

GAO

Briefing Report to the Chairman,
Subcommittee on Commerce, Consumer
and Monetary Affairs, Committee on
Government Operations, House of
Representatives

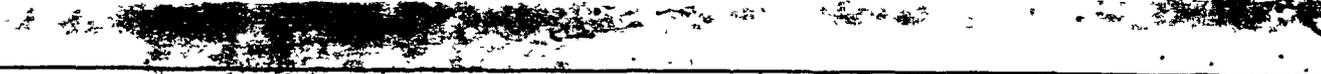
September 1986

THRIFT INDUSTRY

Cost to FSLIC of Delaying Action on Insolvent Savings Institutions



036619



The Honorable Doug Barnard, Jr.
Chairman, Subcommittee on Commerce, Consumer
and Monetary Affairs
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In your letter of February 25, 1986, you requested information on the net cost to the Federal Savings and Loan Insurance Corporation (FSLIC) of permitting insolvent thrift institutions to remain open instead of closing them immediately. This briefing report has been prepared to provide that information.

We recognize that the risk of losses on bad loans and investments (credit risk) is important in determining the cost of closing institutions. According to the Chairman of the Federal Home Loan Bank Board (Bank Board), credit risk is a serious problem that could significantly increase FSLIC's cost of liquidating or otherwise resolving the problem of financially troubled institutions. However, definitive data to measure credit risk are not readily available, as you noted in your request letter. We could not estimate the precise extent of credit risk problems in troubled institutions' portfolios. Therefore, our quantitative analysis is dominated by the effects of changes in interest rates. It is possible that increasing credit risk could offset any savings from declining interest rates that we describe later. Accordingly, although our study does not provide the ultimate net cost of delaying the closing of insolvent thrifts, we believe it provides insight into some of the financial consequences to FSLIC of not immediately resolving the problem of insolvent thrifts.

In 1982, FSLIC found itself unable to cope financially with the full extent of the thrift insolvency and low net worth problem that confronted it. Consequently, it allowed many insolvent thrifts to remain in operation. In your letter, you refer to this practice as "warehousing." Table 1 shows that at least 582 thrifts may have been warehoused for some or all of the period 1982 to 1985. In the first part of the report we provide an estimate of the historical cost (or savings) of warehousing 107 thrifts, from the end of 1982 to the close

of 1985.¹ The 107 thrifts comprise the subset that were insolvent at the end of 1982 and at the end of 1985. They were, therefore, warehoused for the whole period. We did not attempt to include other institutions which may have been warehoused for part of the period because it would have vastly complicated the analysis without, we believe, affecting its basic conclusion. Therefore, the reader should be aware that we are estimating only part of the costs (savings) resulting from FSLIC's warehousing insolvent thrifts during this period.

Table 1

Analysis of Insolvent Thrift Institutions
December 1982 to December 1985

Insolvent Institutions in December 1982

<u>No longer in existence</u>		<u>Still in existence</u>		<u>Total</u>
<u>Merged</u>	<u>Liquidated</u>	<u>Recovered</u>	<u>Still Insolvent</u>	
54	9	52	107	222

Institutions that became insolvent after
December 1982 and were still insolvent in December 1985

Number of institutions	<u>360</u>
Total ^a	<u>582</u> <u> </u>

^aThis total does not include those institutions that may have become insolvent after December 1982 but were not insolvent in December 1985.

¹The costs (and savings) associated with warehousing that are presented in this report are defined as the change in costs that would occur as a result of waiting from one point in time until another point in time to resolve thrifts' problems. Of course, explicit FSLIC outlays only occur when failed institutions are either liquidated or merged with assistance. Our figures are estimates based on what the costs would have been if the problems of all eligible thrifts had been resolved simultaneously.

The second part of this report provides some insight into how much a delay in closing insolvent thrifts may affect FSLIC's costs in the future. Four hundred and sixty-seven thrifts were insolvent in December 1985. Based on their historical earnings, we estimate that 367 of these will be insolvent at the end of 1987. Again, our analysis focuses on estimating warehousing costs for the 367 thrifts that are likely to be insolvent for the whole period. We do not attempt to measure the full extent of warehousing costs facing FSLIC.

The importance of the current cost of warehousing insolvent thrifts is underscored by the recent proposal issued jointly by the Treasury Department and the Bank Board for recapitalizing FSLIC. In introducing the proposal on May 8, 1986, before the Subcommittee on Financial Institutions Supervision, Regulation, and Insurance of the Committee on Banking, Finance, and Urban Affairs, House of Representatives, Bank Board Chairman Edwin J. Gray testified that estimates of the cost to FSLIC of resolving all problem thrift cases range from about \$10 billion to \$25 billion.

As of December 31, 1985, FSLIC's financial reserves were less than \$4.6 billion.² Although the estimated resolution cost far exceeds FSLIC's current reserves, Mr. Gray observed that deferring the resolution of many problem thrift institutions will most probably increase the ultimate cost to the insurance fund.

In this report, we define an insolvent thrift institution as one having zero or negative net worth using Generally Accepted Accounting Principles (GAAP). The Bank Board uses a different accounting standard, Regulatory Accounting Principles. Recent statements by the Bank Board indicate a decision to move toward GAAP for the industry.

The data on individual, FSLIC-insured thrift institutions come from the unaudited financial reports that all insured thrifts are required to file with the Bank Board. We have not verified the accuracy of the reports filed by individual institutions or of the Bank Board's transcription of the data to computer-readable media. The reliability of the financial reports is checked by the district Federal Home Loan Banks but these reports are not audited. The December 1985 Quarterly Financial Reports were the most recent available when this report was prepared. Market interest rate data came from various issues of the Federal Reserve Bulletin and the mortgage research staff of Salomon Brothers Inc.

Appendix I contains our analysis of the warehousing costs for the 107 institutions we examined for the 1982 to 1985 period and the 367 institutions for the 1985 to 1987 period that result from FSLIC's delaying liquidating insolvent thrifts. A technical discussion of the methodology we used to arrive at our results is found in appendix II.

