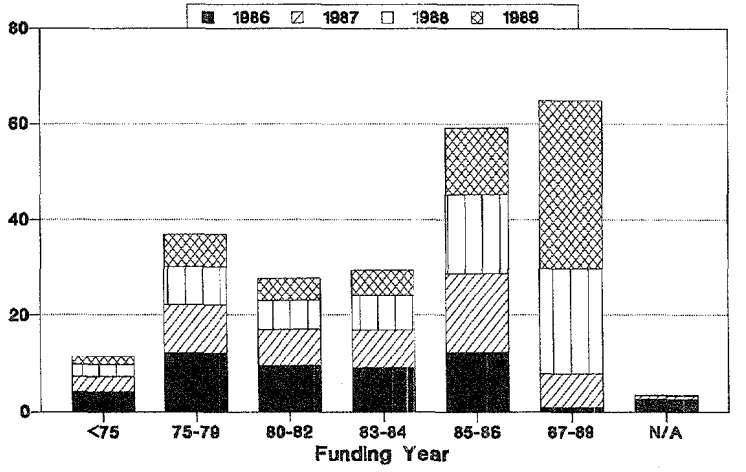


FIGURE 68
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING WITH FIRST CATEGORY AS BEFORE 1975: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE

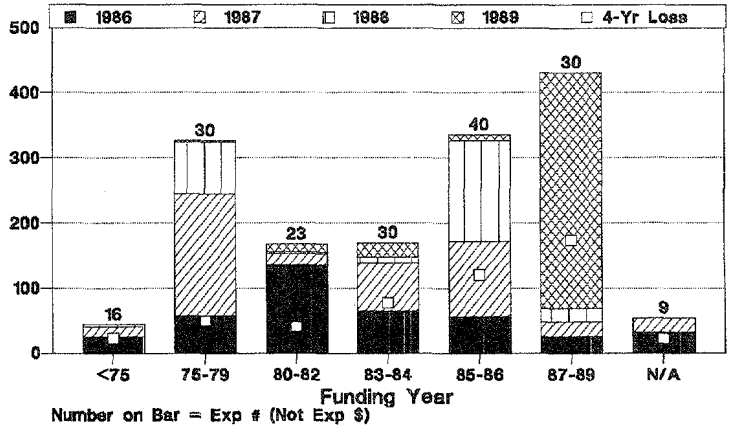


FIGURE 69
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING
WITH FIRST CATEGORY AS BEFORE 1976:
INCIDENCE RATES, AND LOSS PER DOLLAR
EXCLUDING ONE BIG CRE

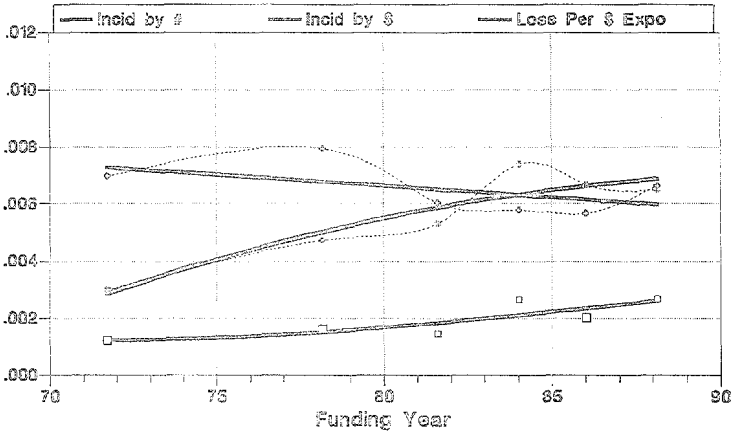


FIGURE 70
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING
WITH FIRST CATEGORY AS BEFORE 1976:
LOSS SEVERITY, EXCLUDING ONE BIG CRE

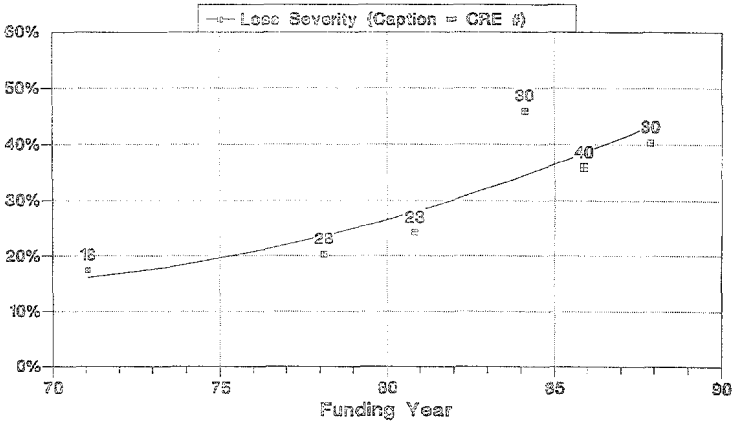


FIGURE 71
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING
WITH FIRST CATEGORY AS BEFORE 1976:
EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

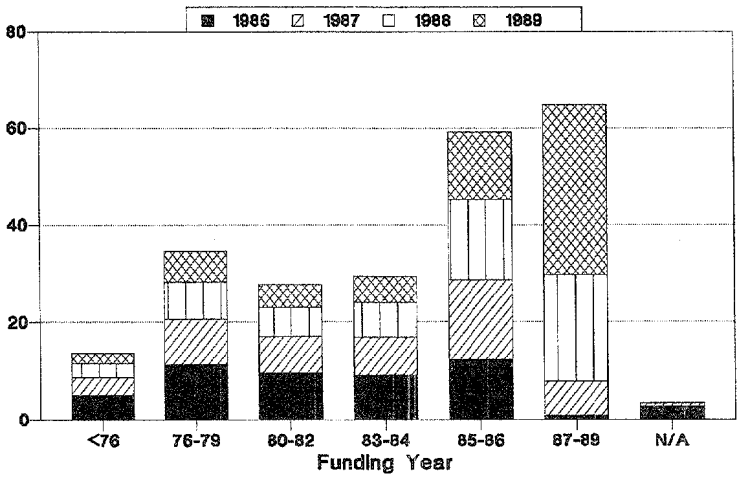
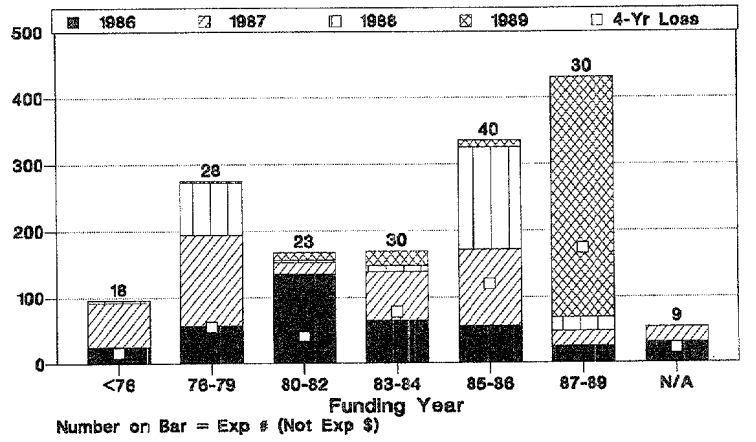


FIGURE 72
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING
WITH FIRST CATEGORY AS BEFORE 1976:
CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



Figures 65–68 and 69–72 illustrate one of the difficulties inherent in statistical analysis for grouped data. The regression line for loss severity is significantly different if the first category is changed from "before 1975" (Figures 65–68) to "before 1976" (Figures 69–72).

The scatter diagram (Figure 73) again provides a picture of the dispersion of loss severity values. The more complete picture of the distribution of exposure, CRE exposure and economic loss given by the last set of funding year graphs (Figures 74 and 75) highlights the large proportion of exposure from those bonds funded in 1985 through 1988 and the higher amount of economic loss for bonds funded in 1983 through 1988.

