

# RESCINDED

Office of Thrift Supervision

April 12, 2001

Department of the Treasury

Regulatory Bulletin

**RB 32-18**

This rescission does not change the applicability of the conveyed document. To determine the applicability of the conveyed document, refer to the original issuer of the document.



Handbook: **Thrift Activities**

Subjects: **Liquidity and Sensitivity to Market Risk**

Sections: **510, 540, 660**

## Thrift Activities Regulatory Handbook Update

**Summary:** This bulletin provides updates to the following Thrift Activities Regulatory Handbook Sections:

- 510, Funds Management. Remove existing section 510, Asset/Liability Management, and insert new handbook section 510.
- 540, Investment Securities. Remove existing sections 220, Investment Securities, and 542, Mortgage-Backed Securities and Mortgage-Derivative Products. Insert new handbook section 540.
- 660, Derivative Instruments and Hedging. Remove existing sections 541, Hedging, and 543, Derivative Instruments. Insert new handbook section 660.

**For Further Information Contact:** Your Office of Thrift Supervision (OTS) Regional Office or the Supervision Policy Division of the OTS, Washington, DC. You may access this bulletin at our web site: [www.ots.treas.gov](http://www.ots.treas.gov). If you wish to purchase a handbook and a subscription to the updates, please contact the OTS Order Department at (301) 645-6264.

*Regulatory Bulletin 32-18*

### SUMMARY OF CHANGES

OTS is issuing updates to the following Thrift Activities Handbook Sections. We restructured sections 510, 540, and 660 so we did not include change bars in these sections. We provide a summary of all substantive changes below. These handbook sections are in plain language.

#### **510 Funds Management**

We changed the name of this section from Asset/Liability Management to Funds Management and made the following revisions:

- Moved several topics relating to interest rate risk to Section 650, Interest Rate Risk.
- Moved several topics relating to profitability and management decisions to Section 310, Oversight by the Board of Directors.
- Removed the detailed Asset/Liability Committee requirements and made it clear that OTS does not require Asset/Liability Committees.
- Eliminated obsolete regulatory references.

## 540 Investment Securities

This section combines sections 220, Investment Securities, and 542, Mortgage-Backed Securities and Mortgage Derivative Products. We added the following information:

- New types of investments and changes in regulatory and accounting policy.
- Applicable guidance from TB 13a, Management of Interest Rate Risk, Investment Securities, and Derivative Activities.
- Applicable guidance from CEO Memo No. 130, Underwriting the Purchase of Investment Securities.
- Reporting of investment securities from the rescinded FFIEC Supervisory Policy Statement on Investment Securities and End-User Derivatives Activities. The banking agencies included this information in the necessary call report instructions.
- Appendix A, Total Return; Appendix B, Money Market, Fixed-Income Market, and Equity Market Securities; and Appendix C, Mortgage-Related Securities. We omitted appendices A and B to previous section 220; they are no longer necessary due to a regulatory change.

## 660 Derivative Instruments and Hedging

We combined the Derivative Instruments and Hedging Handbook Sections and moved them from the Liquidity Chapter to the Sensitivity to Market Risk Chapter. We omitted the Hedging General Questionnaire. We added the following information:

- An expanded discussion of Risks of Using Derivatives.
- A discussion of OTS Policy on Derivatives that incorporates Sensitivity Analysis or Stress Testing from TB 13a.
- A discussion of FASB's SFAS No. 133, Accounting for Derivative Instruments and Hedging Activities.



—Scott M. Albison  
*Managing Director, Supervision*

**INTRODUCTION**

Funds management encompasses both the treasury management and asset/liability management functions. The goal of funds management is to achieve an association's targeted risk and return objectives through the effective management of the association's resources. Funds management is the management of an association's balance sheet mix and pricing of assets and liabilities.

Funds management encompasses the coordination and integration of a broad range of functions, policies, and decisions that influence the association's net interest earnings, net interest margin, and net portfolio value, including the following:

- Asset and liability composition
- Loan and deposit pricing
- Funds transfer pricing policies
- Capital structure and capital financing
- Asset securitizations
- Hedging activities.

An effective funds management process should increase the likelihood that an association will achieve its financial objectives. Successful funds management programs typically have four elements:

- Management that understands how to structure the balance sheet and price deposits, loans, and other products to achieve risk and return objectives.
- A clearly defined funds management process that includes sound policies, procedures, and controls.
- Effective information systems that provide the information needed to make sound funds management decisions.
- An effective performance measurement system.

The sophistication of an association's funds management process and systems should be appropriate to the size and complexity of the association.

In assessing an association's funds management, you should:

- Review the policies, procedure, and controls governing the funds management process.
- Determine whether the policies, procedures, and controls are sufficient given the size and complexity of the association.
- Determine whether the association's information/analytical systems are adequate given the size and complexity of the association.
- Review the reports to the board that summarize major decisions and transactions.
- Determine compliance with policies, procedures, and controls governing funds management.

**SETTING FINANCIAL GOALS: THE RISK/RETURN PROFILE****The Risk/Return Tradeoff**

The board of directors and senior management should define the association's overall financial objectives with clearly defined risk and return measures.

An association usually states its overall financial objectives regarding return with accounting-based earnings and profitability measures or with economic or market value-based performance measures. In specifying these goals, a number of specific measurement gauges may be appropriate, either individually or in combination.

The most common accounting-based measures are:

- Return on assets

- Return on equity
- Net Interest Margin.

The economic/market value-based measures that associations commonly use are:

- Net portfolio value
- Market value capitalization
- Total return.

Associations sometimes seek to achieve short-term earnings and profitability targets by accepting greater risk and in the process compromise long-term earnings and market value objectives.

### THE FUNDS MANAGEMENT DECISION-MAKING PROCESS

You should review the funds management policies and procedures.

- Are the policy limits reasonable given the association's financial condition?
- Is management complying with the board-approved policies?
- Are periodic reports to the board adequate?

An integrated, funds management process is important. A piecemeal approach to funds management, or a structure in which one or more of the financial functions are autonomous, will complicate the attainment of a common overall risk/return profile. The funds management process in small associations may be informal, while in larger associations the process may be very formal.

### FUNDS MANAGEMENT FUNCTIONS

Presented below are the functions of the typical funds management process:

- Determine financial objectives and set policy for each of the financial functions.
- Provide periodic reports to the board concerning funds management.
- Periodically review the funds management policies with the board.

- Oversee funding activities.
- Coordinate asset and liability product pricing.
- Evaluate proposed strategies and transactions through sound methodology, including simulation and scenario analysis.
- Oversee investment portfolio management activities.
- Monitor the economic and interest-rate environment, including local economic conditions, prepayment trends, and volatility.
- Identify instruments that the board of directors authorized for use to manage the association's risk exposures.
- Oversee funding and capital financing activities, including debt and equity issuance, and dividend policies.

### PROCEDURES AND CONTROLS

If the funds management process is not functioning properly, then you should focus on the related operating procedures and internal controls. Typically in a large association, extensive documented procedures are necessary to accommodate a large volume of data flow from numerous functional areas to the manager responsible for funds management. In smaller associations such complex procedures are not necessary.

#### Internal Procedures

Associations should document and follow procedures that allow for the smooth and timely flow of data to the funds management function. Flow charts documenting the physical flow of data to and from all departments are usually very informative. Other procedures may be necessary to accommodate the funds management function at certain associations.

#### Internal Control

In small associations, the lack of adequate internal controls may be more of a concern because one individual will often perform multiple functions. For example, the CFO may direct funds management, but may also execute transactions, oversee the disbursement of cash, and authorize the related

accounting entries. Associations should segregate these duties to the extent possible to ensure adequate internal control.

You should verify that internal controls are adequate in the following areas:

- Transaction authorizations – both internal (officers authorized to transact business) and external (approved dealers).
- Position and transaction limits, regulatory requirements or limits, and other guidelines.

**REFERENCES****Code of Federal Regulations (12 CFR)**

- § 563.172 Financial Derivatives
- § 563.176 Interest Rate Risk Management Procedures

**Office of Thrift Supervision Bulletins**

- RB 3a-1 Policy Statement on Growth for Savings Associations
- TB 13a Management of Interest Rate Risk, Investment Securities, and Derivatives Activities
- TB 13a-2 Structured Advances

**FFIEC Policy Statements**

Supervisory Policy Statement on Investment Securities and End-User Derivatives Activities

**Financial Accounting Standards Board (FASB)**

- No. 107 Disclosures About Fair Value of Financial Instruments
- No. 115 Accounting for Certain Investments in Debt and Equity Securities
- No. 133 Accounting for Derivative Instruments and Hedging Activities

**Other References**

Standard & Poor's, Inc. Credit Review

---

# Funds Management Program

---

## Examination Objectives

Ascertain whether the institution has sufficient funds management policies, procedures, and controls.

Verify that management uses appropriate instruments to manage the institution's risk/return profile.

## Examination Procedures

### Level I

### Wkp.Ref.

1. Review scoping materials applicable to funds management. Due to the nature of the funds management review, consult and coordinate with the examiner(s) assigned to review interest rate risk, cash flow and liquidity management, investment management, and related areas. Discuss the scope of the proposed review with the examiner in charge if needed.

---

2. Identify the institution's return objectives and risk constraints.

---

3. Review and evaluate trends in the institution's return on equity, return on assets, and net interest margin. Review the interest rate risk exposure report to evaluate trends in net portfolio value.

---

4. Review the institution's policies, procedures, and controls regarding funds management. Determine whether objectives are reasonable, and whether risk constraints are prudent given the association's capital and earnings characteristics. Determine whether written policies, procedures, and controls are adequate.

---

5. Review applicable board or committee minutes and reports.

---

6. Determine whether the board of directors and management have a comprehensive funds management process and adequately performs the funds management functions.

---

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Funds Management Program

---

**Wkp.Ref.**

7. Evaluate senior management's depth of understanding of the funds management process.  
\_\_\_\_\_  
\_\_\_\_\_
8. Study the flow of data from the functional areas. Review any assumptions the association uses.  
\_\_\_\_\_  
\_\_\_\_\_
9. Review output reports from any analytical models used in funds management. Determine whether they are adequate to fulfill the needs of the funds management function.  
\_\_\_\_\_  
\_\_\_\_\_
10. Determine whether the institution relies excessively on outside vendors or consultants for financial modeling.  
\_\_\_\_\_  
\_\_\_\_\_
11. Review the execution and related documentation of the association's strategies. If there are procedural or control concerns, expand scope to include Level II procedures.  
\_\_\_\_\_  
\_\_\_\_\_
12. Determine compliance with board-approved funds management policies.  
\_\_\_\_\_  
\_\_\_\_\_
13. Review Level II procedures and perform those necessary to test, support, and present conclusions derived from performance of Level I procedures.  
\_\_\_\_\_  
\_\_\_\_\_

### **Level II**

14. Review related internal procedures and controls in detail. Verify the institution follows all procedures and controls.  
\_\_\_\_\_  
\_\_\_\_\_

**Exam Date** \_\_\_\_\_  
**Prepare By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Funds Management Program

---

**Wkp.Ref.**

15. Determine whether any inaccuracies in or misuse of data or assumptions are contributing to inappropriate or poorly executed funds management decisions.

---

16. Review the assumptions used in any financial modeling systems. Determine whether the models are appropriate given the association's size and complexity. Perform on-site review of vendor or consultant models, if necessary.

---

17. Recommend changes in structure, functions, and other aspects of the funds management process, if necessary.

---

18. Ensure that your review meets the *Objectives* of this Handbook Section. State your findings and recommendations on the appropriate work papers and report pages.

---

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

**INTRODUCTION**

**Section 540 updated with the  
issuance of RB 37-51 on 12/15/10.  
Click to link to Section 540.**

Savings associations must manage investment activities prudently and in accordance with the terms of a clear and well-reasoned investment policy. Associations should have diversified portfolios that achieve an appropriate balance between risk and return. In addition, associations should establish appropriate risk management systems and controls to monitor and control investment portfolio activity and performance.

This section outlines the following areas:

- Role of the investment portfolio
- Permissible investments
- The investment process
- Investment risks
- TB 13a requirements and guidance
- Use of investment consultants
- Reporting and accounting for securities
- Collateralized Mortgage Obligation (CMO) issuances

In addition, this section has three appendices that cover the following areas:

Appendix A — Total Return Analysis

Appendix B — Money Market, Fixed-Income Market, and Equity Market Securities

Appendix C — Mortgage-Related Securities

**ROLE OF THE INVESTMENT PORTFOLIO**

A savings association's investment portfolio serves as a source of income and liquidity, as well as a tool for asset/liability management. At many associations, the primary influences of loan

termines the performance of the investment portfolio. If the investment portfolio is weak, the association deploys excess cash inflows in the investment account, and when loan demand is strong, the association draws down the investment account.

Since savings associations can change the composition of an investment portfolio with relative ease, many savings associations also use the investment portfolio to adjust their overall interest rate risk exposure. Similarly, some associations use the investment portfolio to manage diversification, asset quality, and risk-based capital levels.

**PERMISSIBLE INVESTMENTS**

Section 5 of the Home Owners' Loan Act (HOLA) outlines permissible investments for federal savings associations. Applicable OTS regulations include those in Part 560, Lending and Investment.

Subject to certain restrictions and limitations, the following types of investments are permissible investments for savings associations:

- Bankers' bank stock
- Business development credit corporations
- Commercial paper
- Corporate debt securities
- Community development equity investments
- Deposits in insured depository institutions
- U.S. Treasury securities
- Securities and instruments issued by U.S. Government-sponsored enterprises
- Foreign assistance investments
- HUD-insured or guaranteed investments

- Liquidity investments
- Mortgage-backed securities
- National Housing Partnerships Corporation and related partnerships and joint ventures
- Open-end management investment companies registered with the SEC
- Small business investment companies
- Small business-related securities
- State and local government obligations
- State and local housing
- State housing corporations.

See Appendices B, Money Market, Fixed-Income Market, and Equity Market Securities; and C, Mortgage-Related Securities, for information on specific types of investments.

### THE INVESTMENT PROCESS

A sound investment program results from clear policies and objectives, and a sound investment process. The savings association should begin the investment process by determining its objectives for return requirements and risk tolerance. Management should have a clear understanding of how much return they expect the investment portfolio to generate and how much risk they can tolerate. Management should determine risk and return objectives in the context of the various investment constraints faced by the savings association, including those that restrict the list of permissible investments. The association's investment objectives and constraints provide the foundation for developing sound investment policies.