²U.S. General Accounting Office, Financial Audit: Federal Savings and Loan Insurance Corporation's 1985 and 1984 Financial Statements (GAO/AFMD-86-65, July 2, 1986), p. 11.

CONCLUSIONS

Between 1982 and 1985, the number of book-value insolvent thrifts grew steadily. At the same time, the market value of thrift portfolios was steadily increasing due to the downward movement of market interest rates. FSLIC and the Bank Board delayed taking action against failing thrifts. If only the decline in interest rates during this period is considered, this practice of warehousing insolvent institutions may have contributed to a substantial savings to the insurance fund. However, to the extent that there was further deterioration in warehoused institutions' loans and investments, the gains from falling interest rates would have been eroded.

We do not have specific information on the credit risk problems of each institution. Our audit work of FSLIC indicates that the most recent and largest thrift failures have resulted from credit risk problems. In addition, we have been told by the Bank Board, the U.S. League of Savings Institutions, and others that credit risk has become a primary problem in institutions currently receiving FSLIC assistance. The Bank Board Chairman has recently stated that many of the institutions being warehoused have serious asset quality problems; their cost of resolution will, in all likelihood, be higher than usual. Our analysis shows, for a set of 107 warehoused thrifts, that an annual credit deterioration of between 3 and 4 percent in the value of assets would have been enough to neutralize all the gains to FSLIC from falling rates.

Our simulations predict that FSLIC may lose over \$1.4 billion from warehousing 367 thrifts from December 1985 to December 1987 if interest rates do not change over this period. Moreover, even modest increases in interest rates result in substantially higher costs to FSLIC. Only if interest rates fall do our simulations predict that there will be a continued pattern of apparent savings to FSLIC. And all these results ignore the possibility of escalating asset quality problems which can only increase warehousing costs.

Although the Bank Board is aware of this report and its contents, at your request we did not obtain comments from the Bank Board on the report. As arranged with your office, copies of this report will be sent to the Chairmen of the House and Senate Banking Committees. The report will also be distributed to other interested parties. Any questions you may have can be addressed to me at (202) 275-8678 or to Gillian G. Garcia at 275-9856.

Sincerely yours,


Craig A. Simmons
Senior Associate Director

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LIST OF ABBREVIATIONS

ARM	Adjustable rate mortgage
Bank Board	Federal Home Loan Bank Board
FHLBB	Federal Home Loan Bank Board
FRM	Fixed rate mortgage
FSLIC	Federal Savings and Loan Insurance Corporation
GAAP	Generally Accepted Accounting Principles
S&Ls	Savings and loans associations

COST TO FSLIC OF PERMITTING INSOLVENT
THRIFT INSTITUTIONS TO REMAIN OPEN

In 1982, the Federal Savings and Loan Insurance Corporation (FSLIC) found itself unable to cope financially with the full extent of the thrift insolvency and low net worth problem that confronted it. Consequently, it allowed many insolvent thrifts to remain in operation; that is, it "warehoused" them. This briefing report examines two questions: (1) What has been the cost to FSLIC of warehousing our subset of 107 insolvent thrift institutions from December 1982 through December 1985? and (2) What is the cost likely to be over the period December 1985 through December 1987 of continuing to warehouse our subset of 367 projected insolvent thrifts? The methodology used to examine these two questions is discussed briefly below and explained more fully in appendix II.

OBJECTIVES, SCOPE, AND METHODOLOGY

In the historical part of the estimation, only those institutions which were warehoused over the entire period are included in the cost calculations. One hundred and seven savings and loan associations (S&Ls) that were insolvent in December 1982 and still operating and insolvent in December 1985 comprise our warehoused sample.¹ Although this simplification tends to understate the size of the problem that faced FSLIC at the end of 1982 and at the end of 1985, it allows comparisons to be made and greatly reduces the number of assumptions that would have to be made about the value of assets and liabilities of institutions that recovered or became insolvent between 1982 and 1985.

¹There were 222 insolvent, FSLIC-insured thrift institutions in December 1982 and 467 in December 1985 as shown in table 1 on p. 2. One hundred and seven thrifts were insolvent at both times. The other 115 from the original 222 had either been closed, merged with other institutions, or regained solvency.

The estimates of warehousing costs are based on approximations of changes in liquidation cost over time resulting from interest rate changes.² Liquidation involves selling off the institution's assets and settling its debts.³ Any excess of projected outlays over receipts represents the likely net cost to FSLIC in a liquidation. The potential receipts which would have been realized from quickly disposing of an insolvent institution are estimated as the market value, based on prevailing market conditions, of the thrift's assets. FSLIC's projected net outlays depend on how much of the institution's liabilities are covered by liquidation receipts. FSLIC policy is to pay all insured deposits and secured liabilities. These are called "covered" liabilities in this report. If the market value of assets is less than enough to pay these liabilities, FSLIC will cover the difference. Other liabilities are paid only if the receipts exceed the guaranteed payout. Administrative and similar costs incurred in liquidations are ignored in the analysis.

FSLIC assistance to warehoused thrifts has not been counted in the estimates of market value. Some institutions dropped out of our set of insolvent thrifts due to FSLIC-assisted mergers. Others received FSLIC assistance but remained insolvent. In many of these cases, FSLIC accepted Income Capital Certificates and Net Worth Certificates in exchange for cash and interest-bearing notes in order to augment the thrifts' capital. In accordance with a recent Financial Accounting Standards Board decision, we have subtracted the certificates from thrifts' net worth. However, in the event of a liquidation, the FSLIC notes would probably not be available for use to pay off the institution's liabilities and should, therefore, also be removed from assets. This assistance

²FSLIC can dispose of a failed institution either by finding another firm that is willing to merge with it, possibly with FSLIC financial assistance, or by liquidating it. Although liquidation generally has proved to be considerably more expensive than merger, the large number of insolvency cases make it highly unlikely that FSLIC could have found enough healthy, willing, and qualified merger partners to absorb a large number of the weak institutions during this period.