FIGURE 73
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
LOSS SEVERITY VERSUS YEAR OF FUNDING,
EXCLUDING ONE BIG CRE

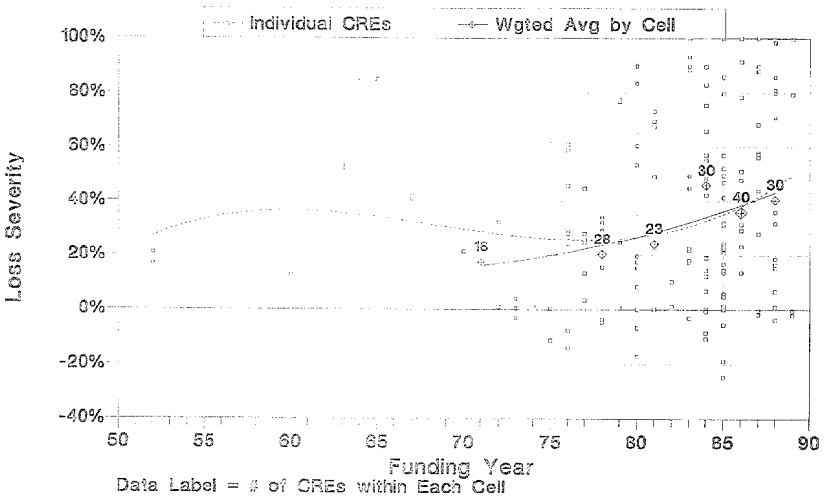


FIGURE 74
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

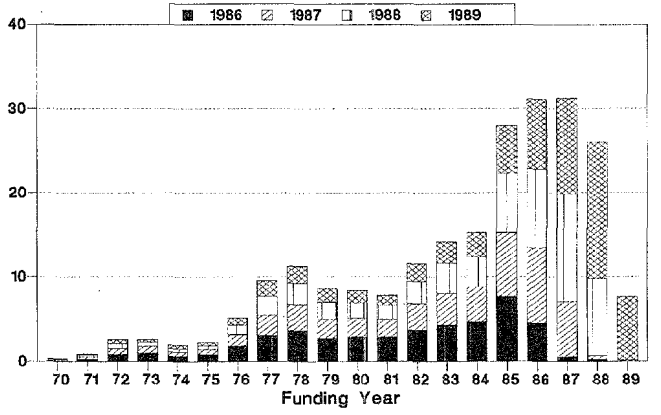
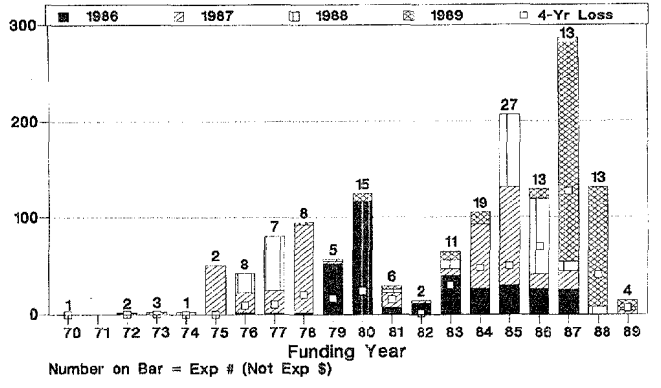


FIGURE 75
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEAR OF FUNDING: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



Highlights of the results by *Years Since Funding* (Tables 54–57 and Figures 76–82) include:

- The incidence rate by number seems to peak at approximately two years since funding, while the incidence rate by amount seems to peak both at two years and for the ten years and over category. However, the latter peak is another illustration of the influence one large CRE can have on the results for incidence rate by amount. The graphs exclude that CRE, with the result that both the incidence rate by number and incidence rate by amount peak at approximately two years.
- Although the regression line for loss severity suggests a downward trend, the ratio of economic loss to all exposure also seems to peak at approximately two years.

The shape of the line graphs of incidence rates (Figure 76) is interesting. The curve rises steeply but falls just as sharply before it levels off. So it does not suggest the conventional select-ultimate effect associated with many mortality tables. In fact, between the select period (of about one year) and the ultimate period (after five years) there seems to be a weeding-out period (peaking in the second or third year).

The initial phase may signify the wearing out of the underwriting effect. The middle phase may signify the weeding out of the weaker assets. The last phase may signify the survival of the fittest. Ideally, however, the pure seasoning effect should be observed over a longer period of economic stability and invariant underwriting standards.

Perhaps a better way to isolate the impact of time since funding is to consider cohorts of bonds by funding year. Unfortunately, developing credible cohort data requires a long period of time; currently, the cohort data are complete only for funding years 1986 through 1989.

TABLE 54

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING*: INCIDENCE RATE BY NUMBER

Years since Funding	Year	No. of CREs	No. of Exposures	Ratio
<2	1986	9	1,164.5	0.00773
	1987	4	1,146.5	0.00349
	1988	5	1,553.5	0.00322
	1989	12	1,677.5	0.00715
	1986–89	30	5,542	0.00541
2	1986	7	571	0.01226
	1987	10	751	0.01332
	1988	7	926	0.00756
	1989	8	831	0.00963
	1986–89	32	3,079	0.01039
3	1986	7	542	0.01292
	1987	9	541.5	0.01662
	1988	10	854	0.01171
	1989	2	829	0.00241
	1986–89	28	2,766.5	0.01012
4–7	1986	18	1,757	0.01024
	1987	4	1,560	0.00256
	1988	2	1,764.5	0.00113
	1989	5	1,903	0.00263
	1986–89	29	6,984.5	0.00415
8–9	1986	2	856.5	0.00234
	1987	7	808	0.00866
	1988	1	798	0.00125
	1989	4	588.5	0.00680
	1986–89	14	3,051	0.00459
10+	1986	4	2,154	0.00186
	1987	18	2,148.5	0.00838
	1988	9	2,504	0.00359
	1989	3	2,523.5	0.00119
	1986–89	34	9,330	0.00364
Not Available	1986	6	695	0.00863
	1987	5	284	0.01761
	1988	1	28.5	0.03509
	1989	0	3.5	0.00000
	1986–89	12	1,011	0.01187
All	1986	53	7,740	0.00685
	1987	57	7,239.5	0.00787
	1988	35	8,428.5	0.00415
	1989	34	8,356	0.00407
	1986–89	179	31,764	0.00564
% NA	1986	11.32%	8.98%	
	1987	8.77	3.92	
	1988	2.86	0.34	
	1989	0.00	0.04	
	1986–89	6.70	3.18	

*Defined to be loss year less funding year.

TABLE 55

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING*: INCIDENCE RATE BY DOLLAR AMOUNT†

Years since Funding	Year	CRE Exposure	All Exposure	Ratio
<2	1986	$ 56,470	$ 12,312,718	0.00459
	1987	34,213	15,490,468	0.00221
	1988	18,000	21,780,677	0.00083
	1989	131,304	23,763,179	0.00553
	1986–89	239,987	73,347,042	0.00327
2	1986	26,100	4,743,171	0.00550
	1987	101,137	7,555,256	0.01339
	1988	78,444	9,384,479	0.00836
	1989	231,000	11,388,331	0.02028
	1986–89	436,681	33,071,237	0.01320
3	1986	39,526	4,288,659	0.00922
	1987	66,402	4,117,584	0.01613
	1988	75,189	7,010,553	0.01073
	1989	9,500	8,270,464	0.00115
	1986–89	190,617	23,687,260	0.00805
4–7	1986	188,121	12,354,883	0.01523
	1987	24,481	11,348,270	0.00216
	1988	13,623	11,154,076	0.00122
	1989	21,116	13,240,797	0.00159
	1986–89	247,341	48,098,026	0.00514
8–9	1986	3,416	6,736,051	0.00051
	1987	92,947	5,395,799	0.01723
	1988	2,278	3,769,483	0.00060
	1989	11,230	2,659,057	0.00422
	1986–89	109,871	18,560,390	0.00592
10+	1986	27,259	6,783,221	0.00402
	1987	360,508	7,703,990	0.04679
	1988	79,147	8,466,823	0.00935
	1989	3,153	8,505,217	0.00037
	1986–89	470,067	31,459,251	0.01494
Not Available	1986	56,545	3,398,170	0.01664
	1987	27,540	1,297,152	0.02123
	1988	2,461	130,935	0.01880
	1989	0	3,955	0.00000
	1986–89	86,546	4,830,212	0.01792
All	1986	397,437	50,616,873	0.00785
	1987	707,228	52,908,519	0.01337
	1988	269,142	61,697,026	0.00436
	1989	407,303	67,831,000	0.00600
	1986–89	1,781,110	233,053,418	0.00764
% NA	1986	14.23%	6.71%	
	1987	3.89	2.45	
	1988	0.91	0.21	
	1989	0.00	0.01	
	1986–89	4.86	2.07	

*Defined to be loss year less funding year.
†Dollar amounts in thousands.