#### Investment Objectives

The savings association should clearly state portfolio objectives. The objectives should focus on the trade-off between risk and return. In formulating risk and return objectives, a savings association should consider the following constraints:

- Liquidity

- Interest rate risk
- Investment horizon
- Taxes
- Laws and regulations
- Other needs.

The investment objectives should be internally consistent and supportive of other efforts such as the interest rate risk policy, funds management, capital plan, and profit plan. The investment policy should fit into the association's overall direction as described in the business plan.

### INVESTMENT RISKS

#### Investment Risk Versus Portfolio Risk

While management should understand the risks associated with individual securities, the decision of whether to buy a security should not rest on the risk of a security alone. Management should evaluate how the addition of the security to the portfolio affects the overall risk and return of the portfolio. The addition of a risky security to a portfolio can either raise or lower portfolio risk depending on the characteristics of the security and the portfolio.

Management should have a clear understanding of how changes in the composition of the investment portfolio affect the risk of the investment portfolio and the overall risk of the savings association. In a sense, the investment portfolio is a portfolio within a larger portfolio that includes all the assets, liabilities, and off-balance sheet contracts of the savings association. The overall risk of the savings association should be the primary consideration of management.

All investments, even U.S. Treasury securities, carry some elements of risk. The primary risks associated with investments are:

- Market risk (including interest rate risk)
- Credit risk
- Prepayment risk
- Liquidity risk

- Operational risk.

**Market Risk**

We define market risk as the potential that the market price of a security will fall due to changes in interest rates, exchange rates, commodity prices, or other market or political conditions.

A primary market risk faced by investors in fixed income securities is interest rate risk. Simply put, interest rate risk is the risk that the price of a security will change when interest rates rise or fall. Almost all fixed income securities decline in price when interest rates rise.

A savings association can control the degree of interest rate risk in its investment portfolio by managing the weighted average maturity of the securities in its portfolio. In general, the longer the weighted average maturity of a portfolio, the greater the interest rate risk. Similarly, a savings association can also control interest rate risk exposure by managing the duration of the portfolio. Duration is a more precise measure of the interest rate sensitivity of a security or a portfolio of securities than weighted average maturity. Duration is a measure of the average time required to receive all the cash flows (interest and principal) from a security or a portfolio of securities. The higher a portfolio’s duration, the greater the losses when interest rates rise. In general, bonds with longer maturities and higher durations carry more risk. For more information on interest rate risk, see Section 650.

**Credit Risk**

Credit risk is the risk that an issuer may default (fail to pay) on principal or interest payments. Savings associations can manage the credit risk of an investment portfolio by using the following techniques:

- Portfolio diversification — investing in a variety of securities with differing credit risks.
- Investment selection — managing the quality of securities in the portfolio.

Savings associations can assess the overall quality of individual bonds by analyzing the financial

condition of the issuer and other related factors. Such factors include the quality of management, competitive conditions in the industry, economic conditions, and so forth.

Many investors rely on credit rating agencies to measure the quality of corporate and municipal bonds. The most widely used bond rating agencies are Standard & Poor’s Ratings Services and Moody’s Investors Service.

Savings associations may only invest in investment grade bonds. Investment grade bonds are those in one of the four highest rating categories by a nationally recognized investment rating service such as Standard & Poor’s and Moody’s. Savings associations, by statute, may not invest in non-investment grade bonds. The table below shows investment-grade and non-investment-grade ratings of these agencies.

**Bond-Quality Ratings**

Moody’s	Standard & Poor’s
Investment Grade: Aaa – Highest Quality Aa A Baa	Investment Grade: AAA – Highest Quality AA A BBB
Non-Investment Grade (“Junk Bonds”) Ba and below	Non-Investment Grade (“Junk Bonds”) BB and below

Savings associations that invest in corporate bonds should obtain current bond ratings before purchase and should review the ratings of their holdings on a regular basis. For more detailed information on bond ratings, see Appendix B, Money Market, Fixed-Income Market, and Equity Market Securities.

For both rated and non-rated issues, associations should develop a system of periodic credit review. Refer to Thrift Activities Regulatory Handbook Section 260, Classification of Assets, for classification of non-investment-grade corporate debt securities.

**Prepayment Risk**

Prepayment risk is the risk that an issuer may repay all or part of the principal on a bond prior to maturity. Prepayment risk is a particular concern with mortgage-backed securities (MBS). Issuers back MBS by mortgages that borrowers can prepay or refinance. When this occurs, the principal of the MBS is reduced and the issuer returns the cash flows from prepayments to the holders of the MBS. The risk is that the bonds will repay at an inopportune time, such as when interest rates are falling. Periods of falling interest rates usually generate widespread prepayments. If the investor wants to reinvest the proceeds from the prepayments, the prevailing yields on newly issued bonds are generally lower than the investor previously earned on the bond that prepaid.

**Liquidity Risk**

Liquidity risk is the risk that a security will be difficult to sell at a reasonable price within a reasonable time. On occasion, the liquidity of entire securities markets can seize up due to financial crisis or panic. Certain types of securities, however, such as those of small firms and securities with unusual features, are inherently illiquid.

By law, savings associations may not invest in corporate securities that they cannot sell with reasonable promptness at a price that corresponds reasonably to the fair value of the security. See 12 CFR §541.7.

**Operational Risk**

Operational risk is the risk that deficiencies or failures in personnel, technology, or systems will result in unexpected losses.

**Settlement Risk**

Settlement is an arrangement between parties for payment or receipt of cash or securities. Settlement risk is the possibility that a counterparty will fail to honor its obligation to deliver cash or securities at settlement, and is a key operational risk in managing investment portfolios.

The careful selection of brokers and dealers can mitigate settlement risk. The selection process should include a review of each firm's financial statements and an evaluation of its ability to honor its commitments.

An inquiry into the general reputation of the dealer is also appropriate. This includes review of information from state or federal securities regulators and industry self-regulatory organizations. For example, the National Association of Securities Dealers provides public information concerning any formal enforcement actions against the dealers, their affiliates, and associated personnel.

**TB 13a REQUIREMENTS**

You should ensure that the savings association conducts its investment activities in accordance with Thrift Bulletin 13a. Part III of TB 13a identifies, in broad terms, the types of analysis a savings association should undertake before making securities investments. A savings association should exercise diligence in assessing the risks and returns associated with investment securities, including expected total return. For a discussion of total return, see Appendix A, Total Return Analysis. As a matter of sound practice, before taking an investment position, an institution should:

- Ensure that the investment is legally permissible. Review the terms and conditions of the investment. Ensure that the investment is allowable under the institution's investment policies and is consistent with the institution's objectives and liquidity needs. Exercise diligence in assessing the market value, liquidity, and credit risk of the investment.
- Conduct a pre-purchase portfolio sensitivity analysis for any significant investment (see TB 13a for details).
- Conduct a pre-purchase price sensitivity analysis of any complex security before taking a position (see TB 13a for details).

TB 13a states that, "Investments in complex securities and the use of financial derivatives by associations that do not have adequate risk meas-

urement, monitoring, and control systems may be viewed as an unsafe and unsound practice.”

### Risk Reduction

In general, savings associations should limit investments in complex securities with high price sensitivity (see TB 13a) to transactions and strategies that lower interest rate risk. Any savings association that invests in such securities for a purpose other than that of reducing portfolio risk should do so in accordance with safe and sound practices.

### Sound Practices for Market Risk Management

You should assess the overall quality and effectiveness of the savings association’s risk management process as it relates to investment activities. In making this assessment, you should review TB 13a, Appendix B, *Sound Practices for Market Risk Management*. This section summarizes the key elements of that Appendix.

#### *Board and Senior Management Oversight*

The board and senior management should understand their oversight responsibilities regarding the management of investment activities. Board oversight need not involve the entire board, but may be carried out by an appropriate subcommittee of the board. In particular, the board, or an appropriate subcommittee of board members, should take the following steps:

- Approve broad objectives and strategies and major policies governing investment activities.
- Provide clear guidance to management regarding the board’s tolerance for risk.
- Ensure that senior management takes steps to measure, monitor, and control risk.
- Review periodically information that is sufficient in timeliness and detail to allow the board to understand and assess the institution’s investment activities.
- Assess periodically compliance with board-approved policies, procedures, and risk limits.

- Review policies, procedures, and risk limits at least annually.

Senior management should ensure the effective management of the institution’s operations, establish and maintain appropriate risk management policies and procedures, and ensure that resources are available to conduct the institution’s activities in a safe and sound manner. In particular, senior management should take the following steps:

- Ensure that effective risk management systems are in place and properly maintained.
- Establish and maintain clear lines of authority and responsibility for managing investment activities.
- Ensure that competent staff with technical knowledge and experience consistent with the nature and scope of their activities conducts the institution’s operations and activities.
- Provide the board of directors with periodic reports and briefings on the institution’s investment activities and risk exposures.
- Review periodically the institution’s investment risk management systems, including related policies, procedures, and risk limits.

#### *Adequate Policies and Procedures*

Savings associations should have written policies and procedures governing investment activities. Such policies and procedures should be consistent with the institution’s strategies, financial condition, risk-management systems, and tolerance for risk. An institution’s policies and procedures (or documentation issued pursuant to such policies) should do the following:

- Identify the staff authorized to conduct investment and derivatives activities, their lines of authority, and their responsibilities.
- Identify the types of authorized investments and investment instruments.
- Specify the required type and scope of pre-purchase analysis for various types or classes of investment securities.

- Define, where appropriate, position limits and other constraints on each type of authorized investment, including constraints on the purpose(s) for which such instruments may be used.
- Identify dealers, brokers, and counterparties that the board or a board-designated committee authorizes the institution to conduct business with and identify credit exposure limits for each authorized entity.
- Ensure that contracts are legally enforceable and documented correctly.
- Establish a code of ethics and standards of professional conduct applicable to personnel involved in investment and derivatives activities.
- Define procedures and approvals necessary for exceptions to policies, limits, and authorizations.

#### *Monitoring and Reporting*

Savings associations should have accurate, informative, and timely management information systems, both to inform management and to support compliance with investment policy. The board of directors and senior management should receive reports for monitoring investment risk on a timely basis.

The board of directors and senior management should monitor investment activities on a regular basis. The types of reports prepared for the board and various levels of management will vary depending on the size and complexity of the saving's associations operations.

#### *Record Keeping*

Savings associations must maintain accurate and complete records of all securities transactions according to 12 CFR § 562.1. In particular, savings associations should retain any analyses (including pre- and post-purchase analyses) relating to investment transactions. A savings association should make these records available to you upon request.

#### *Internal Controls*

Savings associations should have adequate internal controls over investment activities. A fundamental component of the internal control system involves regular independent reviews and evaluations of the effectiveness of the system.

Internal controls should promote effective and efficient operations, reliable financial and regulatory reporting, and compliance with relevant laws, regulations, and institutional policies. An effective system of internal control should include the following elements:

- Effective policies, procedures, and risk limits.
- An adequate process for measuring and evaluating risk.
- Adequate risk monitoring and reporting systems.
- A strong control environment.
- Continual review of adherence to established policies and procedures.

Savings associations should review their system of internal controls at least annually. Individuals independent of the function being reviewed should conduct the review. Reviewers should report results directly to the board. You should consider the following factors when reviewing an institution's internal controls:

- Does the association maintain risk exposures at prudent levels?
- Does the association employ the risk measures that are appropriate to the nature of the portfolio?
- Does the association have board and senior management actively involved in the risk management process?
- Does the association document policies, controls, and procedures adequately?
- Do association personnel follow the established policies and procedures?

- Does the association adequately document the assumptions of the risk measurement system?
- Does the association accurately process data?
- Is the risk management staff adequate?
- Has the association changed risk limits since the last review?
- Have there been any significant changes to the institution's system of internal controls since the last review?
- Are internal controls adequate?

#### *Analysis and Stress Testing*

Management should thoroughly analyze the various risks associated with investment securities before making an investment. (See TB 13a, Part III.) In addition, management should periodically review the portfolio.

Before taking a position in any complex securities, management should analyze how the future direction of interest rates and other changes in market conditions could affect the instrument's cash flows and market value. In particular, management should understand the following elements of the complex security:

- The structure of the instrument.
- The best case and worst-case interest rate scenarios for the instrument.
- How the existence of any embedded options or adjustment formulas might affect the instrument's performance under different interest rate scenarios.
- The conditions, if any, under which the instrument's cash flows might be zero or negative.
- The extent to which price quotes for the instrument are available.
- The instrument's universe of potential buyers.
- The potential loss on the instrument (that is, the potential discount from its fair value) if sold prior to maturity.

- That the issuer, together with any guarantors, has the financial capacity, and willingness to meet the repayment terms of the investment.
- That analysis of the legal structure of the investment affirms the institution's authority to make such investment.
- How the investment is expected to perform under various loss and interest rate scenarios, the impact on the overall risk profile of the institution and how all covenants of any trust agreement apply to the senior tranches.
- The effect of the payment priority should the security be divided into separate tranches with unequal payments.
- That a review and analysis of the collateral managers includes historical performance to document investment prudence.

#### *Evaluation of New Products, Activities, and Financial Instruments*

New investment products and activities can entail significant risk. Senior management should evaluate the risks inherent in new products and activities to ensure that they are subject to adequate review procedures and controls. The board, or an appropriate committee, should approve major new initiatives involving new products and activities.

Before authorizing a new initiative, the review committee should review the following items:

- A description of the relevant product, activity, or instrument.
- An analysis of the appropriateness of the proposed initiative in relation to the institution's overall financial condition and capital levels.
- Descriptions of the procedures to measure, monitor, and control the risks of the proposed product, activity, or instrument.

Management should ensure that adequate risk management procedures are in place before undertaking any significant new initiatives.

**USE OF INVESTMENT CONSULTANTS**

Some savings associations use consultants in the investment process. The association should limit the role of consultants and brokers to advising management and executing transactions approved by management. The savings association should not delegate investment decision-making authority to third parties, including brokers or consultants. Ceding decision-making power to a consultant or broker represents an unsafe and unsound practice.

Any savings association that engages a consultant must have a formal written contract that covers the following elements:

- The types of assets that the consultant or broker can buy and sell on a pre-approved basis.
- The requirement for authorization from the board or senior management for any transactions not pre-approved in the contract.
- The documentation and rationale for each trade made for the savings association.
- The requirement of the consultant or broker to maintain records and submit evidence that they obtain prices from several brokers for all transactions, particularly if the consultant is a broker.
- Compensation programs that do not encourage churning (excessive trading activity) of portfolios or short-term strategies that are not in the savings association's best interest.
- The right of the savings association or its agent to audit the records of transactions executed for the savings association.
- The authority of OTS to examine the records of the consultant or broker that pertain to the transactions for the savings association.