³The liquidation cost estimates assume that assets and liabilities are disposed of immediately upon closure of an institution. Insured deposits, which normally comprise most of the liabilities which will eventually be paid off, are, in fact, quickly reimbursed. The assets, however, normally take up to 2 or more years to liquidate. The effect that the assumption of immediate disposition will have on the accuracy of our warehousing cost approximation depends on the future course of interest rates and, therefore, cannot be determined at this time. For a more complete discussion of the effect of this assumption, see p. 26 of app. II.

totaled less than a quarter of a billion dollars for thrifts in the sample.

We subtract the market value of assets from the value of covered liabilities to calculate each insolvent thrift's liquidation cost. Since the market value of any (fixed interest rate) mortgage asset falls as prevailing mortgage interest rates rise and since mortgage rates were high in December 1982 by historical standards, we expect high estimated liquidation costs at that time.⁴ As rates had fallen by the end of 1985, we expect that similarly estimated costs will be less for December 1985. Moreover, by not expending its funds in 1982, FSLIC was able to continue to accrue interest on its portfolio (or refrain from borrowing) over the the ensuing 3 years. The estimated interest earnings on the 1982 net expenditures foregone over the 3-year period to 1985 are added to FSLIC's gains from waiting.

Insolvent thrifts have been observed to experience a growth in credit risk which lowers the (liquidation) value of their assets. Because credit risk and its attendant costs cannot be gauged with available data, we calculate the decrease in 1985 asset values which would have been necessary to offset the effect of the interest rate decline and leave to the reader an assessment of how likely this increase in credit risk may have been.

In the second part of the analysis, we examine the issue of whether FSLIC is likely to save money or incur additional expenses as a result of further delays in dealing with the current problem of insolvent thrifts. An analysis similar to the historical analysis is performed. The sample of thrifts to-be-warehoused is derived as those insolvent in December 1985 that are also projected to be insolvent at the end of 1987. We then project the liquidation cost of thrifts in this sample to December 1987 under three scenarios: (1) no mortgage interest rate change from December 1985 to December 1987, (2) a 2 percentage point drop in rates, and (3) a 2 percentage point rise in rates. Warehousing costs are calculated as summations of the December 1987 liquidation costs less the December 1985 liquidation costs and also less the interest savings from not having to borrow the 1985 costs. We also discuss the effect of credit risk on resolution costs.

THE HISTORICAL COST OF WAREHOUSING: 1982-1985

FSLIC's obligations to covered liability holders, calculated for each of the 107 warehoused thrifts we examine, were summed to

⁴Because of data limitations, we have not been able to include the effect of adjustable rate mortgages explicitly in the calculation of market values. For a discussion of these mortgages and the way they may be accounted for, see p. 28 of app. II.

provide estimated potential expenditures for 1982 and again for 1985. Similarly, the estimated market values of each S&L's assets were summed at each of the two dates. These totals are presented in table I.1. The differences between potential total outlays and receipts represent the estimated impact on the FSLIC insurance fund at the two dates. According to our estimates, FSLIC would have had to expend over \$5.3 billion at the end of 1982 to liquidate the 107 insolvent S&Ls in our analysis. At the end of 1985 the potential drain on the fund for these institutions alone had fallen to \$2.4 billion because of the increase in the market value of their loan portfolios that resulted from the decline in interest rates.

The difference between these two estimates represents a potential savings of approximately \$3.0 billion due directly to delaying resolution of the thrifts' problems. However, because FSLIC did not expend \$5.3 billion in 1982, it neither depleted the insurance reserve fund nor borrowed (from the Treasury, for example). It was able to continue to earn interest on the fund's assets and avoid paying interest on any borrowings. In this way, it saved an additional \$1.7 billion in interest over the 3-year period to December 1985.⁵ In total, considering only changes in interest rates we estimate that FSLIC saved \$4.7 billion overall by delaying resolution of 107 of the insolvent thrift cases in 1982.⁶ The savings resulted solely from the decline in interest rates during the period.

In addition to the dollar values for liabilities, assets, and costs in table I.1, these same figures are presented as percentages of total assets (in parentheses below each figure). The ratio of covered liabilities to assets remains essentially constant between 1982 and 1985 but the ratio of the market value of assets to total book value rises substantially because of the effect of falling market interest rates.

Our sample of insolvent thrifts was defined as those that were insolvent throughout the entire 3-year period. Another 360 institutions became insolvent during this time. These thrifts were also warehoused for varying periods of time and were subject to the same effects of falling market interest rates described

⁵The interest savings are estimated using the 3-year U.S. Treasury note interest rate in effect in December 1982.

⁶These numbers are not meant to be estimates of the total costs to FSLIC at these two points in time. They are limited estimates, based on the 107 thrifts in our set. There were more insolvent thrifts in both 1982 and 1985. Another qualification that might be made recognizes that for some institutions FSLIC may be able to find less expensive resolutions than liquidations.

above. That is, because of increases in the value of their mortgage portfolios, liquidating these institutions at the end of 1985 rather than at the point they became insolvent would probably have reduced the cost to the FSLIC insurance fund.⁷

⁷If we assume that the percentages shown in table I.1 for the set of thrifts can be applied to the entire group of 467 thrifts insolvent in December 1985, then the liquidation cost for these institutions at the end of 1985 would have been approximately \$6.4 billion, or 4.8 percent of \$132.9 billion in total assets. The savings attributable to warehousing the expanded set of thrifts would also have been larger than that shown in table I.1.