TABLE 56

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING*: LOSS SEVERITY†

Years since Funding	Year	Economic Loss	CRE Exposure	Ratio
<2	1986	$ 26,817	$ 56,470	0.47489
	1987	15,831	34,213	0.46272
	1988	654	18,000	0.03633
	1989	45,137	131,304	0.34376
	1986–89	88,439	239,987	0.36852
2	1986	13,651	26,100	0.52303
	1987	11,958	101,137	0.11824
	1988	46,259	78,444	0.58971
	1989	94,723	231,000	0.41006
	1986–89	166,591	436,681	0.38149
3	1986	21,364	39,526	0.54050
	1987	34,899	66,402	0.52557
	1988	24,931	75,189	0.33158
	1989	5,846	9,500	0.61537
	1986–89	87,040	190,617	0.45662
4–7	1986	46,008	188,121	0.24457
	1987	9,619	24,481	0.39292
	1988	5,788	13,623	0.42487
	1989	3,451	21,116	0.16343
	1986–89	64,866	247,341	0.26225
8–9	1986	1,169	3,416	0.34221
	1987	20,022	92,947	0.21541
	1988	12	2,278	0.00527
	1989	416	11,230	0.03704
	1986–89	21,619	109,871	0.19677
10+	1986	16,486	27,259	0.60479
	1987	16,238	360,508	0.04504
	1988	12,779	79,147	0.16146
	1989	(115)	3,153	−0.03647
	1986–89	45,388	470,067	0.09656
Not Available	1986	38,886	56,545	0.68770
	1987	5,927	27,540	0.21521
	1988	(51)	2,461	−0.02072
	1989	0	0	
	1986–89	44,762	86,546	0.51720
All	1986	164,381	397,437	0.41360
	1987	114,494	707,228	0.16189
	1988	90,372	269,142	0.33578
	1989	149,458	407,303	0.36695
	1986–89	518,705	1,781,110	0.29123
% NA	1986	23.66%	14.23%	
	1987	5.18	3.89	
	1988	−0.06	0.91	
	1989	0.00	0.00	
	1986–89	8.63	4.86	

*Defined to be loss year less funding year.
†Dollar amounts in thousands.

TABLE 57

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING*: RATIO OF ECONOMIC LOSS TO ALL EXPOSURES†

Years since Funding	Year	Economic Loss	All Exposure	Ratio
<2	1986	$ 26,817	$ 12,312,718	0.00218
	1987	15,831	15,490,468	0.00102
	1988	654	21,780,677	0.00003
	1989	45,137	23,763,179	0.00190
	1986–89	88,439	73,347,042	0.00121
2	1986	13,651	4,743,171	0.00288
	1987	11,958	7,555,256	0.00158
	1988	46,259	9,384,479	0.00493
	1989	94,723	11,388,331	0.00832
	1986–89	166,591	33,071,237	0.00504
3	1986	21,364	4,288,659	0.00498
	1987	34,899	4,117,584	0.00848
	1988	24,931	7,010,553	0.00356
	1989	5,846	8,270,464	0.00071
	1986–89	87,040	23,687,260	0.00367
4–7	1986	46,008	12,354,883	0.00372
	1987	9,619	11,348,270	0.00085
	1988	5,788	11,154,076	0.00052
	1989	3,451	13,240,797	0.00026
	1986–89	64,866	48,098,026	0.00135
8–9	1986	1,169	6,736,051	0.00017
	1987	20,022	5,395,799	0.00371
	1988	12	3,769,483	0.00000
	1989	416	2,659,057	0.00016
	1986–89	21,619	18,560,390	0.00116
10+	1986	16,486	6,783,221	0.00243
	1987	16,238	7,703,990	0.00211
	1988	12,779	8,466,823	0.00151
	1989	(115)	8,505,217	−0.00001
	1986–89	45,388	31,459,251	0.00144
Not Available	1986	38,886	3,398,170	0.01144
	1987	5,927	1,297,152	0.00457
	1988	(51)	130,935	−0.00039
	1989	0	3,955	0.00000
	1986–89	44,762	4,830,212	0.00927
All	1986	164,381	50,616,873	0.00325
	1987	114,494	52,908,519	0.00216
	1988	90,372	61,697,026	0.00146
	1989	149,458	67,831,000	0.00220
	1986–89	518,705	233,053,418	0.00223
% NA	1986	23.66%	6.71%	
	1987	5.18	2.45	
	1988	−0.06	0.21	
	1989	0.00	0.01	
	1986–89	8.63	2.07	

*Defined to be loss year less funding year.
†Dollar amounts in thousands.

FIGURE 76
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING: INCIDENCE RATE AND LOSS PER DOLLAR, EXCLUDING ONE BIG CRE

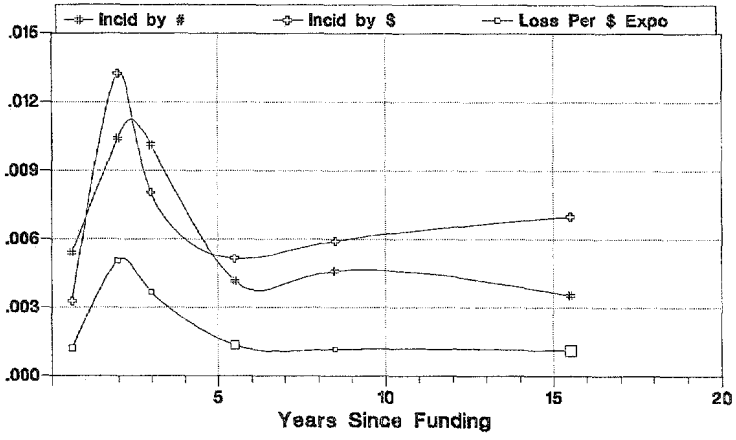


FIGURE 77
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING: LOSS SEVERITY, EXCLUDING ONE BIG CRE

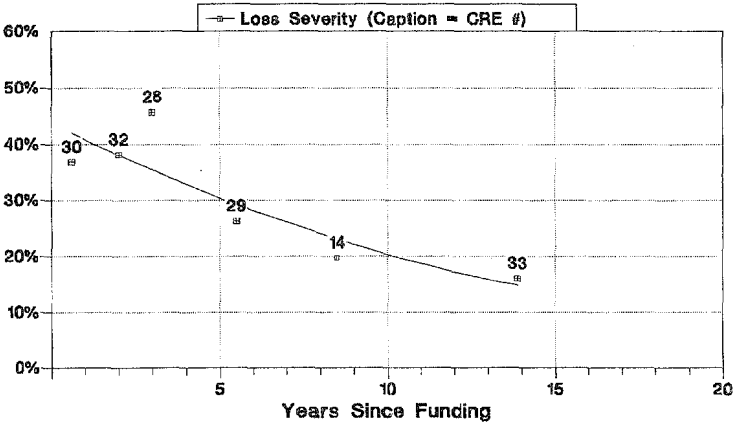


FIGURE 78
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING: EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

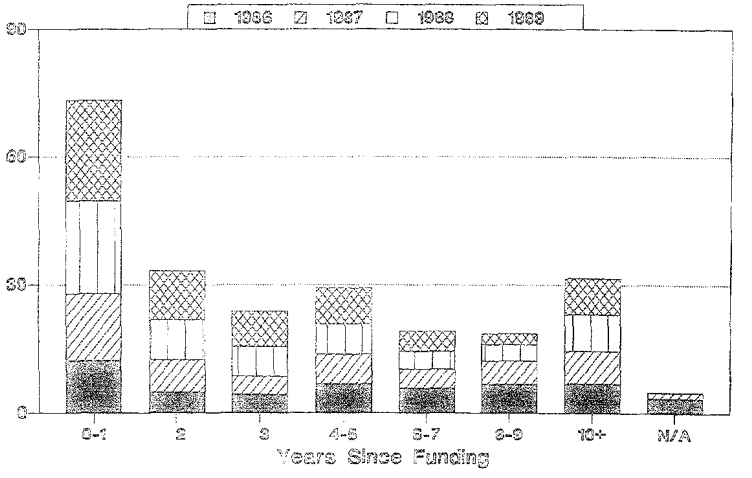


FIGURE 79
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING: CRE EXPOSURE (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE

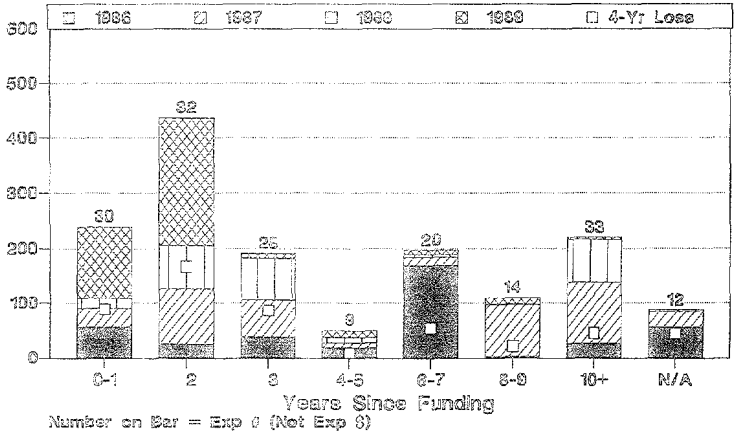


FIGURE 80
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
LOSS SEVERITY VERSUS YEARS SINCE FUNDING,
EXCLUDING ONE BIG CRE

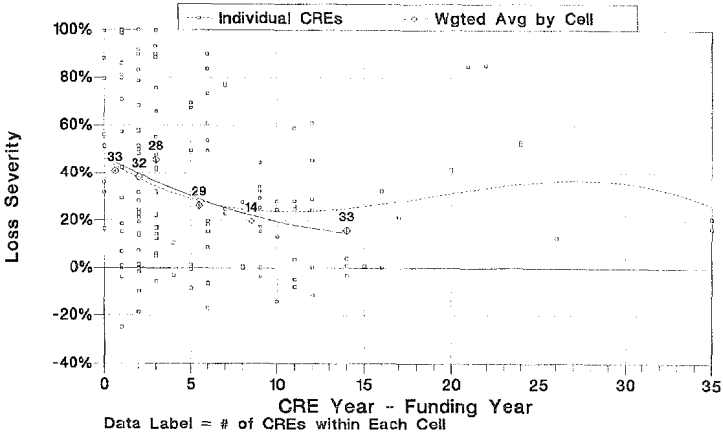


FIGURE 81
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING:
EXPOSURE AMOUNT (IN BILLIONS BY YEAR)

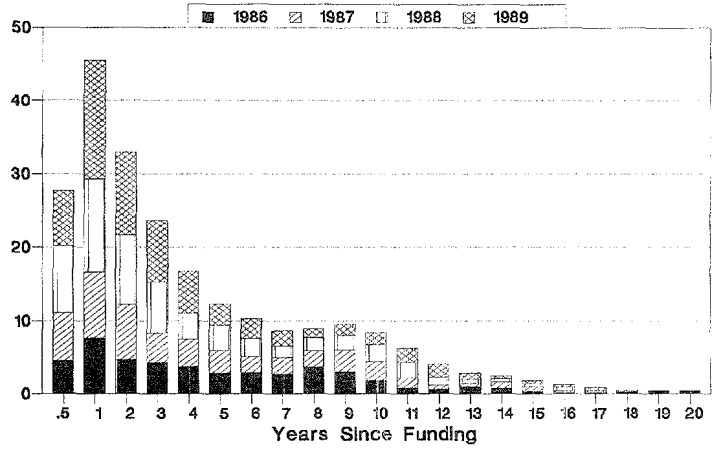
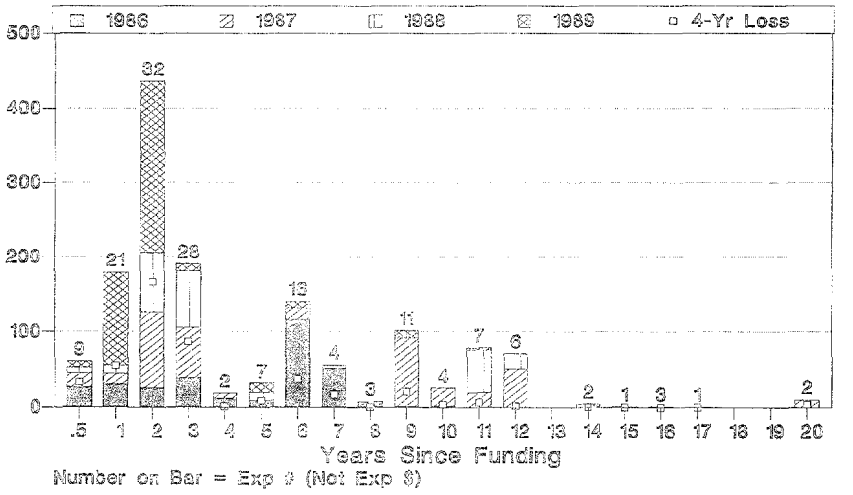


FIGURE 82
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY YEARS SINCE FUNDING:
CRE EXPOSURES (IN MILLIONS BY YEAR), EXCLUDING ONE BIG CRE



D. Additional Analysis of Credit Risk Events

A separate analysis of the credit risk events provides some additional insight regarding both the data and the results.

A histogram (Figure 83) and a line graph (Figure 84) related to loss severity, two scatter diagrams (Figures 85 and 86), and a table of loss severity (Table 58) by a combination of characteristics are included for reference.

Figures 83 and 84 give a graphic representation of the distribution of loss severity. Figure 85 relates the outstanding principal ("par") as of the year-end immediately prior to the credit risk event to the ratio of the present value of the original contractual cash flows (at the coupon rate) to that outstanding principal. This scatter diagram is of diagnostic value. The ratio should generally be very close to one. The band that is highlighted includes those CRE assets for which the ratio falls between 0.9 and 1.1. The great majority fall within that band. However, a significant number fall outside the band, suggesting a possible data inconsistency among the values for outstanding principal, coupon rate and the original contractual cash flows. Two of the 179 CRE assets are not included in the diagram because their large size made it difficult to include using the desired scaling. Both fall within the band from 0.9 to 1.1.

Figure 86 relates the loss severity to the outstanding principal as of the year-end immediately prior to the credit risk event. Except for the few "par" values in excess of $30 million, the distribution of loss severity is approximately uniform, suggesting that the loss severity is independent of the size of the CRE asset. As indicated by the markers to the left of the 0 value, a number of assets that were identified as incurring a credit risk event have resulted in, or are expected to result in, an economic gain. Four CRE assets are not included in this diagram for reasons of scaling: two because of their large size and two because of their highly negative loss severity.

Table 58 gives an indication of the additional types of analysis of CREs that are possible. The amount of data in individual cells is limited, and no clear patterns are evident, except the overall pattern by original coupon rate already noted.