If a savings association uses consultants, it should establish internal policies, controls, and procedures that include the following criteria:

- Establish limitations on the assets managed by consultants with consideration to the types

and level of risk of the assets authorized for purchase.

- Monitor compliance with the limitations established by the board.
- Require senior management personnel or an independent agent to periodically audit the consultant or broker to ensure that the firm is buying and selling securities at the most favorable price for the savings association.
- Guarantee that the savings association always has a perfected security interest on securities bought for its account.

The savings association should measure the performance of the consultant against a relevant benchmark (for example, a standard bond index). In measuring the performance (total return) of the consultant against a benchmark, the association should factor in fees and expenses charged by the consultant. Savings associations should note that consultants and contractors may be subject to OTS enforcement actions as provided for by Section 8 of the FDIA, as amended by FIRREA.

Senior management personnel should supervise the activities of the consultant to ensure conformity to the savings association's investment, liquidity, and interest rate risk management plan. Management must keep the board of directors informed of the performance of the consultant, through periodic reports.

**REPORTING AND ACCOUNTING FOR SECURITIES**

Part 562 of the OTS regulations, require savings associations to record and report their financial condition according to GAAP. This responsibility includes the obligation to properly account for the savings association's securities under GAAP.

Savings associations must categorize each security as trading, available-for-sale (AFS), or held-to-maturity consistent with FASB Statement No. 115, Accounting for Certain Investments in Debt and Equity Securities, as amended. A savings association should determine whether securities are for its trading accounts, AFS, or held-to-maturity at the time it purchases or originates the

securities. The savings association should not record securities in a suspense account until it determines the appropriate category. Management should periodically reassess its security categorization decisions to ensure they remain appropriate.

### Trading Assets

Savings associations should classify as trading assets securities that the association intends to hold principally for the purpose of selling them in the near term. Trading activity includes active and frequent buying and selling of securities for the purpose of generating profits on short-term fluctuations in price. Savings associations must report securities held for trading purposes at fair value; and recognize unrealized gains and losses in current earnings and regulatory capital.

### Held-to-Maturity

Held-to-maturity securities are debt securities that the savings association has the positive intent and ability to hold to maturity. Savings associations generally report held-to-maturity securities at amortized cost.

### Available-for-Sale

Savings associations must report securities not categorized as trading or held-to-maturity as available-for-sale. Savings associations must report AFS securities at fair value on the balance sheet. Savings associations must exclude unrealized gains and losses from earnings and report them in a separate component of equity capital.

Section 260, Classification of Assets, states that savings associations holding noninvestment grade securities with maturities of July 1, 1994, or later must classify these securities as held for sale since they do not have the ability to hold them to maturity.

### Changes in Categorization

If a savings association judges a decline in fair value of a held-to-maturity or AFS security to be other than temporary, the cost basis of the individual security shall be written down to fair value as a new cost basis and include the amount of the

write-down in earnings. For example, if it is probable that a savings association will be unable to collect all amounts due according to the contractual terms of a debt security not impaired at acquisition, an other-than-temporary impairment has occurred.

Sales from the held-to-maturity portfolio could call the intent to hold to maturity into question and result in tainting the remaining portfolio. The savings association may need to redesignate the portfolio as AFS and be subject to mark-to-market adjustments. As a result, savings associations normally limit portfolio restructuring activities to AFS portfolios.

### Proper Categorization of Securities

The proper categorization of securities ensures that savings associations promptly recognize trading gains and losses in earnings and regulatory capital.

### Trading Activity

While designating certain assets for trading can be consistent with prudent investment securities management, you may consider certain practices speculative or otherwise abusive. OTS and the other banking agencies consider the following practices to be trading activities.

#### *Gains Trading*

Gains trading is the purchase of a security and the subsequent sale of the same security at a profit after a short holding period. Savings associations typically retain securities acquired for this purpose that the association cannot sell at a profit in the AFS or held-to-maturity portfolio. Savings associations may use gains trading to defer recognition of losses because unrealized losses on AFS and held-to-maturity debt securities do not directly affect regulatory capital. Generally, savings associations do not report unrealized losses in income until the security is sold. A pattern of selling above-market securities at a gain while retaining below-market securities overstates the institution's financial health.

*When-Issued Securities Trading*

When-issued securities trading is the buying and selling of securities in the period between the announcement of an offering and the issuance and payment date of the securities. A purchaser of a when-issued security acquires the risks and rewards of owning a security and may sell the when-issued security at a profit before having to take delivery and pay for it. Because savings associations intend such transactions to generate profits from short-term price movements, savings associations should categorize such transactions as trading.

**Pair-offs**

Pair-offs are security purchase transactions that are closed-out or sold at, or prior to, settlement date. In a pair-off, a savings association commits to purchase a security. Then, prior to the predetermined settlement date, the savings association will pair-off the purchase with a sale of the same security. Pair-offs are settled net when one party to the transaction remits the difference between the purchase and sale price to the counter party. Pair-offs may also involve the same sequence of events using swaps, options on swaps, forward commitments, options on forward commitments, or other off-balance sheet derivative contracts.

*Extended Settlements*

In the U.S., regular-way settlement for federal government and federal agency securities (except mortgage-backed securities and derivative contracts) is one business day after the trade date. Regular-way settlement for corporate and municipal securities is three business days after the trade date. For mortgage-backed securities, it can be up to 60 days or more after the trade date. Securities dealers may offer the use of extended settlements to facilitate speculation on the part of the purchaser, often in connection with pair-off transactions. Savings associations should report as trading assets securities acquired through the use of a settlement period in excess of the regular-way settlement periods to facilitate speculation.

*Repositioning Repurchase Agreements*

A repositioning repurchase agreement is a funding technique offered by a dealer in an attempt to enable a savings association to avoid recognition of a loss.

A repositioning repurchase agreement occurs when a savings association enters into a when-issued trade or a pair-off (which may include an extended settlement) that the savings association cannot close out at a profit on the payment or settlement date. The dealer provides financing in an effort to fund its speculative position until the security can be sold at a gain. The savings association purchasing the security typically pays the dealer a small margin that approximates the actual loss in the security. The dealer then agrees to fund the purchase of the security, typically by buying it back from the purchaser under a resale agreement. The savings association should report as trading assets any securities acquired through a dealer financing technique such as a repositioning repurchase agreement that the association uses to fund the speculative purchase of securities.

*Short Sales*

A short sale is the sale of a security that the savings association does not own. The purpose of a short sale generally is to speculate on a fall in the price of a security.

*Adjusted Trading*

Adjusted trading is not acceptable under any circumstances. Adjusted trading involves the sale of a security to a broker dealer at a price above the prevailing market value. Simultaneously, the savings association purchases and books a different security, frequently a lower-rated or lower quality issue or one with a longer maturity, at a price above its market value. Thus, the savings association reimburses the dealer for losses on the purchase from the savings association and ensures the dealer a profit. Such transactions inappropriately defer the recognition of losses on the security sold and establish an excessive cost basis for the newly acquired security. Consequently, the banking agencies prohibit such transactions. In addition, these transactions may

be in violation of 18 USC §§ 1001, False Statements or Entries, and 1005, False Entries.

### Limits on MBS Trading Activity

Savings associations may buy and sell securities to manage risk or to improve profitability. Active management of an MBS portfolio may presume an ability to anticipate changes in market interest rates. In practice, interest rates are notoriously difficult to predict. Active portfolio management requires outguessing the market consensus sufficiently to cover transaction costs. Historical data suggests that very few investment professionals can outperform a passive fixed income indexing strategy with active portfolio management.

OTS allows savings associations to use an MBS portfolio for trading purposes only in limited cases and subject to certain safeguards. The institution should have the core earnings and capital to absorb potential trading losses. The savings association should also possess the financial expertise and management information systems to monitor and evaluate trading activity effectively.

You should determine the amount of MBS trading activity by reviewing the volume of trades transacted since the previous examination. You should quantify the volume and compare it with the change in portfolio balances since the previous examination. Calculate portfolio turnover ratio by comparing the dollar amount of securities sold, by type, with the balance of the portfolio at the beginning of a period. For example, if the savings association sold \$10 million of MBSs all with the same coupon rate during the quarter, compared with the balance of \$10 million of this coupon rate at the beginning of the quarter, the turnover ratio would be 100 percent. You can make these comparisons on a monthly or annual basis.

There is no threshold of turnover that automatically indicates that the MBS portfolio is part of a trading portfolio. You should review the composition of the trades and determine the rationale for the transactions.

While designating certain assets for trading can be consistent with prudent portfolio management,

you may consider certain practices speculative or otherwise abusive.

### COLLATERALIZED MORTGAGE OBLIGATION (CMO) ISSUANCES

Some savings associations issue CMOs. The issuer may retain a subordinate interest in the CMO as a credit enhancement to outside investors. The gain recognized on the sale depends on the relative fair values assigned to the sold and retained tranches. The higher the value assigned to the retained pieces, the lower the cost basis for the securitized assets, and the larger the recognized gain on sale. There is often no liquid market for the retained securities, so their fair values may be difficult to verify. You must analyze the savings association's valuation assumptions to ensure that the savings association bases its gain on sale upon the economics of the transaction rather than merely an inflated value assigned to retained tranches. Particularly important variables include the assumed prepayment rate, loss rate on the underlying mortgages, and required rate of return (discount rate).

Consult Appendix C of this section and Section 560, Deposits/Borrowed Funds, for a more detailed discussion of CMO issuances.

### REFERENCES

#### United States Code (12 USC)

- § 1464(c)(1) Loans for Investments Without Percentage of Asset Limitation
- § 1464(c)(2) Loans or Investments Limited to Stated Percentage of Assets or Capital
- § 1464(c)(4) Other Loans and Investments

#### Code of Federal Regulations (12 CFR)

- § 560.40 Commercial Paper and Corporate Debt Securities
- § 560.42 Government Obligations
- § 560.93 Lending Limitations
- § 562.2 Regulatory Reports
- § 563.172 Financial Derivatives
- Part 566 Liquidity

**Office of Thrift Supervision Bulletins and Memoranda**

RB 3b Policy Statement on Growth for Savings Associations

TB 13a Management of Interest Rate Risk, Investment Securities, and Derivative Activities

TB 13a-2 Structured Advances

**FFIEC Policy Statement**

Supervisory Policy Statement on Investment Securities and End-User Derivatives Activities (April 23, 1998)

**Financial Accounting Standards Board, Statement of Financial Accounting Standards (SFAS)**

No. 91 Accounting for Nonrefundable Fees and Costs Associated with Originating or Acquiring Mortgages with Initial Direct Cost of Leases

No. 107 Disclosures about Fair Value of Financial Instruments

No. 115 Accounting for Certain Investments in Debt and Equity Securities

No. 125 Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities

**Emerging Issues Task Force (EITF)**

No. 86-38 Implications of Mortgage Prepayments on Amortization of Servicing Rights

**Other References**

Committee on Sponsoring Organizations of the Treadway Commission (COSO), Internal Control Issues in Derivatives Usage: An Information Tool for Considering the COSO Internal Control – Integrated Framework for Derivatives Applications.

## Examination Objectives

To determine the adequacy of the savings association's policies, procedures, and internal controls regarding its investments.

To determine if the savings association's investment policy, interest rate risk policy, funds management policy, and business plan adequately describe the type and level of authorized investments.

To determine if the savings association documents and describes the rationale for all investments.

To determine if the savings association's investment policy adequately describes the purchase.

To determine if these investment policies adequately describe the current portfolio, interest rate risk structure, and investment objectives.

**Section 540 updated with the  
issuance of RB 37-51 on 12/15/10.  
Click to link to Section 540.**

To determine the prudence of risk management strategies through evaluation of practices and procedures.

To determine if the savings association's officers and employees are operating in conformance with the established policies and whether these individuals have the necessary expertise to execute the authorized strategies.

To determine the overall quality of the savings association's investments and assess the effect of the portfolio quality on the overall soundness of the savings association.

To determine if the savings association is in compliance with the regulations and whether the savings association records transactions according to generally accepted accounting principles (GAAP).

To determine the scope and adequacy of the internal and external audit functions considering the type and complexity of the savings association's investments.

To determine if the savings association incurred any significant prepayment risk from its investment in mortgage-backed securities (MBSs) or mortgage-derivative products (MDPs).

To determine if the savings association actively monitors its investments.

To determine if the savings association, at least quarterly, obtains or performs analysis of each complex security purchased with board of director approved techniques demonstrating that the security reduces overall interest rate risk.

To determine if the savings association engages in speculative trading.

To evaluate investment and trading activities to determine if the volume and number of transactions have any broad and potentially adverse effect on the savings association's financial health.

To summarize findings and initiate corrective actions when there are deficiencies.

## Examination Procedures

### Level I

#### Wkp.Ref.

1. Review scoping materials applicable to this program. If another examiner performed the review of scoping materials, obtain a written or oral summary of the review(s) of items concerning this program.
2. Determine if the savings association corrected any transactions or policies and procedures subject to any of the following:
  - Previous examination report comments and previous examination exceptions.
  - Independent audit exceptions.