Table I.1

The Estimated Effect of Declining Interest Rates
on the Cost of Warehousing 107 Insolvent
Thrift Institutions 1982-1985
(in millions of dollars)

	<u>End of 1982^a</u>	<u>End of 1985^b</u>	<u>Savings^a</u>
Covered liabilities	\$35,119 (95.0)	\$46,844 (94.4)	
Market value of assets ^c	29,762 (80.5)	44,441 (89.6)	
Liquidation cost	\$5,357 (14.5)	\$2,403 (4.8)	
Decrease in liquidation cost			\$2,954 (8.0)
Interest on 1982 costs			1,750 (4.7)
Total estimated savings due to declining mortgage interest rates			\$4,704 (12.7)

^aThe numbers in parentheses below each dollar figure in this column are percentages of \$37.0 billion, the book value of total assets at the end of 1982 for the 107 warehoused institutions.

^bThe numbers in parentheses below each dollar figure in this column are percentages of \$49.6 billion, the book value of total assets at the end of 1985 for the 107 warehoused institutions.

^cThe assumption used to calculate the market value of mortgage assets are: (1) average years to maturity, 25; and (2) average years to termination (prepayment), 10.

Varying the Assumptions

Our estimates of the potential savings from warehousing the 107 insolvent institutions between 1982 and 1985 are derived from a specific set of assumptions about the maturity of the typical mortgage, the rate of prepayment, and which liabilities of failing thrifts FSLIC would have chosen to pay off. A question naturally arises, therefore, as to the sensitivity of our estimates to changes in these assumptions. We recalculated our estimates using different assumptions about whose claims FSLIC would fully pay off, as well as about mortgage prepayment rates. The average length of time mortgages tend to be held is directly related to the level of interest rates (and expectations of future movements in rates). Thus, when rates are high, homeowners hold on to existing mortgages. On the other hand, when rates are low, as in the first half of 1986, mortgages are terminated much more quickly, on average.

Table I.2 presents the savings from warehousing under the changed set of assumptions. The results are not highly sensitive to the changed assumptions. Savings are estimated to range between \$4.6 billion where FSLIC pays all liabilities of the subset of 107 insolvent thrifts and mortgage prepayment occurs after 10 years in both 1982 and 1985 and \$5.2 billion where FSLIC fully pays only covered liabilities and the average number of years to mortgage termination falls from 12 years in 1982 to 8 years in 1985. (See app. II for further discussion of mortgage prepayment rates.)

Table I.2

The Estimated Effect of Declining Interest Rates
on the Cost of Warehousing 107 Insolvent
Thrift Institutions Under Varying Assumptions
 (December 1982 to December 1985)

<u>Assumptions</u>				
Liabilities paid off	Covered	All	Covered	All
Years to presumed average mortgage termination in 1982	10	10	12	12
Years to presumed average mortgage termination in 1985	10	10	8	8
<u>Warehousing costs</u>				
Savings on liquidation cost from Dec. 1982 to Dec. 1985 ^a	\$2,954	\$2,434	\$3,330	\$2,840
3 years' interest on 1982 liquidation cost ^a	<u>1,750</u>	<u>2,129</u>	<u>1,846</u>	<u>2,224</u>
Total estimated savings due to declining mortgage interest rates ^a	<u>\$4,704</u>	<u>\$4,563</u>	<u>\$5,176</u>	<u>\$5,064</u>
Percentage savings from warehousing (total savings as a percent of 1982 cost plus interest)	66.2	52.8	69.1	56.1

^aIn millions of dollars.

Credit Risk Exposure

Managers of thrift institutions that are permitted to continue operating while insolvent have a different set of incentives than solvent institution managers. Most importantly, in this context, is a propensity among managers of insolvent institutions to gamble by engaging in risky investments. Having no equity to preserve and protected against liability for losses by the FSLIC deposit insurance guarantee, managers may see the potential for high returns from such investments as the best hope for returning to solvency. This suggests that, on average, insolvent thrifts should experience a deterioration in the value of their asset portfolios due to an accumulation of risky investments. Unfortunately, data are not readily available to correctly measure changes in asset quality in thrift institutions. Although not necessarily representative of the warehoused institutions, our audit work of FSLIC suggests that the most recent and largest thrift failures have resulted from poor quality loans and investments.

We examine what the rate of deterioration in the credit quality of asset portfolios of insolvent thrifts would have to have been in order to negate the savings in liquidation costs arising from declining interest rates between 1982 and 1985. For our baseline case we estimated that the total market values of the warehoused thrifts' assets would have had to be worth 10.6 percent less than the \$44.4 billion approximated for December 1985. That represents an annual rate of deterioration of 3.4 percent. Other estimates derived by varying the assumptions we employed do not differ greatly from these figures and are shown in table I.3. We do not know precisely the extent to which credit risk has offset the savings we have described from warehousing. But it is reasonable to presume that increased credit risk decreased the value of insolvent thrifts' assets to some extent during this period.

Table I.3

The Increase in Credit Risk Which Would
Have Offset the Effect of Falling Mortgage
Interest Rates on the Savings from Warehousing
(December 1982 to December 1985)

<u>Assumptions</u>				
Liabilities paid off	Covered	All	Covered	All
Years to presumed average mortgage termination in 1982	10	10	12	12
Years to presumed average mortgage termination in 1985	10	10	8	8
<u>Offsetting credit risk increase</u>				
Increased credit risk	10.6%	10.3%	11.6%	11.4%
Compound annual rate for 3 years	3.4%	3.3%	3.7%	3.7%

FSLIC Insurance of Insolvent Thrifts
Represents an Implicit Subsidy

In addition to the effects of credit risk on liquidation costs, we believe it important to consider the implied subsidy caused by FSLIC's decision to keep insolvent institutions open. There are a number of bases for believing that such a subsidy exists and should be taken into account when considering past or expected future costs associated with delaying the closing of FSLIC-insured institutions. For example, FSLIC does not, generally speaking, provide sufficient capital to GAAP-insolvent institutions to create the appearance of solvency. Nevertheless, the practical effect of continuing to insure

warehoused thrifts was the same as if they had been given sufficient capital to raise net worth levels above zero. Capital is not costless. Depending on one's perspective, its cost may be measured from an economic efficiency standpoint as the cost of shifting resources from healthy thrifts that earn a positive return on their assets to insolvent institutions that in this study were, in large part, earning negative returns. From a fairness point of view, the cost of the capital deficiency may be viewed as the implicit cost to the government of loaning capital to the thrift industry (instead of to some other industry) in order to underwrite the obligations of the FSLIC insurance fund.