FIGURE 83
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
HISTOGRAM OF LOSS SEVERITY

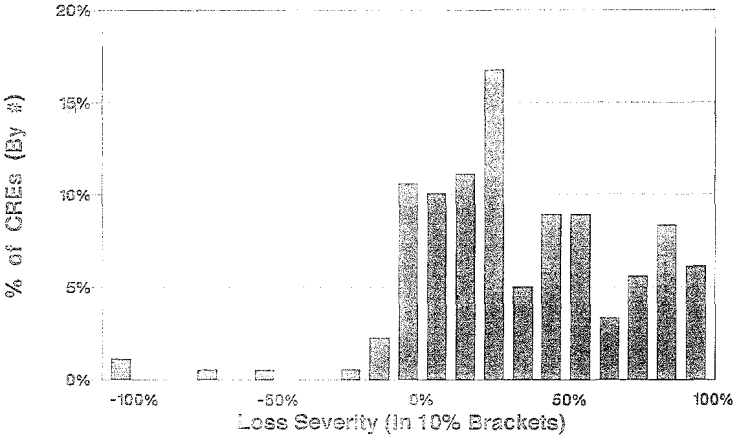


FIGURE 84
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
CUMULATIVE DISTRIBUTION OF LOSS SEVERITY

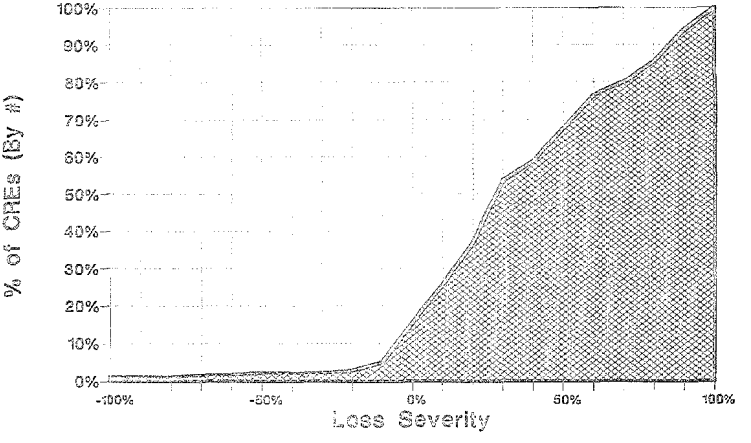


FIGURE 85
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
PAR VALUE VERSUS PVOCF/PAR AMONG ALL BUT TWO CREs

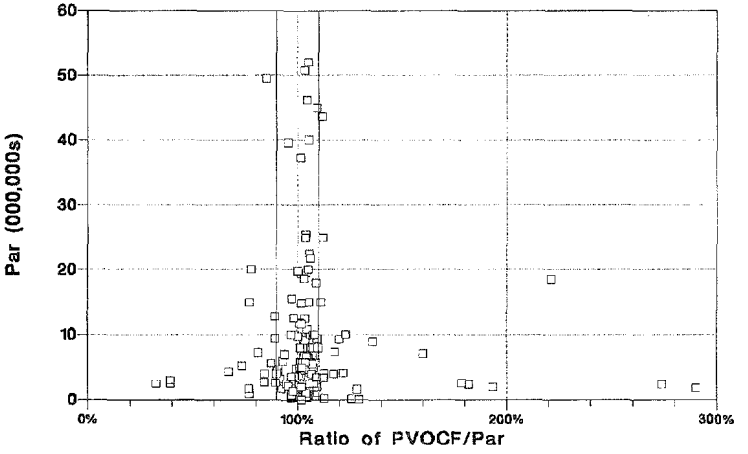


FIGURE 86
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
PAR VALUE VERSUS LOSS SEVERITY AMONG ALL BUT FOUR CREs

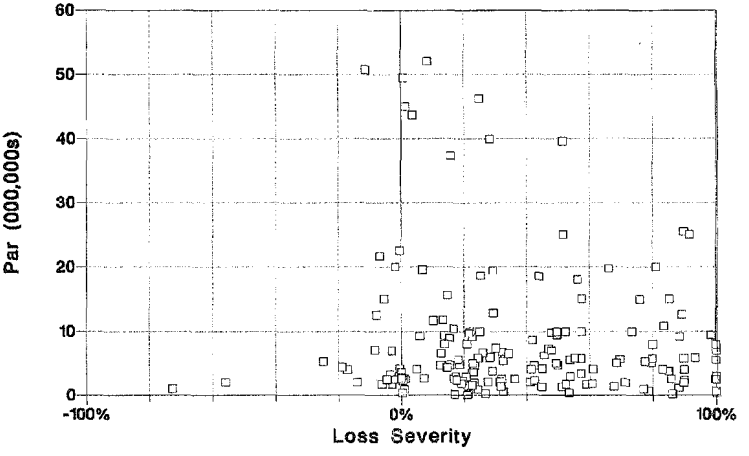


TABLE 58

LOSS SEVERITY OF PRIVATE PLACEMENT BONDS
BY ORIGINAL COUPON RATE AND TIME TO MATURITY*

Time to Maturity	Original Coupon Rate	No. of CREs	Economic Loss	CRE Exposure	Ratio
≤4 Years	<9%	14	$ 13,910	$ 47,619	0.29212
	9% to <11%	10	83,569	190,818	0.43795
	11% to <13%	10	17,542	60,188	0.29145
	≥13%	7	8,481	30,572	0.27742
	All Rates	41	123,502	329,198	0.37516
5–7 Years	≤9%	7	$ 4,817	$ 29,483	0.16338
	9% to ≤11%	13	13,161	66,721	0.19725
	11% to ≤13%	16	13,021	81,867	0.15904
	≥13%	13	19,510	67,620	0.28852
	All Rates	49	50,508	245,691	0.20557
8–10 Years	≤9%	3	$ 2,446	$ 46,099	0.05305
	9% to ≤11%	20	64,776	282,912	0.22896
	11% to ≤13%	9	74,692	142,407	0.52449
	≥13%	19	43,721	112,749	0.38777
	All Rates	51	185,634	584,167	0.31778
≥11 Years	≤9%	5	$ 18,828	$ 265,949	0.07080
	9% to ≤11%	10	36,549	136,810	0.26715
	11% to ≤13%	3	1,356	56,020	0.02421
	≥13%	20	102,326	163,274	0.62671
	All Rates	38	159,060	622,054	0.25570
All Terms	≤9%	29	$ 40,001	$ 389,150	0.10279
	9% to ≤11%	53	198,054	677,262	0.29243
	11% to ≤13%	38	106,610	340,482	0.31312
	≥13%	59	174,038	374,216	0.46507
	All Rates	179	$518,704	$1,781,110	0.29123

*Defined to be maturity year less funding year.

E. Other Additional Analysis

Certain assumptions have been made to facilitate calculations. Two major assumptions are the interest rate methodology and the estimation of the size and number of payments for credit risk event assets after the date of the event. To analyze the impact of the interest rate methodology, a crude test using various interest rate methodologies in a variety of credit risk event scenarios was performed. Although the results suggest that the impact of alternative reasonable methodologies was not very significant, the impact of alternative interest rate methodologies warrants further analysis.

The estimation of the size and number of future payments on credit risk events is critically important with respect to the economic loss calculation. A comparison of credit risk event loss experience for those CREs for which the payments have been completed (or are near completion) and those CREs for which payments are estimated to continue for some time into the future could provide information on the optimism (or pessimism) of the estimates. Table 59 summarizes some preliminary analyses in that regard. Considering all experience years combined, the loss severity is 65% higher for the 89 credit risk events with last revised cash flows scheduled for 1990 or later, as compared to the 90 credit risk events with last revised cash flows scheduled for 1986–1989. Because the incidence rate by amount is essentially the same for both groups (0.0040 vs. 0.0037), this relationship also holds for the basis-point loss (economic loss divided by all exposure).

Considering individual experience years, the loss severity is significantly greater for those credit risk events with revised payments yet to be received for experience years 1986 and 1987, while the reverse is true for experience years 1988 and 1989. It is interesting to note that the proportion of credit risk events in each group is almost a mirror image for 1988 and 1989 as compared to 1986 and 1987, highlighting the significantly higher proportion of "open" CREs for 1988 and 1989. For experience years 1986, 1987, and 1988, the basis-point loss is virtually the same for both groups, while for 1989 the credit risk events with payments yet to be received have a higher basis-point loss because of the significantly higher incidence rate by amount, which more than offsets the lower loss severity. The results are inconclusive and do not lend strong support to the idea that the loss severity on "open" CREs is based on unwarranted optimism relative to what has been recovered on those CREs that have received all expected revised payments.