## Investment Securities Questionnaire

	Yes	No		Yes	No
• The safekeeping location of the security?			• Did the board of directors approve the investment? .....		
• Pledged or unpledged status of the security? .....			• Does the savings association analyze the investment prior to purchase, including the estimated yields under various interest-rate and prepayment scenarios?		
• Premium amortization? .....			• Does the savings association document the expected yield and the prepayment assumptions used? .....		
• Discount accretion? .....			• Are the initial prepayment assumptions reasonable considering the interest rate on the underlying collateral when compared with prevailing mortgage interest rates? .....		
• Interest earned, collected, or accrued? ..			23. Does the savings association periodically adjust the yield or book value of an MBS or MDP based upon changes in the prepayment experience of the underlying collateral? .....		
16. Does the savings association perform a price sensitivity analysis of complex securities prior to purchase? .....			24. Does the savings association purchase commercial MBSs? If so, review the following question:		
17. Does the savings association perform an internal analysis of its investment securities at least quarterly? .....			• Do any of these securities have teaser rates? .....		
18. Does the savings association obtain periodic market valuations for the following investment securities:			• If so, how close was the current interest rate to the lifetime cap:		
• Thinly traded investments? .....			_____		
• Issues not quoted daily on major markets? .....			_____		
19. Does the savings association perform credit analyses independently of the investment department? .....			25. Does the savings association issue CMOs or MDPs through a subsidiary? .....		
20. Does the association obtain bond ratings from any of the well-known bond rating services? .....			26. Did the savings association purchase the senior interest of a senior/subordinated security structure? If so, answer the following questions:		
• Which services? .....			• What was the investment rating? .....		
_____			_____		
21. Does the savings association appropriately classify investment securities? .....					
22. Did the savings association purchase any SMBs or the residual interest in an MDP? If so:					

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

## Investment Securities Questionnaire

	Yes	No		Yes	No
<ul style="list-style-type: none"> <li>• What was the underlying collateral? .....</li> </ul> <hr style="width: 30%; margin-left: 0;"/>			32. Does the savings association reconcile subsidiary records at least monthly? .....		
27. Did the savings association purchase the subordinated interest in the security? .....			<ul style="list-style-type: none"> <li>• How often? .....</li> <li>• Does the savings association test them for accuracy? .....</li> </ul>		
28. Is there adequate segregation between the individuals responsible for executing the transactions, accounting for the transactions and transferring funds? .....			33. Does an independent party, not connected with the transaction, review commitments and advices? .....		
29. Do trade tickets contain the following information:			34. Does the savings association verify delivery or safekeeping records? .....		
<ul style="list-style-type: none"> <li>• Trade date? .....</li> <li>• Settlement date? .....</li> <li>• Purchase or sale transaction? .....</li> <li>• Contract description? .....</li> <li>• Quantity? .....</li> <li>• Price? .....</li> <li>• Reason for trade? .....</li> <li>• Identity of person conducting transaction? .....</li> </ul>			35. Who has custody or control of securities? .....		
			36. Does the savings association obtain comparative price quotes from at least two broker/dealers other than the broker/dealer that executed the transaction? .....		
			37. Does the savings association use reputable dealers? .....		
			38. Is there a concentration of activity with one broker/dealer? .....		
			39. Does the association properly safeguard the physical securities? .....		
30. Does someone other than the person who authorizes, executes, or controls the securities record the transaction? .....			40. Does the savings association have procedures in place to ensure proper access and control? .....		
31. Does someone other than the person with custody or control of securities post transaction records? .....			41. Does the savings association review safekeeping records for accuracy? .....		

Exam Date: \_\_\_\_\_  
 Prepared By: \_\_\_\_\_  
 Reviewed By: \_\_\_\_\_  
 Docket #: \_\_\_\_\_



## TOTAL RETURN ANALYSIS

This appendix discusses total return analysis and shows how to measure the expected return of fixed-income securities. In evaluating the return of a portfolio of fixed-income securities, investors use yield to maturity (YTM) or yield to call (YTC), as selection criteria, to determine the expected investment return.

**Section 540 updated with the  
issuance of RB 37-51 on 12/15/10.**

**[Click to link to Section 540.](#)**

Investment decisions made using YTM or YTC can lead to investments with lower total returns depending on the following variables:

- Changes in reinvestment rates.
- End-of-period required yields.
- Length of the investment horizon.

However, there is an important caveat. In computing total returns based on scenario analysis, investors should be aware that total return estimates will only reflect investment returns if expectations regarding reinvestment rates and end-of-period yields turn out to be correct.

### Background

Both the Federal Financial Institutions Examination Council (FFIEC) and the Office of Thrift Supervision (OTS) issued policy guidance that recommends institutions conduct a total return analysis in assessing the effects of interest rate changes on the returns associated with investment securities and financial derivatives prior to taking a position in these financial instruments. The 1998 FFIEC policy statement states: "The agencies agree that the concept of total return can be a useful way to analyze the risk and return tradeoffs for an investment. This is because the analysis does not focus exclusively on the stated yield to maturity. Total return analysis, which includes income and price changes over a specified investment horizon, is similar to stress testing securities under various interest rate scenarios. The agencies' supervisory emphasis on stress testing has, in fact, implicitly considered total return. Therefore the agencies endorse the use of total return analysis as a useful supplement to price sensitivity analysis for evaluating the returns for an individual security, the investment portfolio, or the entire institution." In Thrift Bulletin 13a, issued December 1998, OTS states: "Management should exercise diligence in assessing the risks and returns (including expected total return) associated with investment securities and financial derivatives."

### Conventional Measures of Investment Return

The price of a bond is equal to the present value of the bond's expected cash flows. By definition, the yield, or internal rate of return, is that interest rate that equates the present value of a bond's cash flows to its current market price. As stated earlier, YTM and YTC are two frequently used measures of return (or yield) on fixed-income securities. YTM is used to price and trade non-callable bonds, while YTC is used to price and trade callable bonds.

YTM is the internal rate of return on a non-callable bond that is held until maturity. In using this yield measure, one assumes that the security is held until maturity and that all cash flows can be reinvested at the same constant YTM. YTC is the internal rate of return on a callable bond that is held until either the first call or first par call date. In using this yield measure, one assumes that the security is held until being called by the issuer and that all cash flows can be reinvested at the same constant YTC.

Both of these return measures have several important drawbacks:

- Investors typically do not hold fixed-income investments until these investments mature or are called.
- Interim cash flows cannot be reinvested at the assumed constant yields.
- It is not possible to compare the likely returns on investments with different maturities or more complex return/risk profiles.

### Total Return Analysis in Theory

Total return analysis avoids the shortcomings associated with using the two conventional yield measures, YTM and YTC, and provides an investor with a better measure of the expected return on fixed-income investments. The total return (also known as the horizon or total holding-period return) accounts for the three sources of potential dollar return on a bond:

- Coupon interest payments,
- Capital gain or loss when bond matures, is sold, or called, and
- Income from reinvestment of coupon interest payments (interest-on-interest income).

Therefore, to calculate the total return for a non-callable bond, an investor chooses an investment horizon or holding period, a reinvestment rate, and a selling price for the bond at the end of the investment horizon (that is, end-of-period required return). Based on the values chosen for these parameters, the total return calculation is straightforward. First, calculate total coupon payments plus interest-on-interest income for the assumed reinvestment rate over the given investment horizon using the following expression:

where

$$\text{Coupon plus interest - on - interest} = \text{Coupon} \left[ \frac{[(1+r)^h - 1]}{r} \right]$$

$h$  = length of investment horizon, and  
 $r$  = assumed reinvestment rate.

Second, calculate the predicted sales price of the bond at the end of the investment horizon. Third, calculate total future dollars derived from the bond over the holding period by summing total coupon payments, reinvestment income, and the predicted sales price. Finally, substitute this value into the following expression to obtain the total return:

$$y_h = \left[ \frac{\text{Total future dollars}}{\text{Purchase price of bond}} \right]^{1/h} - 1$$

where  $r$  and  $h$  are defined as above, and

Total future dollars = Coupon payments + Interest-on-interest income + Sales price.

For example, to obtain the total return on a bond-equivalent basis for a bond with semiannual coupon payments, the semiannual total return calculated using the above expression would be multiplied by a factor of two.<sup>1</sup>

### Total Return Analysis in Practice

There are three different approaches an investor or portfolio manager can use to calculate total return:

- Subjective forecasts of the reinvestment rate and required yield at the end of the investment horizon.
- Implied forward rates from the yield curve (for instance, U. S. Treasury or LIBOR yield curves) to determine the reinvestment rates and the yield on a bond at the end of the investment horizon. This approach to total return analysis produces *an arbitrage-free total return* because the calculation is based on the market's expectations of the reinvestment rate and end-of-period required yield.
- Scenario analysis. Scenario analysis involves specifying different possible values for the reinvestment rate and the required yield at the end of a given investment horizon, and then calculating the total return associated with each scenario.

Of the three approaches, total return analysis based on scenario analysis is the best approach because it allows an investor, or portfolio manager, to measure how sensitive a bond's expected performance is to differing reinvestment rates and end-of-period required yields. One can also use total return analysis to compare the expected returns of a bond for investment horizons of varying lengths. In the two examples that follow, scenario analysis is used to compare:

- The total returns for a bond using two different investment horizons.
- The total returns for two bonds of different maturities.

Assess the effect on a bond's total return by varying the length of the investment horizon using scenario analysis. Assume Bond A is a 9 percent coupon, 20-year non-callable bond with a current market price of \$109.90 and a yield to maturity of 8 percent. Tables 1 and 1A show scenarios for the reinvestment rate and end of period required yields for Bond A for a three-year and ten-year investment horizon, respectively.

**Table 1**  
Scenario Analysis for Bond A's Total Return

	Required Yield at End of 3-Year Investment Horizon (%)		
	6.0	8.0	10.0
Reinvestment Rate (%)			
4.0	13.36	7.78	3.06
5.0	13.44	7.87	3.16
6.0	13.53	7.97	3.26

<sup>1</sup> This discussion draws on material from Frank J. Fabozzi, editor, *The Handbook of Fixed Income Securities*, 5<sup>th</sup> Edition, 1997, Chapter 4. See this chapter for further discussion of the total return concept.

**Table 1A**  
Sensitivity of Bond A's Total Return to Investment Horizon

Reinvestment Rate (%)	Required Yield at End of 10-Year Investment Horizon (%)		
	6.0	8.0	10.0
4.0	7.59	6.88	6.24
5.0	7.85	7.16	6.53
6.0	8.11	7.43	6.82

As shown in the tables, there are three different reinvestment rates, 4, 5, and 6 percent, and three different end-of-period required yields, 6, 8, and 10 percent. In both tables, for each combination of reinvestment rate and end-of-period yield, there is a total return estimate for Bond A. As shown in the two tables, the total return estimates vary substantially across the two investment horizons. The differences in the total return estimates illustrate the effect that the choice of investment horizon has on a bond's expected return since the relative importance of the reinvestment rate and end-of-period required return change is related to investment horizon. For short investment horizons, reinvestment income is small, but it increases in size as the investment horizon lengthens.

The second example compares the total returns for two bonds of different maturities. The first bond, Bond A, is the same bond used in the previous example. The second bond, Bond B, is a 7.25 percent coupon, 14-year non-callable bond with a current market price of \$94.55 and a yield to maturity of 7.9 percent.<sup>2</sup> In comparing the total returns for the two bonds below, the investment horizon is set to three years. Based on yield to maturity, Bond A appears to be a better investment than Bond B because of Bond A's higher yield to maturity. However, as the example shows convincingly, yield to maturity is not a reliable measure of expected investment return.

Table 1 and Table 2 show various scenarios for the reinvestment rate and end of period required yields for Bond A and Bond B, respectively. There are three different reinvestment rates, 4, 5, and 6 percent, and three different end of period required yields, 6, 8, and 10 percent. These are the same values used in the previous example.

**Table 2**  
Scenario Analysis for Bond B's Total Return

Reinvestment Rate (%)	Required Yield at End of 3-Year Investment Horizon (%)		
	6.0	8.0	10.0
4.0	12.00	7.50	3.48
5.0	12.08	7.58	3.57
6.0	12.16	7.67	3.67

The total return estimates for both bonds vary substantially across the different rate scenarios. For Bond A, these estimates range from a maximum value of 13.53 percent to a minimum value of 3.06 percent. For Bond B, these estimates range from a maximum value of 12.16 percent to a minimum value of 3.48 percent. This example shows the high degree of sensitivity of a bond's expected return to different values for reinvestment rates and end-of-period required yields.

<sup>2</sup> This example is adapted from Fabozzi, *The Handbook of Fixed Income Securities*, 5<sup>th</sup> Edition, pages 72-75.

If a portfolio manager currently owned Bond B, the higher yield to maturity on Bond A might induce the manager to swap Bond A for Bond B in a pure yield pickup swap transaction. However, Tables 1 and 2 show that the likely returns on both bonds are sensitive to what happens to interest rates, despite the higher promised yield to maturity for Bond A. To see this more clearly, Table 3 shows the total return for Bond A minus the total return for Bond B in basis points.

**Table 3**  
**Bond A's Total Return Minus Bond B's Total Return (in Basis Points)**

Required Yield at End of 3-Year Investment Horizon (%)			
	6.0	8.0	10.0
Reinvestment Rate (%)			
4.0	136	28	-42
5.0	137	29	-41
6.0	137	30	-41

Table 3 shows that for required yields of 6 and 8 percent, Bond A's total return exceeds that of Bond B's for all three reinvestment rates. However, for a required yield of ten percent, the situation reverses dramatically, with Bond B's total return exceeding that of Bond A. These results suggest that investment decisions based only on stated yield to maturity will not produce the best total returns as interest rates change. The results of this simple example demonstrate the importance of conducting a stress test over various interest rate scenarios when evaluating the expected return on investment securities before taking positions in these financial instruments.

---

## MONEY MARKET, FIXED-INCOME MARKET, AND EQUITY MARKET SECURITIES

There are investment opportunities in each of the three major areas that make up the money and capital markets:

- Money market
  - Fixed-income market
  - Equity market.
- Section 540 updated with the  
issuance of RB 37-51 on 12/15/10.  
Click to link to Section 540.**

### Money Market

The money market is the arena where financial institutions and other businesses adjust their liquidity positions. This primarily consists of debt instruments with a remaining maturity of one year or less. Money market securities generally have a high degree of liquidity and low risk to principal. The money market operates through dealers, money center banks, and the Open Market Trading Desk of the New York Federal Reserve Bank.

#### *Federal Funds*

Federal funds are balances at the Federal Reserve that financial institutions lend to one another and are not subject to reserve requirements. The purchasing institution uses these funds to meet reserve requirements or for a special arbitrage funding arrangement. Federal funds sold are subject to default risk, as with any unsecured loan. The shorter the term of the transaction, the less default risk is a primary concern. The majority of federal funds transactions are for overnight or over weekends. Term federal funds, however, are not uncommon. They transact at a fixed rate for a period longer than one day, typically 30, 60, or 90 days. Term federal funds are subject to loans-to-one-borrower and other lending limitations.

#### *Negotiable Certificates of Deposit*

These certificates are usually issued by money center or large regional banks in denominations of \$1M or more and the issuing institution may issue them at face value with a stated rate of interest, or at a discount similar to U.S. Treasury bills. These certificates are widely traded and offer substantial *liquidity*.

#### *Eurodollar Time Deposits*

Eurodollar time deposits are certificates of deposit issued by banks in Europe, with interest and principal paid in dollars. Such certificates of deposit usually have minimum denominations of \$100,000 and short-term maturities of less than two years. Usually they have interest rates pegged to LIBOR.

#### *Certificates of Deposit*

Certificates of deposit are time deposits in banks or savings associations with maturities longer than 30 days. Most certificates of deposit have an original maturity of one to three months. Variable-rate certificates of deposit are also available, typically either six-month with a 30-day roll or one year with a three-month roll. In general, certificates of deposit have a slightly higher return, are slightly riskier, and are slightly less liquid than Treasury bills. A prudent investment manager should limit holdings in any depository institution to amounts covered by federal deposit insurance.