Because there are a number of ways, both conceptually and methodologically, to value the subsidy, we have not attempted to estimate it in this report. But it is important that the existence of the subsidy be recognized as an additional cost associated with keeping these institutions open.

Additional Considerations

Two other factors, not accounted for in this analysis, may influence the level of cost or benefit attributable to warehousing, although the direction of the effects is not possible to determine conceptually. First, for simplicity we have assumed that FSLIC sells the assets of liquidated thrifts immediately. In fact, most of these assets are held for 6 to 18 months, and much longer in some cases. Introduction of this delay into the analysis would complicate it enormously.

The actual value of the assets at the point of liquidation depends on the future course of interest rates, holding costs, and the length of time before the assets are sold. Whether these factors increase or decrease the savings or costs of warehousing depends on the particular combination of circumstances.

The second factor involves classification of the assets in the insolvent thrifts' portfolios. Holdings of adjustable rate mortgages increased between 1982 and 1985. Because of data limitations, the calculation of market value does not take explicit account of adjustable rate mortgages. An adjustment is implicit in the methodology used, but whether this adjustment over- or understates the savings from warehousing is impossible to determine. (Both of these factors are discussed in more detail in app. II.)

PROJECTED COSTS OF CONTINUING TO WAREHOUSE INSOLVENT THRIFTS

For policy purposes, the most important question about warehousing concerns the cost of continuing to delay action on insolvent thrifts. To estimate these potential future warehousing costs, we first examined the set of thrifts that were insolvent at

the end of 1985. Each of these thrifts was then assumed to earn the same amount in 1986 and 1987 as in 1985.⁸ Under these assumptions, 367 institutions will continue to be insolvent at the end of the 2-year period. Having determined our initial set of potentially warehoused institutions, we then estimate the cost to FSLIC of delaying action through the end of 1987 using the same techniques as in the historical analysis.

The first crucial unknown in looking at projections of future warehousing costs is the future course of interest rates. Simulation results for three interest-rate scenarios are presented in table I.4. Conventional mortgage rates were about 11 percent in December 1985. We have estimated warehousing costs for our set of insolvent institutions by assuming no change in mortgage rates from December 1985 to December 1987. We also calculated the change in FSLIC's liquidation costs if mortgage interest rates increase or decrease by 2 percentage points.⁹ The table shows that delaying action until December 1987 is estimated to cost over \$1.4 billion because of accumulated losses if mortgage rates do not change. A 2 percentage point increase in mortgage rates would increase the cost to FSLIC by over \$7.1 billion dollars, whereas

⁸The average growth rate of assets for the institutions projected to be insolvent was -0.02 percent in 1985. Therefore, a zero growth rate of assets was assumed.

⁹Some important dynamic effects of interest rate changes are not brought into the analysis. For example, if all interest rates fall then the funds which thrifts use will cost less but the returns which thrifts earn on new loans will also drop. The net effect on profits depends on the changes in long- and short-term interest rates and on the maturities of thrifts' assets and liabilities; this effect cannot be predetermined. We did not introduce these complicating factors into the analysis because we judge that they would greatly encumber the discussion without adding to the usefulness of the analysis or significantly altering the results.

about \$4.5 billion could be saved if interest rates fall by 2 percentage points.

Table I.4

The Effect of Changing Interest Rates and Other
Factors on the Projected Cost of Warehousing 367 Insolvent,
FSLIC-Insured Thrift Institutions from 1985 to 1987
(in millions of dollars)

	<u>Mortgage interest rate change</u>		
	<u>-2%</u>	<u>0%</u>	<u>2%</u>
End of 1987 liquidation cost	\$1,624	\$7,554	\$13,270
End of 1985 liquidation cost	<u>5,246</u>	<u>5,246</u>	<u>5,246</u>
Change in liquidation cost	-\$3,622	\$2,308	\$ 8,024
Interest on 1985 cost	<u>890</u>	<u>890</u>	<u>890</u>
Total cost of warehousing	<u><u>-\$4,512</u></u>	<u><u>\$1,418</u></u>	<u><u>\$ 7,134</u></u>

Credit Risk

Our audit work of FSLIC indicates that the most recent and largest thrift failures have resulted from credit risk problems. In our historical examination of warehousing costs, we could not take account directly of deteriorating asset quality in thrift portfolios. The same problem exists in assessing the importance of changing asset quality in the future. The set of thrifts that we estimated would remain insolvent between 1985 and 1987 was determined by projecting each institution's 1985 rate of return on assets. That rate of return, however, includes the effects of many other influences besides credit risk. Nevertheless, if credit risk is increasing in the industry, as the Bank Board suggests, then the negative contribution of such risks to profits should also be increasing for some institutions. Asset values will also decrease.

1985 was a good year for the industry as a whole. For the institutions in our set of insolvent thrifts, however, it was not such a good year. These institutions' losses averaged 1.8 percent

of assets during 1985.¹⁰ If asset quality deterioration continues, the estimates of FSLIC's cost will also increase. For every 1 percent devaluation of 1987 asset portfolio due to credit risk, the resolution cost to FSLIC would increase by about \$0.8 billion for our set of 367 insolvent thrifts.