TABLE 59

LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS BY LAST REVISED CASH-FLOW PAYMENT*

Year	Last Revised Cash Flow Payment	No. Of Exposed Assets	No. of Credit Risk Events	Incidence by Number	Amount Exposed	Credit Risk Event Exposure	Incidence by Amount	Economic Loss	Loss Severity	Econ. Loss Divided by All Exposures
1986	1986–89	7,740.0	35.0	0.0045	$ 50,616,872	$ 271,775	0.0054	$ 75,959	0.2795	0.0015
	1990 and Later	7,740.0	18.0	0.0023	50,616,872	125,663	0.0025	88,421	0.7036	0.0017
	Total	7,740.0	53.0	0.0068	50,616,872	397,438	0.0079	164,380	0.4136	0.0032
1987	1986–89	7,239.5	34.0	0.0047	52,908,519	501,076	0.0095	52,344	0.1045	0.0010
	1990 and Later	7,239.5	23.0	0.0032	52,908,519	206,153	0.0039	62,151	0.3015	0.0012
	Total	7,239.5	57.0	0.0079	52,908,519	707,229	0.0134	114,495	0.1619	0.0022
1988	1986 89	8,428.5	11.0	0.0013	61,697,026	107,683	0.0017	49,748	0.4620	0.0008
	1990 and Later	8,428.5	24.0	0.0028	61,697,026	161,458	0.0026	40,622	0.2516	0.0007
	Total	8,428.5	35.0	0.0042	61,697,026	269,141	0.0044	90,370	0.3358	0.0015
1989	1986–89	8,356.0	10.0	0.0012	67,830,999	49,161	0.0007	28,576	0.5813	0.0004
	1990 and Later	8,356.0	24.0	0.0029	67,830,999	358,141	0.0053	120,822	0.3375	0.0018
	Total	8,356.0	34.0	0.0041	67,830,999	407,301	0.0060	149,458	0.3669	0.0022
1986–89	1986–89	31,764	90.0	0.0028	233,053,415	929,695	0.0040	206,628	0.2223	0.0009
	1990 and Later	31,764	89.0	0.0028	233,053,415	851,415	0.0037	312,076	0.3665	0.0013
	Total	31,764	179.0	0.0056	$233,053,415	$1,781,110	0.0076	$518,704	0.2912	0.0022

*Dollar amounts in thousands.

The data request format allows analyses by additional characteristics not reflected in this report. These analyses have not yet been completed because of limited data or limited resources and time. It is anticipated that such analyses will be completed as additional data are provided.

Other characteristics for which data are requested and thus for which future analysis could be possible include:

- Outstanding principal
- Loan amount at issue
- Maturity date
- SIC code
- Leveraged buyout indicator
- Secured status indicator
- Interest spread at date interest rate set
- Bond equivalent yield at acquisition
- Amortization indicator
- Equity participation indicator
- Asset-backed security indicator
- Variable rate bond indicator
- Secondary acquisition indicator
- Special loan type category (for example, to affiliate or for social purposes).

In addition, future analysis could include consideration of various combination of characteristics.

Also, more work relating the results to external economic measures (for example, GNP) might be possible.

Finally, the results presented in this report are essentially descriptive statistics. The "scatter" diagrams and distribution graphs do give some indication of the variability of some of the results. However, that variability has not been quantified. More sophisticated statistical analysis can be conducted. In particular, additional statistical analysis of the loss severity distribution of the CREs would seem to be worthwhile.

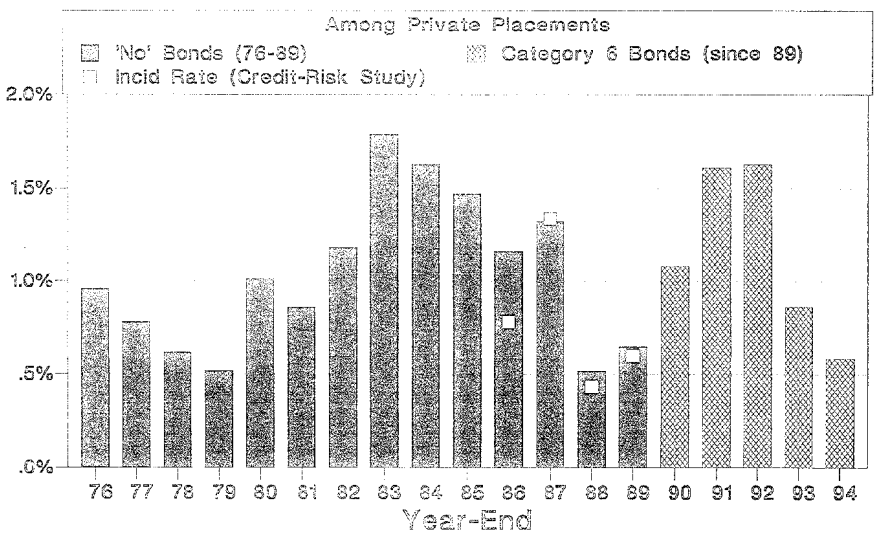
F. Comparison to Other Studies

There have been similar studies of other asset types, notably public bonds. The results discussed in this commentary are not directly comparable to the results of those studies because:

- The results reflect several special features:
  - The asset types studied
  - The definition of credit risk event
  - The methodology for calculation of economic loss
  - The intercompany pooling and comparison.
- Interpretation of the results discussed in this commentary are subject to the limitations indicated in Section II.

However, a comparison to the results of the ACLI survey of bonds rated low by the NAIC is instructive. Although the measures being used are not directly comparable, the similarity of the patterns, as illustrated by the markers in Figure 87, is striking.

FIGURE 87*
LOSS EXPERIENCE FOR PRIVATE PLACEMENT BONDS:
PERCENTAGE OF NAIC "NO" BONDS IN 1976–89
AND CATEGORY 6 BONDS (IN OR NEAR DEFAULT) SINCE 1990†



*This chart is only illustrative; an incidence rate is an inception rate not directly comparable to the percentage in a particular status at a particular time.
†ACLI data on U.S. Insurance Company General Account coverage of 60+% in 1976–89 and 98% in 1990–91.

VII. WHAT NEXT?

There are at least three directions to go as we continue to study credit risk: update data, add data contributors from other financial intermediaries, and study other asset types. The Coordinating Committee believes all three are desirable. Updating data through 1992 is already being pursued. As that is pursued, we will approach other financial intermediaries such as banks and pension funds for data contributions. Expanding the methodology to other asset types is relatively straightforward. In particular, studying public bond holdings of insurance companies or other financial intermediaries should not present any particularly difficult problems and could provide, for example, an indication whether the significant difference between the loss severity of private placement bonds and public bonds is due to the difference between privates and publics, the difference between asset management by insurance companies and asset management by other investors, or some other difference (for example, difference in quality rating systems or distributions).

VIII. QUESTIONS, ADDITIONAL INFORMATION

If you have any questions about these results or would like information on how you or your company can support the ongoing study by contributing data or by providing financial assistance, please contact the Society of Actuaries Research Department at 847-706-3571 (Fax: 847-706-3599).

APPENDIX

A. Definition of Credit Risk Event

The occurrence of any of the following is considered a credit risk event:

- Failure (other than for known non-credit-related reasons, such as administrative problems) to pay interest or principal under the terms of the contract. For commercial mortgages, a 90-day delinquency is the start of a credit risk event if the payments are not made up. Also, a Chapter 7 or 11 bankruptcy of borrower is considered a credit risk event.
- Modification of the principal or interest payment terms where the lender agrees to new terms to avoid or minimize possible losses from failure to pay interest or principal under the terms of the contract.
- Sale of the investment before maturity because of concerns about deteriorated credit, if the purpose of the sale is to avoid or minimize possible losses from failure to pay interest or principal under the terms of the contract.

The opportunity cost associated with the call or contractually allowed prepayment of an asset in a low interest rate environment is excluded as a credit risk loss, because the call or prepayment is an exercise of the borrower's right and is therefore not credit-related. However, the opportunity cost associated with a restructuring or a default in a low-interest-rate environment is considered a credit risk loss.

B. Date of Credit Risk Event and Loss Calculation Date

The credit risk event is considered to have occurred on the earliest of the date of the first missed payment (for a private placement) or the 90-day delinquency date (for a commercial mortgage), the date of modification of the principal or interest terms, the date of the sale, or the date of bankruptcy filing.