*Repurchase Agreements*

In a repurchase transaction, an institution loans funds and, in effect, buys securities from a counterparty. They also commit to resell the same securities back to the counterparty, at a later date at a specified price. In a reverse repurchase transaction an institution receives funds from and sells securities to a counterparty. They also promise to repurchase the same securities at a specified price and date. Repurchase agreements are short-term in nature; therefore, the transaction takes place in the money market.

*Treasury Bills*

U.S. Treasury bills are U.S. Government securities with three-month, six-month, and one-year maturities. The government issues them in minimum denominations of \$10,000 and multiples of \$5,000 thereafter. The government issues treasury bills at a discount from face value. They are exempt from state and local taxation, and are backed by the full faith and credit of the U.S. Government.

*Municipal Notes*

Short-term municipal bond with a maturity of one year or less.

*Municipal Bonds*

Municipal bonds based on the general taxing authority of the issuer or general obligation bonds have certain factors that may adversely affect the creditworthiness of these types of bonds. These factors include the following:

- Declining property values and an increasing number of delinquent taxpayers.
- Increasing tax burden relative to other regions.
- Increasing property tax rate in conjunction with declining population.
- Actual general fund revenues consistently falling below budgeted amounts.
- Budget expenditures increasing annually in excess of inflation rate.
- General obligation debt increasing while property values remain static.
- Declining economy as measured by increased unemployment and declining population.
- Investment activities that involve excessive leveraging to achieve enhanced yields.

Floating-rate notes usually have a maturity of five to seven years, and interest payments periodically adjust, often every six months. A money market index, usually Treasury bills or Eurodollar rates determine the interest rate. State, municipal, and other political subdivisions, including independent school districts, issue municipal bonds that are usually dependent upon the general taxing authority of the locality or on specific revenue generating projects for repayment. Interest income generated by state and municipal obligations is not subject to federal income taxes and is usually exempt from taxation by the issuing state and local authorities. Other state and municipal obligations include Bond Anticipation Notes (BANs), Tax Anticipation Notes (TANs), and Revenue Anticipation Notes (RANs). These notes are short-term obligations to finance current expenditures pending receipt of proceeds from expected bond offerings or revenues.

Section 560.42 permits savings associations to invest in obligations of state or political subdivisions. The obligations must meet the following requirements:

- Rated in one of the four highest grades.
- Issued by a public housing agency.
- Backed by the full faith and credit of the United States.

The regulation limits investments in state or political subdivisions ten percent of capital for any one issuer, excluding general obligations of any one issuer. A savings association may invest, in the aggregate, up to one percent of its assets outside of the rating requirements and guarantee provisions within the state or political subdivision where the savings association's home or branch office is located.

#### Revenue Bonds

Revenue bonds are dependent upon the income generated by specific projects established by government authority. A type of revenue bond often held by savings associations are public housing authority revenue bonds. Although they have corporate debt characteristics, the FDIC does not consider such public entity issues to be corporate debt securities and are not subject to the FDIC divestiture requirements. The credit quality of these issues varies greatly and is dependent upon the revenue source, any guarantees, sinking funds, and market value of collateral, if any.

Because the taxing authority does not support revenue bonds, unless rated, you should classify them the same as other commercial credits. Other factors that negatively affect their creditworthiness include:

- Decreasing coverage of debt service by net revenues.
- Regular use of debt reserves and other reserves by the issuer.
- Growing financial dependence of the issuer on unpredictable federal and state aid appropriations for meeting operating budget expenses.
- Unanticipated cost overruns and schedule delays on capital construction projects.
- Frequent or significant user rates increases.
- Deferred capital plant maintenance and improvement.
- Shrinking customer base.
- New and unanticipated competition.

#### *Commercial Paper*

Top-rated corporations issue commercial paper with 2- to 270-day maturities. Commercial paper is unsecured, usually discounted and possibly backed by bank lines of credit. Standard and Poor's rates commercial paper ranging from A, the highest quality, to D, the lowest quality. Moody's uses designations of Prime-1 to Prime-3, and Not Prime (issuers that do not fall within any of the Prime rating categories).

#### *Banker's Acceptances*

Banker's acceptances arise mostly out of foreign trade transactions and are similar to commercial paper in form. They are noninterest-bearing notes sold at a discount and redeemed by the accepting bank at maturity for full face value. Banker's acceptances are short-term instruments with maturities of nine months or less. Most banker's acceptances are for very large amounts, although some are available for as low as \$5,000. Liquidity risk varies considerably based on the size of the security. There is no secondary market for the very

low denomination instruments. Banker's acceptances have very low credit risk since the accepting bank and the ultimate borrower both guarantee payment.

#### *Federal Agency Discount Notes and Coupon Securities*

Although they are only a small portion of the money market, federal agency securities are second highest in credit quality. The purposes, maturities, and types of agency securities issued vary widely. Typically the government backs these issues with collateral such as cash, U.S. Government securities, and debt obligations the issuing agency acquires through its lending activities. The more common types of federal agency securities include obligations of the following agencies:

- Federal Home Loan Banks (FHLBs)
- Farm Credit System (FCS)
- Federal National Mortgage Association (Fannie Mae)
- Federal Home Loan Mortgage Corporation (Freddie Mac)
- Government National Mortgage Association (GNMA)
- Student Loan Marketing Association (SLMA).

Obligations of the U.S. Government and federal agencies are safe and liquid. Federal agency securities (except for GNMA's) generally do not bear the full faith and credit of the U.S. Government. They do bear the full faith and credit of the U.S. Government agency or government sponsored enterprise that sponsors them.

#### Structured Notes

Federal agency notes include structured notes that are securities with derivative-like characteristics. Structured notes are fixed-income securities with embedded options where the bond's coupon, average life, or redemption value are dependent on a reference rate, an index, or formula. Fannie Mae, Freddie Mac, and the FHLBs are the primary issuers of structured notes. OTS considers structured notes a complex security and they require a price sensitivity analysis. See TB 13a-2 for more information.

Structured notes take various forms. The term structured notes includes the following securities:

- Dual-indexed floaters
- De-leveraged floaters
- Inverse floaters
- Leveraged inverse floaters
- Ratchet floaters
- Range floaters
- Leveraged cap floaters
- Stepped cap/floor floaters
- Capped callable floaters

- Stepped spread floaters
- Multi-step bonds
- Indexed amortization notes.

The major type of structured note owned by financial institutions are step-up bonds. These bonds have successively higher coupons over their life and the issuer may call them. Institutions should carefully evaluate the purchase of a step-up bond. See the explanation of the call feature of step up bonds immediately below in the description of corporate bonds.

OTS does not consider standard, non-leveraged, floating rate securities (where the interest rate is not based on a multiple of the index) to be structured notes.

#### *Shares in Money Market Funds*

The combined money of many entities that is jointly invested in high yield financial instruments including U.S. government securities, certificates of deposits, and commercial paper. A money market fund is a mutual fund that makes its profit by buying and selling various forms of money rather than buying and selling shares of ownership in corporations.

#### **Fixed-Income Investments**

The bond (or debt) market represents debt instruments with maturities of longer than one year and includes longer-term U.S. Government and federal agency bonds and notes, corporate debt securities, and municipal bonds.

#### *Bond Ratings*

Bond ratings are good threshold indicators of the probability of default, but savings associations should conduct a thorough credit analysis of the security issuer before buying a security. Savings associations should also monitor the security after the purchase. The issuer should have the capacity to meet principal and interest payments as they become due. Failure to do so results in a default. Credit analysis should, at a minimum, encompass a review of the issuing entity's financial statement, level of capitalization, management, earnings, business reputation, and other relevant factors. Other relevant factors may include: adequacy of sinking funds, collateralization, refinancing needs, and callability.

Besides performing the very basic credit analysis, each type of bond or industry has a unique set of factors. The institution should also review these factors when performing a credit review.

#### Rated Securities

We identify Moody's ratings first, and Standard & Poor's ratings in parentheses.

#### Investment Grade

- Aaa (AAA): Bonds judged to be of the best quality that carry the smallest degree of risk. The capacity to pay interest and repay principal is extremely strong.
- Aa (AA): Bonds judged to be of high quality by all standards. These securities have a very strong capacity to pay interest and repay principal. They differ from the higher-rated issues only in a small degree.

- A (A): Bonds of upper-medium-grade obligation with many favorable investment attributes. These securities have a strong capacity to pay interest and principal. However, they are somewhat more susceptible to the adverse effects of changes in circumstance and economic conditions than debt in higher-rated categories.
- Baa (BBB): Bonds considered to be of medium-grade obligation. They are not highly protected nor poorly secured. These securities have an adequate capacity to pay interest and repay principal. Normally, debt in this category exhibits adequate protection limits. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal than in higher-rated categories.

#### Below Investment Grade

- Ba (BB): Bonds judged to have speculative elements. Often the protection of interest and principal payments may be moderate and thereby not well safeguarded.
- B (B): These bonds generally lack the characteristics of a desirable investment. Assurance of principal and interest payments or maintenance of other contract terms over a long period may be suspect.
- Caa, Ca, C (D): These bonds are of poor standing. Such issues may be in default or have other shortcomings.

The rating agencies (Moody's or Standard & Poor's) may append a designation of Provisional (Moody's) or Conditional (Standard & Poor's) to a rating. For example, the provisional or conditional description is when the issuer does not specify an offering date.

Subquality debt is, on balance, predominantly speculative regarding capacity to pay interest and repay principal according to the terms of the obligation. Large uncertainties on major risk exposures to adverse conditions outweigh any quality and protective characteristics. Debt rated D is in payment default. Rating companies use the D rating category when issuers do not make interest or principal payments on the date due. They assign the D rating even if the applicable grace period has not expired, unless the rating agency believes that the issuer will make such payments during the grace period.

Institutions should obtain current bond ratings or credit analysis before any purchase. Associations invested in corporate bonds should regularly review the current ratings of their holdings for any adverse changes, and management should report the result of these credit reviews to the board of directors.

#### Non-Rated Securities

For non-rated securities, institutions should establish guidelines to ensure that the securities meet legal requirements and that the institution fully understands the risk involved. Institutions should establish limits on individual counterparty exposures. Policies should also provide credit risk and concentration limits. Such limits may define concentrations relating to a single or related issuer or counterparty, a geographical area, or obligations with similar characteristics.

#### *U.S. Treasury Securities*

##### Treasury Notes

A U.S. government long-term security, sold to the public and having a maturity of one to ten years.

### Treasury Bonds

A U.S. government long-term security, sold to the public and having a maturity longer than ten years.

### Zero-Coupon Treasuries or STRIPS

Zero-coupon bonds, although they can be U.S. Government or agency securities, are most frequently corporate bonds. The market sells zero-coupon bonds at a deep discount from par value. They accumulate and compound interest and pay full face value at maturity. Zero-coupon bonds are highly sensitive to interest rates and tend to exacerbate interest rate risk in the majority of savings associations. As a result, it may be an unsafe and unsound practice for savings associations with excessive exposure to interest rate risk to invest in zero-coupon bonds. Moreover, taxable zero-coupon securities receive unfavorable tax treatment. Even though the savings association receives no cash, thrifts must pay taxes annually on accrued interest.

### *Corporate Bonds*

Corporate bonds can consist of subordinated debentures, collateralized or mortgage bonds, and floating-rate notes. Corporate debt securities face the same risks as loans to a business entity. Section 560.40 restricts investments in corporate obligations that sets forth requirements for minimum credit quality and loan-to-one-borrower limitations. Federal institutions may only invest in investment grade corporate bonds. Investment grade corporate debt securities are those that, at the time of their purchase, were in one of the four highest rating categories by at least one nationally recognized statistical rating organization.

### Collateralized Bonds

Corporate bonds come in many varieties with differing features and characteristics such as being secured or unsecured. The real estate mortgage or capital equipment that the bond money purchases usually collateralizes the bond. The bondholder can sell the collateral to satisfy a claim if the bond issuer fails to pay principal and interest when due. The full faith and credit of the issuer, but not any specific collateral backs an unsecured bond or debenture.

### Debenture Bonds

A bond that has no specific security set aside or allocated for repayment of the principal. A debenture bond is secured only by the general credit of the issuer.

### Callable Bonds

Institutions should carefully evaluate provisions that permit the issuer to modify the maturity of a bond. Many corporate bonds contain call privileges that permit the issuer to redeem the bond, either fully or partially, before the scheduled maturity. Call provisions are generally detrimental to investors since they run the risk of losing a high-coupon bond when rates begin to fall. Call provisions also tend to limit the price appreciation of the bond that might otherwise occur when interest rates decline. The presence of call protection, however, limits the right of the issuer to call the bond to a specified number of years early in the life of the bond.

### Sinking Fund Bonds

Sinking fund provisions are a form of maturity modification most often found in industrial bonds but increasingly found in other types of bonds as well. A sinking fund provision can take either of two forms. In one form, the issuer makes periodic payments to a segregated fund that is sufficient to retire the bonds upon maturity.

The other form mandates the issuer to retire some portion of the debt in a prearranged schedule during its life and before the stated maturity. Sinking funds are beneficial because they assure an orderly retirement of debt and enhance liquidity. Sinking funds can also be disadvantageous to investors. In particular those investors holding one of the early bonds to be called for a sinking fund are disadvantageous to the investor.

### **Equity Instruments**

The equity markets are the primary exchanges for the trading of stocks. The shares of common stock and preferred stock bought and sold in these markets represent actual ownership interest in a corporate entity. The major markets are the New York Stock Exchange, the American Stock Exchange, and the over-the-counter market. Savings associations may not generally invest in or retain equity securities. The Home Owners' Loan Act permits the following investments:

#### *Federal Agency Securities*

Savings association may invest in certain equity securities of FHLBs, Freddie Mac, Fannie Mae, SLMA and GNMA.

#### *Banker's Banks*

A federal savings association may purchase for its own account shares of stock of a bankers' bank, provided the following conditions are met:

- The institution is insured by the Federal Deposit Insurance Corporation or a holding company that owns or controls such an insured institution, if the stock of such institution or company is owned exclusively by depository institutions or depository institution holding companies.
- Such bank or company and all subsidiaries are engaged exclusively in providing services to or for other depository institutions, their holding companies, and the officers, directors, and employees of such institutions and companies, and in providing correspondent banking services at the request of other depository institutions or their holding companies.
- The total amount of such stock held by the association in any bank or holding company must not exceed at any time ten percent of the association's capital stock and paid in and unimpaired surplus.
- The purchase of such stock must not result in an association's acquiring more than five percent of any class of voting securities of such bank or company.