Additional Thrifts to Become Insolvent by 1987

The set of warehoused thrifts included in the estimates of FSLIC's future warehousing costs (table I.4) did not include 100 thrifts that were insolvent at the end of 1985, but whose rate of return on assets was large enough for them to become solvent by the end of 1987. Nor did it include 74 thrift institutions that were solvent in 1985 but which, under our assumptions, can be projected to become insolvent by the end of 1987.¹¹

In table I.5, we have added these 74 institutions to our set of warehoused thrifts. The table shows our simulation results for the group of 441 thrifts that are projected to be insolvent by December 1987. Thus, including all institutions that are projected to be insolvent in the warehousing cost calculation increases the cost to FSLIC of delaying action to \$1.8 billion if interest rates remain stable. A 2 percentage point reduction in rates would save FSLIC about \$5.5 billion, but a 2 percentage point increase would raise resolution costs by \$9.3 billion over the costs in December 1985.

¹⁰Not all of the 367 institutions insolvent in both 1985 and 1987 had a negative rate of return on assets in 1985. One hundred twenty-nine earned positive profits but the profits were so small (or their insolvency was so large) that accumulated profits in 1986 and 1987 were insufficient to allow them to become solvent by December 1987.

¹¹This set of 74 institutions experienced about an 8.5 percent asset growth rate in 1985. Therefore, warehousing cost forecasts for this group assumed that their assets will continue to grow at 8.5 percent per year.

Table I.5

The Effect of Changing Interest Rates and Other
Factors on the Projected Cost of Warehousing Insolvent
Thrift Institutions from 1985 to 1987 When All 441
Thrifts Projected to be Insolvent Are Included
(in million of dollars)

	<u>Mortgage interest rate change</u>		
	<u>-2%</u>	<u>0%</u>	<u>+2%</u>
End of 1987 liquidation cost	\$919	\$8,218	\$15,659
End of 1985 liquidation cost	<u>5,461</u>	<u>5,461</u>	<u>5,461</u>
Change in liquidation cost	-\$4,542	\$2,757	\$10,198
Interest on 1985 cost	\$ <u>926</u>	\$ <u>926</u>	\$ <u>926</u>
Total cost of warehousing	<u>-\$5,468</u>	<u>\$1,831</u>	<u>\$ 9,272</u>

Alternative Assumptions

As discussed earlier, an important determinant of the market value of a thrift's assets is the number of years that a typical mortgage is likely to be held. In our projections of future warehousing costs, we have assumed that mortgages will be held, on average, for 10 years. This is the assumption on which the estimates in tables I.4 and I.5 are based. Relaxing this assumption about the market's presumed average number of years to termination of insolvent thrifts' mortgages leads to different results. Table I.6 shows a reasonable scenario in which mortgage prepayment rates vary with interest rates for both our original set of 367 warehoused thrifts and for the expanded set of 441 institutions. Falling mortgage rates at the end of 1985 may have shortened the average holding time for a mortgage. If rates continue to fall, then a relatively short holding period could also be assumed to exist at the end of 1987. Given this assumption, a 2-percent drop in interest rates would lead to a warehousing savings of \$3.6 billion for FSLIC. Thus, if interest rates were to fall and the housing market were active, FSLIC's saving from additional delay would be less than suggested by our baseline estimates in tables I.4 and I.5.

Table I.6

The Effect of Changing Interest Rates and
Other Factors on the Projected Future Cost of
Warehousing Insolvent Thrift Institutions Under Varying
Assumptions About Mortgage Prepayment^a
(in millions of dollars)

	<u>Assumed Mortgage Interest Rate Change</u>		
	<u>-2%</u>	<u>0%</u>	<u>+2%</u>
367 thrifts insolvent in 1985 and projected to be insolvent in 1987	-3,645 ^b	1,418 ^c	8,198 ^d
441 thrifts projected to be insolvent in 1987	-4,386 ^b	1,831 ^c	10,611 ^d

^aSee p. 33 of app. II for more detail about the costs associated with alternative prepayment assumptions.

^bAssumes 8 years to mortgage termination in both 1985 and 1987.

^cAssumes 10 years to mortgage termination in both 1985 and 1987.

^dAssumes 8 years to mortgage termination in 1985 and 12 years in 1987.

A rise in mortgage interest rates, on the other hand, is likely to cause prepayment rates to lengthen as people hold on to existing home mortgages longer rather than assume new, higher-rate mortgages. In table I.6, we have assumed 12 years to prepayment if mortgage rates go up. In this case, FSLIC's projected cost of delaying action until December 1987 could be \$8.2 billion if mortgage rates rises by 2 percentage points. This is more than \$1 billion higher than our baseline estimate.

The same pattern exists for the expanded set of 441 thrifts projected to be insolvent at the end of 1977. A reduction in interest rates would lead to a \$4.4 billion savings, but the potential penalty for delay would be about \$10.6 billion if rates increase.

ASSUMPTIONS AND METHODOLOGY USED TO
ESTIMATE THE COSTS OF WAREHOUSING
INSOLVENT THRIFT INSTITUTIONS

This appendix explains the methodology used in the examinations.

THE HISTORICAL ANALYSIS

In the historical part of the estimation, only those institutions which were warehoused over the entire period (that is, those that were insolvent in December 1982 and were still operating and insolvent in December 1985) are included in the basic cost calculations. This simplification tends to understate the size of the full problem that faced FSLIC. It excludes, for example, any costs incurred for institutions that later recovered, were merged with FSLIC assistance, were liquidated from 1983 through 1985, or became newly insolvent after 1982. However, the simplification allows some clear comparisons to be made.

We identified FSLIC-insured institutions as insolvent if they had negative accounting net worth.¹ Accounting net worth is measured using Generally Accepted Accounting Principles, which are established by the Financial Accounting Standards Board.^{2,3}

¹Although nonpositive market value could have been used to identify insolvency, most of the industry was insolvent by this gauge at the end of 1982. Closing market-value insolvent thrifts at that time would have involved too large a cost to realistically have been considered by FSLIC or the Congress.

²Income Capital Certificates have been subtracted from institutions' net worth in light of a recent ruling by the Financial Accounting Standards Board.