The loss calculation date is the earliest of the date of the first missed payment (for a private placement) or the 90-day delinquency date (for a commercial mortgage), the date of modification or the date of sale. For example, in the case of bankruptcy prior to default, rather than being the bankruptcy filing date, the loss calculation date is the date of the first missed

payment, or if earlier, the date of modification or the date of sale of the asset.

C. Summary of Calculation Methodology

Traditionally, asset default studies have looked at either the incidence of default (number of defaults) or losses of par value. Studies considering only losses of par value do not accurately account for all lost cash flows, costs of collection or restructure, or for the time value of money.

In this study, the measure of loss resulting from a credit risk event is based on comparing, at the loss calculation date, the present value of the remaining cash flows of the original investment to the present value of the cash flows of the investment that results from the credit risk event.

1. Interest Rates

The determination of the interest rates to use to calculate the present values is a critical component because the ultimate quantification of the economic loss depends upon the interest rates used. There are several alternatives for developing these interest rates. Use of spot rates, if available, is highly desirable because it avoids the troublesome question of reinvestment risk. However, for private placements, no good source of spot rates was located. The following subsections give detail on the approaches used for the 1986–89 study.

a. Commercial Mortgage Loans

For commercial mortgages, the alternative used is to prepare a table of spot rates for the discount factors. A yield curve was created for each month of the exposure period of the study. The three-, five-, seven-, and ten-year interest rates provided by the monthly Barron's/John B. Levy & Co. National Mortgage Survey were utilized as the data points to construct the yield curve using a polynomial function. Each yield curve was extended over a period of 360 months. The function provided monthly interest rate values to be used in discounting for the present value calculation for a given loss date and credit risk event.

The month and year of a loss date of the credit risk event pinpoint the appropriate yield curve for a present value calculation. The timing of the original and revised cash-flow streams then are matched to the proper

monthly discount factors based on this yield curve, and in effect, these payments are discounted following the given yield curve.

b. Private Placement Bonds

For private placement bonds, the alternative selected for the preliminary results is to use monthly average Treasury rates, based on the month and year of the loss calculation date and varying by term to maturity, as the base. A margin, calculated to reflect the spread over Treasuries, is added to the base rate. This margin varies by the month and year of the loss calculation date, and by a measure of the remaining term of the investment.

Thus, the following procedure was used for determining the table of interest rates to be used in the present value calculations for the private placement bonds results:

- The Treasury rates by month and maturity (one-year, two-year, three-year, five-year, seven-year, ten-year, and 30-year) for the years 1986–89 were obtained from the Federal Reserve Statistical Release.
- Data from the ACLI "New Investment Commitments" survey were used to determine the spread over Treasuries by month and year, and maturity.
- For each month, year, and Treasury maturity, the sum of the Treasury rate and the spread was rounded to the nearest 0.25%.

Once the table of interest rates was developed, the interest rates to be used for the original and revised cash flows of a specific credit risk event were determined by the month and year of the event and the remaining time until maturity, as measured by:

$$\sum_{t=1}^{n} t\ CF_t \text{ divided by } \sum_{t=1}^{n} CF_t$$

where CF_t = cash flow at time t for the appropriate original and revised cash flows.

Different interest rates were selected if the remaining times until maturity were different for the original and revised cash flows.

Table A-1 contains the resulting interest rates for one-year, two-year, three-year, five-year, seven-year, ten-year, and 30-year maturities. Linear interpolation was used to obtain the interest rates for other values of remaining time until maturity.

TABLE A-1

RATES TO USE IN PRIVATE PLACEMENT BONDS PRESENT VALUE CALCULATION
(TREASURY PLUS SPREAD BASED ON THREE-MONTH AVERAGE)

	Maturity						
Month	1 yr	2 yrs.	3 yrs.	5 yrs.	7 yrs.	10 yrs.	30 yrs.
1986							
January	9.00	9.50	9.75	10.00	10.75	11.00	11.00
February	9.00	9.25	9.50	9.75	10.50	10.75	10.50
March	8.75	9.00	9.00	9.25	10.00	10.25	10.00
April	8.25	8.50	8.75	9.00	9.75	9.75	9.50
May	8.00	8.25	8.50	8.75	9.50	9.50	9.25
June	8.00	8.25	8.50	8.75	9.50	9.50	9.25
July	8.00	8.25	8.50	8.75	9.50	9.50	9.50
August	7.75	8.00	8.25	8.50	9.25	9.50	9.50
September	7.25	7.75	8.00	8.25	9.25	9.50	9.75
October	7.25	7.75	8.00	8.25	9.25	9.50	9.75
November	7.25	7.75	8.00	8.25	9.25	9.25	9.75
December	7.75	8.00	8.25	8.50	9.00	9.25	9.75
1987							
January	7.75	8.25	8.50	8.50	9.25	9.50	9.50
February	8.00	8.25	8.50	8.75	9.50	9.50	9.50
March	7.75	8.25	8.25	8.50	9.50	9.75	9.50
April	7.50	8.00	8.25	8.50	9.75	10.00	9.75
May	7.75	8.50	8.75	9.00	10.00	10.00	10.00
June	8.00	8.75	9.00	9.25	10.00	10.00	10.25
July	8.00	8.75	9.00	9.25	10.00	10.25	10.25
August	8.25	9.00	9.25	9.50	10.25	10.25	10.50
September	8.50	9.25	9.50	9.75	10.50	10.50	10.75
October	8.50	9.50	9.75	10.00	10.50	10.75	11.00
November	8.50	9.25	9.50	10.00	10.75	11.00	11.00
December	8.50	9.25	9.50	9.75	10.75	10.75	10.75

TABLE A-1—*Continued*

Month	Maturity						
	1 yr	2 yrs.	3 yrs.	5 yrs.	7 yrs.	10 yrs.	30 yrs.
1988							
January	8.50	9.25	9.50	9.75	10.50	10.75	10.50
February	8.75	9.25	9.50	9.75	10.25	10.50	10.25
March	8.50	9.25	9.50	9.75	10.25	10.25	10.25
April	8.50	9.00	9.25	9.50	10.00	10.25	10.50
May	8.50	9.00	9.25	9.50	10.25	10.50	10.50
June	8.50	9.00	9.25	9.50	10.25	10.25	10.50
July	9.00	9.50	9.50	9.75	10.50	10.50	10.75
August	9.25	9.75	9.75	10.00	10.50	10.50	10.75
September	9.50	9.75	10.00	10.00	10.75	10.75	10.75
October	9.75	10.00	10.00	10.00	10.75	10.75	10.50
November	9.75	10.00	10.00	10.00	10.75	10.75	10.50
December	10.00	10.00	10.25	10.00	10.50	10.50	10.75
1989							
January	10.25	10.25	10.25	10.25	10.75	10.50	10.75
February	10.50	10.50	10.50	10.50	10.75	10.75	10.75
March	10.50	10.75	10.75	10.50	11.00	10.75	10.75
April	10.75	10.75	10.75	10.75	11.00	10.75	10.75
May	10.75	10.75	10.75	10.75	10.75	10.75	10.50
June	11.00	11.00	11.00	10.75	10.25	10.25	10.25
July	10.50	10.25	10.25	10.25	10.00	10.25	10.00
August	10.50	10.50	10.50	10.50	10.00	10.00	9.75
September	10.00	10.00	10.00	9.75	10.00	10.00	9.75
October	10.00	10.00	10.00	10.00	10.25	10.25	10.00
November	9.75	9.75	9.75	9.75	10.00	10.00	10.00
December	9.75	9.75	9.75	9.75	10.00	10.00	10.00

2. Calculation of Economic Loss

$PV^{OCF\ CRE_i}_{loss\ calc\ date}$ = present value of the original contractual cash flows for credit risk event i at the loss calculation date

$PV^{RCF\ CRE_i}_{loss\ calc\ date}$ = present value of the revised cash flows for credit risk event i at the loss calculation date

OCF = original contractual cash flow
RCF = revised cash flow (net of credit risk event expenses)

a. General formulas

$$PV^{OCF\ CRE_i}_{loss\ calc\ date} = OCF_1\ v^{(date\ 1 - loss\ calc\ date)/365} + \ldots + OCF_n\ v^{(date\ n - loss\ calc\ date)/365}$$