#### *Trust-Preferred Securities*

Savings associations may invest in trust-preferred securities in accordance with the limitations established in 12 CFR § 560.40. Trust preferred securities are non-perpetual cumulative preferred stock issued by a wholly owned trust subsidiary of a corporation. Revenue from the sale of the trust-preferred securities is exchanged for junior subordinated debentures issued by the parent corporation. These debentures feature coupon payment and term to maturity identical to those of the trust preferred securities. See Thrift Bulletin 73 for a complete discussion of trust secured preferred securities.

---

## MORTGAGE-RELATED SECURITIES

### Mortgage-Backed Securities

High default rates on mortgages until the introduction of the 1970. Even with the federal mortgage securities in the

**Section 540 updated with the issuance of RB 37-51 on 12/15/10.**  
**Click to link to Section 540.**

these instruments through security in out the acceptance of

The mortgage-backed securities (MBSs) introduced by GNMA in 1970, consisted only of Federal Housing Administration (FHA) and Veteran's Administration (VA) mortgages. Conventional lenders had indirect access to the capital markets only through the Federal Home Loan Mortgage Corporation (Freddie Mac) beginning in 1971. Originators could sell mortgages to Freddie Mac, which pooled and sold the resulting securities as Participation Certificates (PCs).

In 1981, Freddie Mac began a swap program, Guarantor I, that allowed lenders to exchange conventional mortgages for pass-through securities. In the first Freddie Mac swap of mortgages for securities, no cash exchanged hands. The seller received payment as PCs representing ownership in the mortgages sold. In this exchange or swap of assets, the savings association believed it could sell its low-rate mortgages more easily and at a higher price in security form rather than mortgage form. Soon after, the Federal National Mortgage Association introduced its Mortgage-Backed Security program. This restructuring of savings association mortgage portfolios was the major factor in the rapid growth of conventional mortgage securities.

As the mortgage securities market grew, lenders began to recognize that the swap programs provided an attractive alternative method for mortgage sales. In addition, many lenders began to securitize their portfolio mortgages to add both value and liquidity. Most issuers now issue the securities through the swap programs. Fannie Mae, Freddie Mac, and GNMA all collect a small guarantee fee throughout the life of the mortgages for the service.

The term mortgage security describes a variety of mortgage-related financial instruments. Although characteristics can vary widely, there are only two basic types of mortgage securities:

- A certificate representing ownership of an undivided interest in a proportionate share of each mortgage in a pool, referred to as a mortgage pass-through security or a mortgage-backed security (MBS).
- A debt obligation secured by a specified pool of mortgages, referred to as a mortgage derivative product (MDP).

Within each type, the market designed variations to appeal to certain investor classes or to reduce the cost of security financing.

Some mortgage derivative products (MDPs) exhibit considerably more price volatility than mortgages or ordinary mortgage pass-through securities and can expose investors to significant risk of loss if not managed in a safe and sound manner. Uncertain cash flows that result from changes in the prepayment rates of the underlying mortgages cause this price volatility.

Because these products are complex, savings associations need a high degree of technical expertise to understand how their prices and cash flows may behave in various interest-rate and prepayment environments. An institution's management should understand the risks and cash flow characteristics of its investments. This is particularly important for products that have unusual, leveraged, or highly variable cash flows. Moreover, because the secondary market for some of these products is relatively thin, they may be difficult to liquidate should the need arise. Finally, there is additional uncertainty because the market continues to introduce new

variants of these instruments. Savings associations are not able to test their price performance under varying market and economic conditions because the products are too new.

Savings associations should ensure that levels of activity involving MDPs are reasonable and appropriately relate to a savings association's capital, capacity to absorb losses, and level of in-house management sophistication and expertise. OTS considers investments in complex securities and the use of financial derivatives by institutions that do not have adequate risk measurement, monitoring, and control systems to be an unsafe and unsound practice. Appropriate managerial and financial controls must be in place and the savings association must analyze, monitor, and prudently adjust its holdings of MDPs in an environment of changing price and maturity expectations.

### *Secondary Mortgage Market*

Through this market, original lenders are able to sell loans in their portfolios to build liquidity to support additional lending. Mortgage agencies, such as Freddie Mac, Fannie Mae, and investment bankers buy mortgage loans. In turn, these agencies and investment bankers create pools of mortgages that they repackage as mortgage-backed securities, which they sell to investors. Mortgage-backed securities or mortgage pass-through certificates provide investors with payments of interest and principal on the underlying mortgages. Since the underlying issuer guarantees the mortgage pass-through certificate, the default risk is low for this type of security.

The buying, selling, and trading of existing mortgage loans and mortgage-backed securities constitutes the secondary mortgage market. This has become a significant activity for many savings associations.

The payments for MBSs resemble mortgage payments but without delinquencies. Principal and interest payments, less guarantee and servicing fees, pass through to the investor whether or not the issuer collects them. The servicer advances the delinquencies to the investor until the mortgage either becomes current or foreclosure is complete. Prepayments pass through to the investor as received.

The servicer collects mortgage payments on a monthly basis from the mortgagor and remits those funds less its servicing fee to a central collection point, or directly to the investors for GNMA I. Fannie Mae, Freddie Mac, and GNMA II collect their guarantee fee either directly from the payments that they pass through or from the servicer.

Fannie Mae and GNMA have always guaranteed the timely payment of both principal and interest to investors for their MBSs, requiring the servicer to advance its own funds to the investor to make up for delinquencies. Freddie Mac only guaranteed the timely payment of principal until they developed their Gold PC and now it, too, guarantees the timely payment of both principal and interest. The following characteristics determine the structure of an MBS:

- Types of mortgages in the pool.
- Weighted-average coupon on the pool of underlying mortgages.
- Pass-through rate on the MBS.
- Weighted-average remaining maturities of the mortgages.
- Number and size of the mortgages.
- Geographic distribution of mortgages.

### Weighted-Average Coupon and Pass-Through Rate

The weighted-average coupon (WAC) of the mortgage pool is an important factor in determining prepayment speeds. In general, higher WACs relative to current mortgage rates result in faster prepayments because homeowners have an incentive to refinance at lower market rates. Lower WACs relative to current mortgage rates lead to slower prepayments because lower refinancing rates are not readily available.

The average interest rate on the underlying mortgages of an MBS usually exceeds the pass-through rate. The spread between the WAC and the pass-through rate represents guarantee fees and servicing fees. A savings association that originates and packages loans for securitization can set limits on the permissible range of interest rates in a pool. These limits must be within the guidelines established by the guarantor of the MBS for each specific program.

### Original Term and Weighted-Average Remaining Maturity

The original term and the weighted-average remaining maturity (WARM) also affect the rate of repayment. Longer terms to maturity mean that amortization of principal will spread out over a longer period. This means the security passes through less principal during the early years of the security. In addition, prepayment patterns vary by original terms such as 30 years or 15 years. Loan age, which represents the difference between original and remaining maturity, also affects the rate of repayment. Payments on older mortgages allocate more to principal than to interest. Prepayments on a mortgage pool also tend to increase as the mortgages age, or become more seasoned. Eventually, prepayments slow down, or burn out. This occurs when most of the mortgagors remaining in the pool are either unwilling or unable to prepay. The maturity date of an MBS is generally the date on which the last mortgage in the pool repays in full. Each guarantor of an MBS sets limits on the permissible range of interest rates and maturities for each specific program.

### Geographic Distribution

The location of the mortgages comprising the pool affects the likelihood and predictability of prepayments. Different areas of the country prepay at much different rates. Geographical diversity permits greater predictability of cash flows as the mortgage pool is less subject to regional economic conditions and other local influences. More mortgages in a given pool tend to diversify risks and make cash flows more regular and predictable.

### *Types of Mortgage-Backed Securities*

#### Agency-Issued MBS

Agency-issued MBSs are attractive to certain investors because of their minimal credit risk, ease of trading, and liquidity. The low credit risk of MBSs results from the guarantees that Fannie Mae, Freddie Mac, or GNMA places on its mortgage securities.

#### Non-Agency MBSs

Other issuers, including mortgage bankers, insurance companies, investment banks, and other financial institutions that issue MBSs, also create and issue securities from a pool of loans. Non-agency MBSs include both pass-through and pay-through structures.

These securities typically have more credit risk and less liquidity than agency MBSs but still often carry AA or AAA ratings due to various credit enhancements. These credit enhancements include primary mortgage insurance and reserve funds. Some issuers split the security into a senior/subordinated structure. The senior/subordinated structure splits the security into low-credit risk (senior) and high-credit risk (subordinated)

pieces or tranches. The subordinated tranche(s) absorb the first wave of losses. Only after exhausting the subordinate class(es) does the senior tranche(s) incur losses. The credit risk of the subordinated tranches depends on the credit risk of the underlying mortgages and the deal structure. Therefore, the credit risk depends on the amount of loss exposure assigned to the tranche. Investors should monitor the credit ratings on MBSs and CMOs issued by private conduits.

Non-agency MBSs often include nonconforming mortgages that are too large or otherwise ineligible for securitization by the agencies. Non-agency MBSs also tend to be more geographically concentrated than Fannie Maes, Freddie Macs, and GNMAAs.

#### Fixed-Rate MBSs

Fannie Mae, Freddie Mac, and GNMA issue fixed-rate MBSs with terms of 30 years, 20 years, and 15 years. They also issue pools of balloon mortgages that follow a 30-year amortization schedule but mature after five or seven years. Graduated Payment Mortgages (GPMs) and Tiered Payment Mortgages (TPMs) pay a pre-established but increasing rate over time.

#### Adjustable-Rate MBSs

The issuance of MBSs backed by adjustable-rate mortgages (ARMs) provides an additional type of pass-through security in the secondary market. An adjustable-rate MBS offers protection against rising rates by linking its interest rate to a market-based index, like the one-year Constant Maturity Treasury (CMT) rate or the Eleventh District Cost of Funds. Periodic and lifetime caps along with teaser rates limit that protection by constraining the extent of rate adjustment. A teaser ARM features a low introductory interest rate designed to induce borrowers to select ARMs over fixed-rate mortgages.

ARMs often have periodic caps, lifetime caps, or both. A typical periodic cap on a one-year ARM limits the increase or decrease in the coupon to two percent per year. While an annual cap limits the amount of rate adjustment during any given year, the lifetime cap establishes a maximum coupon on the ARM throughout the life of the mortgage. Some ARMs without periodic caps still have payment caps that limit the increase in monthly payments rather than the interest rate. Negative amortization can occur, that is, the principal balance increases, if the mortgage reaches its payment cap.

You should determine the effect of teaser rates, periodic caps, and lifetime caps on the savings association's ARM MBS portfolio. The interaction between teaser rates and periodic caps is particularly important. Consider an ARM with a teaser rate of five percent, a fully indexed rate of eight percent, and an annual cap of two percent. This ARM offers the investor no protection against rising rates for at least two years. The rate at the start of the second year will be the same (seven percent) if rates fall one percent or rise four percent. The ARM only reaches its fully indexed rate in the third year if the index rate increases by 100 basis points or more. A teaser rate affects the lifetime cap as well. With a five percent teaser rate, the lifetime cap will typically be 11 percent, or only 300 basis points above the current, fully indexed rate.

### **Mortgage-Backed Security Considerations**

#### *MBS Yields and Prices*

Present value analysis discounts the future cash flows of mortgages by their required rate of return, which equals the rate available in the market for investments of similar risk. This process calculates an MBS's present value or estimated market value. Alternately, given a market price, it is possible to determine the rate of return or yield that would make the sum of the discounted cash flows equal to the market price. Two common measures of yield are the cash flow yield and the option-adjusted yield.

Cash Flow Yield

To determine the cash flow, or static yield of an MBS, discount the sum of all future cash flows back to the current market price. The cash flow yield calculation requires two major inputs: the current price of the security and a projection of future cash flows. Issuers usually base prepayment estimates upon Wall Street forecasts for similar MBSs and incorporate those prepayment estimates into the analysis.

The cash flow yield assumes cash flows will follow projections. Actual prepayments may exceed or fall short of projections, depending largely on the future course of interest rates. Falling market interest rates encourage homeowners to prepay their mortgages and refinance them at the new, lower rate. Rising interest rates encourage homeowners to retain mortgages, which would then have below-market rates. The cash flow yield does not take the variability of future interest rates and, therefore, prepayments into account. While cash flow yield may be an adequate measure (particularly for MBSs at or near par), it is less accurate than the option-adjusted yield measure described below.

Option-Adjusted Yield

The option-adjusted yield method can provide a more accurate comparison of the yield on investments with embedded options, like the prepayment option on a mortgage, to investments without embedded options such as noncallable corporate bonds. The option-adjusted yield does not rely on a single projected cash flow using a single prepayment estimate. The option-adjusted yield derives from many projected cash flows and prepayment estimates. The option-adjusted yield equals the discount rate (internal rate of return) that makes the average present value of the cash flows equal to the market price of the security. As shown in the example below, option-adjusted yields are typically lower than nominal yields. The difference between nominal and option-adjusted yields is greatest when prepayments are most interest-rate sensitive.

**Example: Nominal Yield Vs. Option-Adjusted Yield**

Compare an MBS with a seven percent coupon and a five-year base case weighted average life to a five-year noncallable corporate bond also with a seven percent coupon and of similar credit risk and liquidity. Both are priced at par. Consider three possible interest-rate scenarios: rates rise 100 basis points (25 percent probability), rates fall 100 basis points (25 percent probability), and rates stay the same. The weighted average life of the MBS increases to seven years if rates go up 100 basis points and decreases to three years if rates fall 100 basis points. The discount rate (internal rate of return) needs to equal 6.84 percent for the average present value of the cash flows to equal the current market price.

Rate Scenario	Probability	Present Value	Discount Rate
Flat	.50	100.668	6.84%
Up 100 basis points	.25	95.54	7.84%
Down 100 basis points	.25	103.15	5.84%
Weighted Average	1.00	100.00	6.84%

Although the bond and MBS provide the same nominal yield (seven percent), the bond outperforms the MBS by an average of 16 basis points once the investor considers interest rate and cash flow volatility. The option-adjusted yield is usually superior to cash flow yield as a measure of the yield of financial instruments with embedded prepayment options. This is because the option-adjusted yield considers the estimated probability distribution of potential prepayment rates instead of using a single estimate.

*MBS Accounting*

The interest method is the required accounting measurement for recording the yield for MBSs. Savings associations should amortize or accrete into income premiums and discounts using the interest method over the expected life of the mortgage security. This should result in a constant rate of interest (level-yield) when applied to the amount outstanding at the beginning of any given period.

Account for differences between anticipated and actual prepayments by recalculating the effective yield to reflect actual payments to date and anticipated future payments. This adjusts the net investment in the MBS to the amount that would have existed had the new effective yield been applied since acquisition.