³The Federal Home Loan Bank Board is moving toward using Generally Accepted Accounting Principles as the standard for the thrift industry. See Kathleen Day, "Rule Expected to Make S&L Evaluations Easier," The Washington Post, April 26, 1986, pp. G1-G2.

FSLIC can dispose of a failed institution either by finding another firm that is willing to merge with it, possibly with FSLIC financial assistance, or by liquidating it. Liquidation involves selling off an institution's assets and settling its debts. Liquidating a thrift has generally proven to be considerably more expensive for FSLIC than merger.⁴ However, the large number of insolvency cases (there were 222 insolvent institutions at the end of 1982 and 467 at the end of 1985) make it highly unlikely that FSLIC would have been able to find enough healthy, willing and qualified merger partners within the thrift industry to absorb all of these institutions. Moreover, most of the data needed to measure merger costs are unavailable. Therefore, we assume in this report that liquidation was the principal alternative open to FSLIC during this period, and our estimates of warehousing costs and savings are based on approximations of changes in liquidation costs over time.⁵

Calculation of approximate liquidation costs for December 1982 required that we estimate the market value of assets of each insolvent institution and the legal value of its obligations to depositors and other creditors. Any excess of projected outlays by FSLIC (to pay covered liabilities) over receipts (from the sale of assets) represents the likely net cost to FSLIC from the liquidation. The market values of assets are used to estimate potential receipts because they approximate those monies FSLIC would have obtained from quickly disposing of the assets of insolvent institutions by selling them to other financial institutions or the investing public.

Insured liabilities are paid off immediately. A question arises as to which depositors and creditors will be reimbursed in a liquidation. FSLIC's recent practice has been to first

⁴According to data provided in J.R. Barth, R.D. Brumbaugh, Jr., D. Sauerhaft, and G.H.K. Wang, "Insolvency and Risk-Taking in the Thrift Industry: Implications for the Future," Contemporary Policy Issues, Vol. III, Fall 1985, p. 11, FSLIC estimated that liquidation of a thrift averaged close to four times as costly as a "least-expensive solution" (such as merger) from 1980 through 1984.

⁵The ability of FSLIC to find a sufficient number of merger partners probably decreased over the study period because the number of troubled thrifts increased dramatically and because reduced restrictions on interstate banking decreased the interest of banks in merging with thrifts. Therefore, although the cost of resolving all insolvent thrift cases has probably been overstated by viewing liquidation as the sole means of resolution, the overstatement is likely to be greater in 1982 than in 1985. Thus, the calculations may understate the warehousing costs.

recompense insured depositors and secured creditors in full. If asset sales do not provide enough cash to pay these "covered" creditors, the deficiency is met from FSLIC funds. Where receipts from asset sales exceed covered liabilities, the residual is apportioned among uninsured depositors and unsecured creditors in a partial repayment of these obligations. Only if the market value of assets equals or exceeds the value of total liabilities are all liabilities covered in full.⁶

Our calculation of liquidation costs assumes that assets are liquidated immediately at the time of the declaration of insolvency. Clearly, this has not been the case in FSLIC liquidations. Assets are assumed by FSLIC and liquidated over a number of years while insured deposits and secured creditors are paid off immediately.⁷ Taking explicit account of the lag in the liquidation of assets would require knowledge of how long such a process would take, a discounting of cash flows from the liquidation of assets to their present value at a rate equivalent to the government's cost of borrowing over the life of the liquidations, and knowledge of the future course of interest rates and their consequent effect on the market value of mortgages over the liquidation period. For this reason, the liquidation costs we present in this report are probably understated. Whether the comparison between liquidation costs between one period and another is affected depends crucially on (1) whether the length of time it takes to liquidate assets has changed between the two periods and (2) whether the level and direction of change of interest rates during the liquidation process have varied over time. We did not introduce these complicating factors into the analysis because we judge that they would greatly encumber the discussion without adding to the usefulness of the analysis or significantly altering the results.

Liability accounts are taken at book value in our calculations. The short maturities of thrifts' liabilities, mostly under a year, cause the accounting values to closely approximate market values. Moreover, reimbursed liabilities are paid off at their accounting values in liquidations.

Administrative and similar costs incurred in liquidations are ignored in the analysis. This is equivalent to assuming that these costs would have been the same in the 2 years.

⁶In this eventuality, the Bank Board would probably choose not to liquidate the institution.

⁷According to FSLIC, most assets are disposed of between 6 and 18 months after an institution fails.

Market Values

For each insolvent institution, the market values of several different categories of assets are dealt with differently. Market values of mortgage loans, which typically represent about two-thirds of a thrift's assets, are estimated by adjusting book values downward when market interest rates on mortgages exceed the rate being earned by the thrift on its mortgage portfolio. Book values are adjusted upward when rates earned exceed market rates.⁸ In fact, mortgage market values rose between 1982 and 1985 because mortgage interest rates fell. A similar approach is used to value mortgage-backed securities. Other assets, such as consumer loans, commercial loans, and liquid assets, are typically short-term or made at market-sensitive rates so that their market values do not deviate far from their book values in response to interest rate movements. Therefore, they are included at book value in our estimates of the market values of savings and loan associations' (S&Ls) portfolios. Goodwill and other intangible assets and deferred net losses on assets are excluded from our analysis because these assets have no market value when an institution is liquidated.

The size of the adjustment of the book value of a thrift's mortgage portfolio to approximate market value depends on the relationship between the rate the thrift earns on its portfolio, the mortgage rate in effect in the market, the maturity of the mortgages and the anticipated rate of early repayment (prepayment).⁹ In our basic analysis we assumed that the mortgage market presumed an average mortgage held by a thrift has 25 years to maturity and 10 years to prepayment.¹⁰ As consumers tend to prepay their mortgages more rapidly when interest rates fall, while holding on to them when rates rise, we used two additional prepayment assumptions, 12 years in 1982 when rates on new mortgages were high and 8 years in 1985 after rates had fallen. We cannot know what the actual average number of years to

⁸However, when rates on new mortgages fall sharply, homeowners refinance their mortgages. Therefore, in reality S&Ls are more likely to suffer when rates rise than to benefit when they fall.