$v = 1/(1+(I^{(2)}/2))^2$, where $i^{(2)}$ is determined as indicated in C.1.b. above (assuming nominal annual rates convertible semiannually)

date j = date of the j-th payment

OCF_j = j-th original cash flow
n = number of original contractual cash flows on or after the loss calculation date

$$PV^{RCF\ CRE_i}_{loss\ calc\ date} = RCF_1\ v^{(date\ 1 - loss\ calc\ date)/365} + \ldots + RCF_k\ v^{(date\ k - loss\ calc\ date)/365}$$

RCF_j = j-th revised cash flow (net of credit risk event expenses)

k = number of revised cash flows on or after the loss calculation date

Note:

- The v in Equation (2) could be different from the v in Equation (1) because a different $i^{(2)}$ might be used for the revised cash flows (RCF).
- If only the year of the loss is given, July 1 is assumed; if only the year and month are given, the 15th of the month is assumed.
- If the loss calculation date is between payments, the calculation begins with the nearest payment.

b. The economic loss for the credit risk event i, EL^{CRE_i}, is given by

$$EL^{CRE_i} = OP_{PYE}^{CRE_i}\left(\frac{PV^{OCF\ CRE_i}_{loss\ calc\ date} - PV^{RCF\ CRE_i}_{loss\ calc\ date}}{PV^{OCF\ CRE_i}_{loss\ calc\ date}}\right)$$

where $OP_{PYE}^{CRE_i}$ = outstanding principal for credit risk event i at year end immediately preceding the loss calculation date.

3. Calculation of Exposure

OP_j = outstanding principal at year-end j

a. Assets that are not credit risk events:

- Assets in both year-end $j-1$ and year-end j exposure data files

  $Exposure_{Year\ j} = (OP_{j-1} + OP_j)/2$

- Assets only in year-end $j-1$ exposure data file (for example, maturity)

  $Exposure_{Year\ j} = OP_{j-1}/2$

- Assets only in year-end j exposure data file (for example, new acquisition during year)

  $Exposure_{Year\ j} = OP_j/2$

b. Assets that incurred a credit risk event during year j:
$Exposure_{Year\ j} = OP_{j-1}$

c. Assets that incurred a credit risk event prior to year j and are in year-end $j-1$ and/or year-end j exposure data file:

$Exposure_{Year\ j} = 0$

Aggregate exposure is the sum of the exposure for the individual assets. Exposure by number of assets is calculated using the same principles.

4. Calculation of Loss Statistics

a. Incidence Rate by Number, $IR^{No.}$

$$IR^{No.} = \frac{\text{Number of credit risk events (CRE) in cell}}{\text{Total number of exposure units in cell}}$$

b. Incidence Rate by Amount, IR^{Amt}

$$IR^{Amt} = \frac{\text{Amount of CRE exposure in cell}}{\text{Total amount of exposure in cell}}$$

c. Loss Severity, *LS*

$$LS = \frac{\text{Economic loss for cell}}{\text{Amount of CRE exposure in cell}}$$

d. Economic Loss per unit of Exposure, *EL/E*

$$EL/E = \frac{\text{Economic loss for cell}}{\text{Total amount of exposure in cell}}$$

D. Data Validation

When data were received from a contributor, a number of audits were instituted to validate the various exposure, cash-flow (original and revised), and expense files. The initial review of an exposure file consisted of an edit check to verify that the inputs for data elements of each record were within a specified set of parameters. For example, original loan amounts and outstanding principals were required to be non-negative and less than one billion dollars, while property types had to fit one of eight categories defined in the specifications. Various other checks verified that data elements were reasonable. While not sufficient to pick up all errors, the process often pointed out systematic problems with the data. Sometimes the explanations were as simple as coding mistakes, incorrect record lengths, wrong justification within a field or improper positioning of information as laid out by the data specifications. In fact, the data often were there, but the format of the fields required some reworking to standardize the information. Other files were edited in a similar fashion.

As each file was edited, questions were asked of the data contributors when appropriate. A record of the solutions to these problems was created,

in part to verify with the companies what changes were made. The original data submissions were saved and duplicate files were used for processing. This practice is an SOA standard operating procedure to maintain the integrity of company data and to be able to reconstruct what modifications were made.

The second review was to check the internal consistency of the exposure records from year to year. "Mismatches" or differences in data elements, on an asset-by-asset basis between consecutive years, were identified and referred to the appropriate companies for clarifications.

The next data check was commonly referred to as the "exits and entrances" screen. Exposure files were compared on a year-to-year basis to see that bonds or mortgages that matured during a given year did not show up in the year-end file. Also, loans that were designated as CREs during the year of observation were flagged for removal from the year-end exposure base. Bonds or mortgages that disappeared from the database without explanation were investigated. Some of these loans were combined with others, transferred to subsidiaries or paid off early. New loans were checked to confirm that they were originated in the given year of exposure. Again, all changes to the data were approved by the companies.

Another check was to tally key totals, such as number of loans and outstanding principal. Companies were asked if these values agreed with their submissions on a year-to-year basis.

Also, the original, revised, and expense cash-flow files were printed out to determine if the information could be interpreted from its electronic form and if it appeared to be providing reasonable responses to the data request. Glaring errors such as unmatched (unpaired) original and revised cash-flow files for a given CRE asset, and loss dates outside the study period were caught during this review. Companies were asked to make corrections where appropriate.

A data quality check known as a "DQ6" was devised to examine in depth the original, revised and expense cash-flow files. This multipurpose tool includes the ratio of the present value of the original cash flow, discounted at the stated interest rate for a given asset, to the outstanding principal. That ratio theoretically should be approximately 1.0. The computer flagged those assets whose ratios were less than 0.85 or greater than 1.15. Most CRE assets passed this screen. For those that did not, many had errors in their coding such as missing balloon/bullet payments or wrong inputs.

The DQ6 also includes the present value of the original and revised cash flows as calculated for the determination of economic loss. Loss severities were calculated from these present values. The output of the DQ6 provided insight into the cash-flow files. Large negative values (indicating substantial gains) were questioned and brought to the attention of the data contributors. In some cases, these assets had the correct information, but in others the cash flows needed to be modified.

During the data validation process, a series of packages was sent to each data contributor asking about specific loans. In some cases, the questions related to important information that appeared to be missing, cash flows that were out of line based on the DQ6, and questions about the inclusion of CREs with loss dates before 1986 or after 1989.

In responding, companies sometimes updated specific assets in their cash flow files with more currently available information. However, in most cases the changes to the data files were simply corrections.

Finally, the March 1993 preliminary report of commercial mortgages, distributed only to data contributors, delineated the initial computer runs of loss statistics, analysis by specific variables, and the detailed information on each company. Companies were asked to review their own results as well as the aggregate statistics. In particular, the participants were queried about their treatment of foreclosed properties with respect to terminal values used in their revised cash flows, the reasons for high and low loan-to-value assets, and the appropriateness of CREs with large negative losses, that is, economic gains.

E. ACLI Commercial Property Type Definitions

1. Apartment

Includes dwellings for more than four families, usually associated with garden apartments and high-rise apartment complexes. Also includes cooperatives and loans for development of condominium buildings. (A loan secured by an individual apartment within a condominium is classified as 1–4 family.)

2. Office Building

Includes office, medical office, post office, and loft buildings.

3. Retail

Includes shopping centers, department stores, supermarkets, retail stores, and specialty shops.

4. Hotel and Motel

Includes any establishment providing lodging and usually meals and various personal services for the public.

5. Industrial

Includes warehouses, research and development (R&D), manufacturing plants, production and assembly facilities, and public utility buildings. Also includes such hybrid properties as office/warehouse, office/R&D, warehouse/R&D and office/showroom/R&D.

6. Mixed Use

Includes buildings (or a large single building) representing a number of different property types, each of which covers a sizable amount of space and produces a sizable amount of gross income, and each of which represents a sizable proportion of total space and total gross income. A mixed-use project consists of a combination of two or more principal uses, such as office building, hotel, retail, and residential.

7. Other Commercial

Includes mobile home parks, nursing homes, congregate care centers, religious, educational, hospitals, social and recreation facilities, restaurants, parking garages, convention centers, merchandise marts, technology marts, and land loans.