For adjustable-rate MBSs, savings associations may base the effective yield on either the rate in effect at acquisition or recalculate the effective yield each time the rate on the MBSs change. Solicit comparable market quotes from at least two brokers other than the broker that executes the transactions. Even if a savings association does not have significant volume, they should obtain comparable price quotes.

*Mortgage-Backed Bonds*

A mortgage-backed bond is unlike a mortgage-backed pass-through security because they do not convey ownership of any portion of the underlying pool mortgages. However, mortgage-backed bonds do offer a more predictable maturity and thus offer a form of call protection. The bond issuer retains nearly all the risk associated with the security, including the interest rate risk and the credit risk. A pay-through bond has less risk exposure for the issuer than a straight bond, but greater risk than a pass-through security.

*Mortgage Derivative Products*

OTS defines a financial derivative in § 563.172. A financial derivative is a financial contract whose value depends on the value of one or more underlying assets, indices, or reference rates. The most common types of financial derivatives are futures, forward commitments, options, and swaps. OTS does not consider certain mortgage derivative securities such as collateralized mortgage obligations (CMOs) or real estate mortgage investment conduits (REMICs) as financial derivatives.

Collateralized Mortgage Obligations

Freddie Mac first issued collateralized mortgage obligations (CMOs) in 1983. Freddie Mac designed CMOs in the early 1980s to broaden investor demand. They do this by splitting an underlying pool of mortgages and MBSs into different classes, or tranches, that appeal to different types of investors. For example, Freddie Mac splits a pool of 30-year, fixed-rate MBSs into short-term, intermediate-term, and long-term tranches. Listed below are various types of CMO tranches found in savings association portfolios.

A major initial drawback to widespread use of the CMO was the substantial size of the mortgage pool; \$100 million or more was necessary to support the cost of issuance. The appearance of CMO conduits, however, made CMO issues feasible for smaller lenders. The conduit achieves the economies of scale needed to make the issue cost-effective for the lender by pooling collateral supplied by a number of lenders. Only a few of the conduits survived and, as a result, Fannie Mae, Freddie Mac, GNMA, and investment bankers that have access to large volumes of collateral dominate the list of issuers.

CMOs demand higher yields than other investments of similar quality and maturity because the actual life of the bond is uncertain. Some CMOs, like PACs, offer more predictability of prepayments than mortgages or other types of mortgage-backed bonds because of the large collateral pools backing each type of issue and the prioritization of cash flows.

The market's assumptions regarding the average life and average life volatility of each investor class determine CMO yields and yield spreads over comparable treasuries. Short-term agency PACs, which have little average life volatility, often trade at spreads of less than 50 basis points over Treasury. More volatile tranches earn significantly wider spreads. As with mortgage investments, the actual prepayment of the mortgages will determine the actual yield to maturity.

Prepayments on a CMO tranche are a function of prepayments on the underlying mortgages and the tranche structure. Faster or slower prepayments on the underlying mortgages can affect the weighted average life of an individual CMO tranche, but not necessarily proportionately. As noted above, PACs usually have much more stable cash flows than the underlying mortgages, but support tranches have much more volatile cash flows.

Geographic concentrations, loan size, and market interest rates affect prepayments on non-agency MBSs. If the MBS consists of mortgages concentrated in a particular state, prepayments on the MBS may differ substantially from national prepayment patterns. Prepayments on the large loans that characterize many non-agency MBSs tend to accelerate more quickly when market interest rates fall.

#### *CMO Risks*

The tranche structure of CMOs allocates rather than eliminates the risk of the underlying mortgages. The creation of tranches with shorter average lives than the underlying mortgages requires the creation of tranches with longer average lives. Stable PAC tranches require volatile support tranches. Investment-grade senior classes create speculative-grade subordinated tranches. The yield and market value of subordinate interests in CMOs are extremely sensitive to prepayment fluctuations. These kinds of riskier tranches can still attract investors in one of two ways. They may appeal to investors with different risk profiles; for example, long-term CMOs can match the long-term liability structure of insurance companies. Issuers may also attract investors by offering higher yields.

CMO structures can also present risks that are less obvious. These risks include PAC drift, cap risk, basis risk, and illiquidity.

- PAC Drift

The industry designed PACs to provide a predictable stream of cash flows across a range of prepayments, known as a PAC band. Many investors incorrectly assume that PAC bands remain fixed. In fact, faster-than-predicted prepayments can cause the band to narrow or drift. The support tranches will shrink or prepay entirely. The planned amortization rate guarantee disappears without a support tranche available to cushion future prepayment volatility. Investors often refer to these securities as busted PACs.

The amount of protection afforded by the PAC depends on the following factors:

- \* Width of the PAC band – wider bands provide more protection.
- \* Relative sizes of the PACs and supports in the deal – more supports provide greater insulation against prepayment volatility.
- \* Prepayment volatility of the underlying mortgages.

The consequences of a PAC's drifting or "busting" depend on the security type. For a traditional PAC, the CMO merely assumes the prepayment characteristics of the underlying mortgages. Narrowing or eliminating the PAC band causes Type II PACs to assume the prepayment characteristics of a support tranche and can be much more volatile than the underlying mortgages.

- Cap Risk

Lifetime caps limit the extent to which floating-rate CMOs can adjust to rising market interest rates. One can consider a lifetime cap an embedded option and, as the value of the option increases, the price of the security falls. As with any option, the effect of a lifetime cap on price and price volatility depends on the following factors:

- \* The option's intrinsic value, that is, the distance between the cap and the current rate on the CMO.
- \* The volatility of the index.
- \* The time to expiration (the average life of the CMO).

Many issuers use floaters as support tranches. With floaters, an increase in market interest rates causes a reduction in the distance to the lifetime cap and an extension (sometimes dramatic) of the average life of the CMO. Savings associations must fully incorporate the effect of lifetime caps on price sensitivity when self-reporting the price sensitivity of floating-rate CMOs on Schedule CMR.

- Basis Risk

Mismatched floaters can expose institutions to considerable basis risk if the index rate on the floater diverges significantly from short-term market interest rates, such as LIBOR. Such a divergence can arise from a non-parallel shift in the yield curve (if the index is the Ten-Year CMT) or from a lag between current market rates and the index rate (if the index is COFI). Basis risk is most significant for mismatched floaters with long or volatile average lives. Savings associations should evaluate the potential effect of nonparallel yield curve shifts on mismatched floaters.

- Liquidity Risk

Volatile or exotic CMO tranches tend to be the least liquid. Illiquidity places both purchasers and sellers at a disadvantage. The lack of an available market makes the asset difficult to sell without considerable price concessions. Illiquidity also makes it difficult to determine the true market value for a security and increases the possibility that the savings association will overpay. Illiquidity imposes transaction costs on buyers and sellers of securities. The broker receives the difference between the amount paid by the buyer and received by the seller, known as the bid-ask spread. A wide bid-ask spread means the buyer pays more and the seller receives less.

#### *Types of CMOS*

- Sequential Pay

Issuers often structure CMO deals as a series of Sequential Pay bonds. Each investor class generally receives monthly interest payments on the outstanding principal balance of its class. The bond allocates principal payments to each investor class in the order of maturity. The shortest outstanding maturity receives all principal payments until that class is fully retired, then holders of the second class begin to receive principal payments, and so forth. Most CMO issues have a compound interest or accrual class (called the Z Bond) that receives no interest or principal payments until the retirement of all other investor classes. The accrual bond's coupon rate compounds during the accrual phase and converts to an interest-paying instrument following retirement of all shorter maturity classes.

- Planned Amortization Class

A CMO innovation that was very popular in the late 1980s is the Planned Amortization Class (PAC). The PAC structure reduces cash flow uncertainty by guaranteeing a specific cash flow stream, provided that prepayments on the underlying mortgages remain within an established range or band. The increased certainty of PAC tranches causes other tranches in the issue (known as companion or support tranches) to have more uncertain cash flows. A Type II PAC represents a hybrid between a PAC and a support tranche. Type II PACs offer predictable cash flows, but within a narrower range of prepayments. If prepayments fall outside that range, Type II PACs assume the cash flow volatility of a support tranche.

- Floating-Rate CMOs

The market developed floating-rate tranches to attract investors more concerned with interest rate risk. Floaters typically adjust monthly or quarterly based on some index, such as LIBOR. Rate adjustments are usually subject to a lifetime cap, but periodic caps are unusual.

- Mismatched Floaters

A further innovation involves mismatched floating-rate CMOs that may adjust monthly or quarterly. Their rate adjustment ties either to a longer-term index, such as the Ten-Year Constant Maturity Treasury (CMT), or to a lagging index, such as COFI. These CMOs offer higher yields than traditional floaters but present basis risk from lack of perfect correlation between the index rate and short-term market interest rates.

- Kitchen Sink Bonds

Typically, a homogeneous pool of MBSs creates a diverse group of CMO tranches. A kitchen sink bond (also called a re-REMIC or a Matched Principal Bond) reverses the process by creating a single CMO from a dissimilar group of mortgage securities. Risky individual securities make up kitchen sink bonds. The resulting bond may not necessarily be volatile due to offsetting risks (that is, combining IOs and POs) but is usually difficult to analyze due to its complex composition.

### Real Estate Mortgage Investment Conduits

Congress passed Real Estate Mortgage Investment Conduit (REMIC) legislation in 1987. This legislation provided a new vehicle for issuing MBSs. Issuers structure REMICs much like CMOs and other securitized receivables but REMICs offer certain tax advantages. The government does not generally tax the special purpose entity formed to issue the pass-through or pay-through certificate at the entity level. Also, the savings association does not typically consolidate the special purpose entities. This allows for increased securitizations in REMIC form and leveraging of savings association capital because the assets are off-balance sheet. Nearly all CMOs are REMICs, as are most non-agency MBSs, including those with a pass-through structure.

### Futures, Forwards, and Options

In the futures market, investors buy and sell contracts for the future delivery of a commodity or security. The forward market is a market in which participants trade some commodity, security, or instrument at a fixed price at a future date. The proper use of derivatives such as futures, forwards, swaps, and options can reduce an institution's exposure to interest rate risk and can provide a framework for hedging strategies. Improper use of these securities can generate extreme losses. See the discussion of swaps in this section under Mortgage Derivative Products. See also Sections 650, Interest Rate Risk Management; and 660, Derivative Instruments and Hedging.

### Stripped Mortgage-Backed Securities

In 1986, Fannie Mae issued the first stripped mortgage-backed securities (SMBSs). This instrument created two new classes of investors or security holders. Each class received a percentage of the principal and interest payments from either the MBS or from the whole mortgages that served as the underlying collateral. For example, one class of the SMBS may receive 99 percent of the interest payments and one percent of the principal payments from the underlying MBS. Investors in different classes of SMBSs buy a derivative mortgage instrument that has significantly different characteristics from the underlying mortgages or the MBSs. The industry also refers to these classes as tranches.

In 1987, Fannie Mae introduced an SMBS composed of an interest only (IO) class and a principal only (PO) class. The holder of the IO receives all the interest payments from the underlying MBS while the holder of the PO receives all the principal payments.

Investment bankers also create their own version of SMBSs both through private placements and public offerings. Investment bankers normally create the private placement through a participation agreement that entitles the holder to a certain predefined percentage of the principal and interest payments from the underlying mortgages or the MBS. These private placements are similar to the original Fannie Mae SMBSs in that holders receive varying percentages of the principal and interest payments rather than a percentage of all the interest or principal. In addition, Freddie Mac issues its own version of IOs and POs using participation certificates rather than MBSs.

### Fallen Angels

Examiners refer to securities not performing as expected due to changes in either tranche structure or market conditions as fallen angels. Savings associations may continue to account for fallen angels as held-to-maturity. You should consider unrealized losses on these securities in your evaluation of the institution's capital adequacy.

### Mortgage Swaps

Mortgage swaps are off-balance sheet transactions designed to replicate the purchase of MBSs with reverse repurchase agreements or some other short-term or floating-rate source of funding. In essence, the transaction combines a forward commitment to purchase MBSs with an amortizing interest-rate swap. Unlike the traditional purchase of mortgage securities, however, the issue makes no cash payment at the outset of the agreement.

Mortgage swaps are an alternative to a straight purchase of MBSs. They involve a great deal of leverage because the initial collateral on the transaction is a small fraction (typically four points) of the par value of the mortgage securities and the transaction is off-balance sheet. They also may enable the investor to effectively finance mortgage securities at a rate tied to a floating-rate index below LIBOR on a guaranteed multiyear basis.

### Collateralized Loan Obligations

Collateralized loan obligations (CLOs) are securities primarily collateralized by commercial loans of varying quality. Some issues may also be collateralized in part by high-yield corporate debt securities.

CLOs are generally sold in several progressively risky tranches. The first tranche often has a high investment rating, such as AAA, due to its payment priority and the initial overcollateralization of the security. The collateral also sequentially supports the next tranche(s). CLOs typically have a revolving period and an amortization period. During the revolving period, principal payments are reinvested in other assets in accor-

dance with the terms of the agreement. During the amortization period, any principal payments are used to first repay the Class A note holders in full, then any remaining principal is used to pay junior tranche investors in order of their priority.

The middle tranches are often rated at the lower investment grade ratings, such as BBB. The lowest priority tranche, or the residual interest tranche, is generally not rated. It is typically subordinated not only to senior tranches, but also to expenses of the issuing trust. These residual tranches are typically difficult to value and are illiquid investments by themselves. To make the residual tranche more marketable, the CLO issuer or trustee may swap the residual interest tranche for certificates guaranteed by a AAA-rated counterparty as to the principal amount at maturity (generally up to 12 years).

While the swap creates a guarantee of the full principal at maturity, the amount guaranteed must be discounted to its present value if terminated early. In that respect, the guaranteed portion of the security is similar to a zero-coupon Treasury bond. Therefore, the credit support provided by the guarantor may cover less than 50 percent of the face value of the certificate at purchase. Unlike zero-coupon bonds, however, these certificates are generally sold at par. Investors must rely on the performance of the reference asset (the residual tranche in this case) to return the remaining portion of their investment and provide any yield. The performance of the reference asset is not, however, guaranteed. Therefore, these investments are not, and should not be considered, fully rated.

Apparently, the motivation to purchase such certificates is the high yield projected if the CLO collateral pool (and thereby the reference asset) performs well. However, there is no guarantee of residual cash flows, and the certificates will not default if no cash flows are paid to the investors. These investments are speculative, and are clearly not intended to hedge interest rate risk or credit risk. Based on discussions with rating agencies, and the lack of supporting cash flow analysis, it is difficult to assess the likelihood that a particular return could be achieved on these investments. In essence, an institution should not be misled by split ratings where only a part of the security is either guaranteed or rated investment grade.