⁹The formula used is $\text{market value} = B * (((i/r) * (1-X) + X * [1 - Y * (1+i)^k])) / (1-Y)$ where $X = 1 / (1+r)^k$ and $Y = 1 / (1+i)^m$ where i is the average rate the thrift earns on its mortgage portfolio, r is the mortgage rate in effect in the market, m and k are the presumed average number of years to maturity and termination of the thrift's mortgages, and B is the book value of the thrift's mortgages.

¹⁰Research staff of the Bank Board confirmed that 25 and 10 are reasonable assumptions for average years to maturity and prepayment, respectively.

prepayment of a thrift's mortgages will be until all of the mortgages have been terminated, which will not occur in this century. On the other hand, market values of mortgages (which are established when the mortgages are sold, as in a liquidation) depend on buyers' expectations of time to prepayment. Bank Board officials have suggested that reasonable expectations range between 8 and 12 years, depending on past, current, and expected future interest rates.

Adjustable Rate Mortgages

Adjustable rate mortgages (ARM) pay interest which decreases with falling mortgage interest rates and increases with rising rates. Thus, the market value of an ARM is always approximately equal to the book value. Of course, the rate paid on ARMs is not always the market rate. Because of caps (both lifetime and annual) and other variations among ARMs, adjustments of ARM rates to the market rate often occur incompletely and with substantial delays. In general, however, a change in the mortgage rate affects the yield rather than the price (resale value) of an ARM. For a fixed-rate mortgage (FRM), on the other hand, the yield remains constant but the resale value changes with a change in the market rate. Thrifts' holdings of ARMs were negligible in 1982 but reached nearly 30 percent of total assets by the end of 1985.

Our calculation of the value of thrifts' assets does not take explicit account of the differences between ARMs and FRMs in thrifts' portfolios. To do so would require data on the asset mix as well as disaggregated data on interest income, i.e., how interest income is allocated between fixed and adjustable rate mortgages. This information was not available to us.

The procedure we used to calculate the market (or resale) value of a mortgage asset estimates the average yield on the mortgage held by a thrift by taking mortgage interest earned as a percentage of mortgage assets held. While not explicitly taking account of ARMs, there is an implicit adjustment that takes place. For example, consider a thrift with both FRMs and ARMs. Assume that mortgage rates fall but asset size and composition do not change. The falling rate means that income from ARMs will fall, resulting in a fall in total interest income earned on mortgages (the only income figure we have). Our calculations will translate this into a lower yield on all mortgages, not just ARMs.

Thus, when the calculation is completed, FRMs will be undervalued because they appeared to experience a drop in yield when they actually did not. ARMs, however, will be overvalued because the data and the calculation do not allow us to adjust their yield to completely reflect the prevailing market rate (and, thereby, to maintain their market value at par). The net effect of undervalued FRMs and overvalued ARMs on our approximations of mortgage and liquidation values cannot be determined without additional information. Nevertheless, the calculation does implicitly reflect at least a partial adjustment for ARMs in thrift portfolios.

Covered Liabilities

The cost of liquidating an insolvent thrift is estimated from the market value of assets and the legal obligation to pay liabilities. According to FSLIC staff, insured depositors and secured creditors are normally fully reimbursed when an institution is closed. Only these liability holders normally receive complete reimbursement. Those depositors and creditors usually paid in full by FSLIC include the following items from S&Ls' financial reports: deposits (insured deposits of \$100,000 or less and the first \$100,000 of larger deposits), Federal Home Loan Bank advances, commercial bank loans, reverse repurchase agreements, consumer retail repurchase agreements, mortgage-backed bonds issued, accrued interest payable, interest accrued or declared on deposits, and advance payments by borrowers for taxes and insurance.

FSLIC Exposure

The sum of insured deposits plus secured credits represents the minimum mandated expenditures by FSLIC. The FSLIC fund will, therefore, experience a drain when asset values are less than covered liabilities. These cases are referred to below as "low market value" institutions. Where the realized value of assets exceeds covered liabilities, FSLIC will, in addition, at least partially reimburse uninsured depositors and unsecured creditors. In these cases (called intermediate market values), the FSLIC fund

will experience neither a gain nor a drain. Only if market values exceed the value of all liabilities (high market values) does FSLIC stand to profit from liquidations.

Data in table II.1 show that there were 101 institutions in the low market value category in 1982. This figure declined to 72 in 1985. In contrast, there were only 6 institutions in the intermediate category in 1982 and 16 in 1985. The number of institutions in the high market value category rose from 0 in 1982 to 19 in 1985.

Table II.1

Distribution of Insolvent
Thrifts by Market Value

<u>Approximate market value of assets:^a</u>	<u>December 1982</u>	<u>December 1985</u>
Low Market Values	101	72
Intermediate Market Values	6	16
High Market Values	<u>0</u>	<u>19</u>
Total	<u>107</u>	<u>107</u>

^aThe definitions of the terms low, intermediate, and high market values are given in the text.

The Gains From Delaying

We subtract the market value of assets from the value of covered liabilities in December 1982. Any positive residual represents the likely liquidation cost to FSLIC at that date. Mortgage interest rates were high in December 1982 by historical standards, and far exceeded the average rates earned by S&Ls on their mortgage portfolios. Therefore, FSLIC would have incurred a large loss on liquidations in December 1982. As rates had fallen by the end of 1985, we expect that similarly estimated costs would be less in December 1985.

By not expending its funds in 1982, FSLIC was able to continue to accrue interest in its portfolio (or refrain from borrowing) over the ensuing 3 years. The estimated interest savings on the 1982 net expenditures foregone over the 3-year period to December 1985, based on the 3-year U.S. Treasury note interest rate in December 1982, are added to FSLIC's gains from waiting.