It is imperative that institutions properly underwrite investment securities for quality, applicable regulatory and policy compliance, and suitability to operational and strategic plans.

**INTRODUCTION**

The market for derivatives has grown rapidly during the past decade. For the most part, this rapid growth reflects the broad range of applications for these derivative products and their wide acceptance by financial institutions, institutional investors, and corporate treasurers. Savings associations typically use derivatives for hedging purposes. In this Handbook Section, we discuss specific objectives and considerations associated with hedging activity. Also in this Section, we describe the characteristics and risks of derivatives, and several regulatory considerations surrounding their use in hedging interest rate risk.

**DERIVATIVE INSTRUMENTS**

Financial derivatives are contracts that derive their value from that of an underlying asset, index, or reference rate. The most commonly used financial derivatives are swaps, futures, forwards, and options.

Some also use the term derivative security to describe securities with option-like characteristics and securities created by tranching, or stripping, other financial instruments. Derivative securities include structured notes and collateralized mortgage obligations (CMOs). A discussion of CMOs appears in Handbook Section 540, Investment Securities, Appendix C; and Handbook Section 560, Deposits and Borrowed Funds.

There are two distinct groups of derivative instruments: forward-based products and option-based products. Forward-based products include futures, forward contracts, and swaps. Option-based products include puts, calls, caps, floors, and collars. Some derivatives, such as options on futures, optional-purchase mortgage commitments, swaptions, and forward caps, combine the features of both forward and option contracts. Some derivatives trade on organized exchanges,

while others trade on over-the-counter (OTC) markets.

Standardized contracts traded on the futures and options exchanges are exchange-traded derivatives. Each exchange operates a corporation, known as a clearinghouse, where it reconciles, guarantees, and settles all contracts. The clearinghouse places itself between the buyer and seller of each contract, and serves as the counterparty to each contract.

OTC contracts, on the other hand, are agreements entered into through private negotiations. Parties seek each other out to negotiate a trade. Many large securities firms and commercial banks, known as derivatives dealers, deal or make markets in derivatives. Swaps, forward agreements, options, caps, and floors actively trade in the OTC market. We discuss the different types of derivative instruments later in this Handbook Section.

**Risks of Using Derivatives**

Derivative instruments provide benefits but, as with other types of financial products, their use entails certain risks. The specific risks of a particular derivative transaction depend on the terms of the transaction and the financial condition and circumstances of the parties involved in the transaction. The primary risks include market risk, credit risk, legal risk, and operational risk.

*Market Risk*

Market risk involves the potential loss in value of a derivative due to changes in market conditions. These changes can include movements in interest rates (interest rate risk), changes in supply and demand factors (liquidity risk), and changes in other factors that can affect price. Sources of market risk differ for various types of derivatives. Savings associations should understand the forces

that cause the market prices of derivatives to change.

Higher asset values or lower funding costs offset market losses on derivatives that savings associations use as hedges. In practice, however, offsetting gains may not occur due to nonparallel movements in the yield curve, mortgage prepayments, deposit attrition, timing differences, or lack of liquidity. We discuss various types of market risk below.

#### Correlation Risk

The balance sheet item and the corresponding derivative may have different interest rate indices. There may not be perfect correlation between the movements of the interest indices or their correlation may change over time. For example, if a savings association uses a LIBOR-based swap to hedge short-term certificates of deposit (CDs), the effectiveness of the hedge will depend on the extent the CD rate moves with LIBOR. If other factors, such as local market conditions, play a major role in setting rates, the hedge may be ineffective or, conversely, lower funding costs may not offset losses on the derivative. A similar correlation problem emerges when the balance sheet item and the corresponding derivatives use indices of different maturities. In that case, an inversion, or other nonparallel shift, in the yield curve could make the hedge ineffective.

#### Prepayment Risk

Because mortgages contain prepayment options, we do not know their actual effective maturity in advance. Moreover, prepayment rates tend to change as interest rates change. A derivative may be an effective hedge for small changes in interest rates but become invalid if interest rates move sharply up or down. Gains on a mortgage portfolio may, therefore, not fully offset losses on derivatives, and vice versa.

#### Deposit Attrition

Determining the effective term and rate sensitivity of non-maturity deposits, such as MMDAs and passbook accounts, is difficult because these de-

posits do not have explicit maturities. Withdrawal rates and the extent their interest rates track market rates vary over time and across institutions. As a result, hedging these liabilities is imprecise and requires a thorough analysis of depositor behavior.

#### Timing Differences

Another source of risk arises from timing differences between the hedging instrument and the hedged item. Consider the case of using swaps to hedge retail CDs. Swaps reprice on a specific date (for example, the end of a quarter) but CDs mature or reprice throughout a quarter. If interest rates change considerably within a quarter, the swap could be an ineffective hedge. A savings association can diversify this timing risk by entering into a number of separate swaps with different reset dates.

#### Inaccurate Initial Pricing

Certain complex derivative instruments may be difficult to price accurately. As a result, the savings association could initiate a swap with a negative market value or overpay for an option. Savings associations should be able to ascertain that the price and rate on a derivative instrument is consistent with current market conditions.

#### Illiquidity

Derivative use involves two types of liquidity risks. The derivative instrument may be illiquid, making the position difficult or expensive to unwind. Potential illiquidity is greatest with exotic derivatives.

#### *Credit Risk*

Credit risk is the potential for loss due to counterparty default. The evaluation of credit risk is particularly important in the case of OTC derivatives because the creditworthiness of counterparties can vary significantly. By comparison, the market views counterparty risk on exchange-traded contracts as minimal because the exchanges guarantee the performance of each contract. In addition, credit exposures on exchange-

traded options are small because of the margin requirements and daily settlement practices imposed by the exchanges.

The credit risk of derivatives consists of two distinct elements: current exposure and potential exposure. Current exposure is the market value of the derivative at any point in time. The market value of a derivative equals the net present value of the derivative's future cash flows and represents the cost of replacing the contract with a new one if the counterparty defaults.

The current exposure can be either positive or negative. When the current exposure is positive, the contract represents an asset and the holder of the contract will suffer a loss if the counterparty defaults. When the market value of the contract is negative, the contract represents a liability. Therefore, no credit loss occurs if there is a default since the contract has no value. The current exposure on exchange-traded contracts is negligible since exchanges require daily settlement of gains and losses on contracts.

The calculation of potential exposure incorporates possible changes in the market value of the contract as market conditions change. Market participants use various techniques, such as Monte Carlo simulation and option pricing models, to estimate potential exposures. For a credit loss to occur on a swap, two conditions must exist: the market value of the contract must be positive and the counterparty must default on the contract.

Only one side of an option contract confronts credit exposure. The writer (seller) of the option receives its fees up front, so only the buyer of the option faces a loss in the case of default. If the seller of the option defaults, the option buyer stands to lose the economic benefits associated with the option as well as an accounting loss equal to the unamortized option premium.

Savings associations must restrict their choice of counterparties to banks and well-capitalized non-bank entities. The market often uses collateral arrangements in derivative transactions to reduce exposure to counterparty risk. In swap transactions, collateral arrangements are subject to

negotiation and can be either unilateral or bilateral. Under a unilateral arrangement, only the less creditworthy counterparty must post collateral. Under a bilateral arrangement, neither side posts collateral initially, but either side may need to post collateral later if a triggering event occurs. Triggering events include credit down gradings or sharp movements in interest rates.

When a party has two or more swap transactions involving the same counterparty, it uses a netting arrangement to reduce risk. Typical netting arrangements call for counterparties to net all transactions in the event of default. This means that all contracts between the two parties are marked-to-market, and those with negative values provide an offset against those with positive values.

Without netting arrangements, no offset occurs in the event of default. As a result, a practice known as cherry picking may occur. For example, a firm may have two swaps with the same counterparty—one with a positive replacement value and one with a negative replacement value. If the firm confronts bankruptcy, it may attempt to seek relief from the swap that has a negative replacement value (a liability) and attempt to force the counterparty to continue to pay on the swap with a positive value.

#### *Legal Risk*

Legal risk with OTC derivatives results from the fact that provisions may be unenforceable for the following reasons:

- Inadequate documentation.
- Illegality of the contract.
- Ineligibility of a counterparty to enter the transaction.
- Bankruptcy or insolvency of the counterparty.

#### *Operational Risk*

Operational risk is the potential for loss from a failure of internal systems and controls, human error, or fraud. Operational risk can arise from

lack of management expertise and depth, excessive reliance on third parties, lack of involvement by senior management and the board of directors, and lack of checks and balances in derivative transactions.

## HEDGING

Savings associations can reduce financial risk by hedging. Hedging can involve forward commitments, futures, options, and swaps.

Before engaging in any hedging strategy, management must review the savings association's overall interest rate risk position under various interest rate scenarios as required by Thrift Bulletin 13a. This evaluation would also include the effect of any hedge strategies.

### Macro-hedging and Micro-hedging

The objective of a macro-hedge is to reduce the interest rate risk of a savings association based on a complete analysis of the balance sheet and off-balance sheet items. The objective of a micro-hedge is to reduce or eliminate the risk of a specific balance sheet or off-balance sheet item. Section 563.172 generally requires that the hedge positions reduce the interest rate risk of the institution.

You should not evaluate the appropriateness of a micro-hedge in isolation, but rather in the context of its effect on the overall interest rate risk of the savings association. Sometimes a micro-hedge can increase rather than reduce a savings association's overall interest rate risk. For example, a savings association that is liability sensitive can establish a micro-hedge to offset the interest rate risk of a fixed-rate mortgage-servicing portfolio. This portfolio may provide protection against an increase in interest rates, as the value of the portfolio would increase as interest rates increase and mortgage prepayments slow.

A well-constructed hedge (one developed with the benefit of an analysis of the overall interest rate risk) should meet the requirements of Statement of Financial Accounting Standard (SFAS) 133,

Accounting for Derivative Instruments and Hedging Activities.

In June 1998, the Financial Accounting Standards Board (FASB) issued SFAS 133 as amended by SFAS 137, Accounting for Derivative Instruments and Hedging Activities — Deferral of the Effective Date of FASB Statement No. 133 (issued June 1999); and SFAS 138, Accounting for Certain Derivative Instruments and Certain Hedging Activities (issued June 2000). SFAS 137 became effective with fiscal years ending after June 15, 2000.

Management, in coordination with an independent audit firm, should establish a policy containing standards, parameters, and conditions to assess the required level of correlation and hedge effectiveness. SFAS 133 requires that a gain or loss from the item hedged be highly correlated to the gain or loss from the hedging instrument. SFAS 133 does not define high correlation. However, in practice, the gain or loss from the future contracts should equal no less than 80 percent to 120 percent of the change in value from the hedged instrument. SFAS 133 limits hedge accounting to those relationships in which derivative instruments and certain foreign currency-denominated nonderivative instruments are designated as hedging instruments and the necessary qualifying criteria are met.

Derivatives subject to SFAS 133 include, but are not limited to, interest rate swaps, options, futures, and forwards. In developing this complex proposal, the FASB concluded that the following five fundamental decisions should serve as cornerstones:

- Derivatives are assets or liabilities, and should be reported in the financial statements. (Prior to SFAS 133, most derivatives, except those held for trading, were "off-balance sheet" and, savings associations did not report them in the financial statements.)
- Fair value is the most relevant measure for financial instruments, and the only relevant measure for derivatives.

- Savings associations should measure derivatives at fair value, and adjustments to the carrying amount of hedged items should reflect changes in their fair value (that is, gains and losses) that are attributable to the risk being hedged and that arise while the hedge is in effect.
- Savings associations should report only items that are assets or liabilities in the financial statements. (Savings associations should not defer and treat realized gains and losses on certain derivatives used for hedging as an asset or liability.)
- Savings associations should use special accounting for items designated as being hedged only for qualifying transactions; one aspect of qualification should be an assessment of offsetting changes in fair values or cash flows.

### Accounting Treatment

Savings associations must account for and disclose hedging transactions and derivative instruments according to generally accepted accounting principles (GAAP). SFAS 133 is a significant accounting change that requires an institution to record all derivatives on the balance sheet as assets or liabilities at their fair value. Under SFAS 133, savings associations should report changes in the fair value of most derivatives in net income. However, savings associations should record the accumulated gains (losses) for derivatives that qualify as effective cash flow hedges, in other comprehensive income, a component of GAAP equity capital. SFAS No. 133 also requires certain disclosures.

Management should consult with its independent auditor to ensure compliance with GAAP. Where GAAP does not specifically address the accounting treatment for a particular derivative instrument, the savings association should document the accounting treatment they use and record the basis for the adopted treatment.

Evolving accounting and regulatory requirements makes it necessary to keep abreast of legislative, regulatory, and accounting initiatives that could

affect the treatment of certain derivatives and influence their market values. On December 29, 1998, the FFIEC issued interim regulatory reporting and capital guidance that departs from GAAP. That guidance requires an institution that has adopted SFAS 133 to report derivative instruments as follows:

- Do not include accumulated gain (losses) for effective cash flow hedges in regulatory capital.
- Report accumulated gain (losses) for ineffective cash flow hedges and for all fair value hedges in net income. This affects the numerator for both the Tier 1 and risk-based capital calculations.
- Separately record and independently risk-weight embedded derivatives and the associated financial instrument.

Management should regularly perform worst-case scenario analysis that measures the potential effect on the savings association of changes in regulatory or accounting rules.

### OTS POLICY ON DERIVATIVES

The Office of Thrift Supervision's rule on financial derivatives in § 563.172 permits savings associations to engage in transactions involving financial derivatives. The rule also describes the responsibilities of a savings association's board of directors and management regarding financial derivatives. In addition, Thrift Bulletin 13a (TB 13a) provides guidance on the use of financial derivatives.

### Sensitivity Analysis or Stress Testing

Management should exercise diligence in assessing the risks and returns (including expected total return) associated with investment securities and financial derivatives. As a matter of sound practice, before taking an investment position or initiating a derivatives transaction, a savings association should:

- Ensure that the proposed transaction is legally permissible for a savings association.
- Review the terms of and condition of the financial derivatives.
- Ensure that the proposed transaction is allowable under the savings association's derivatives policies.
- Ensure that the proposed transaction is consistent with the savings association's portfolio objectives and liquidity needs.
- Exercise diligence in assessing the market value, liquidity, and credit risk of the financial derivatives.
- Conduct a pre-purchase portfolio sensitivity analysis for any significant transaction involving financial derivatives (as described below in Significant Transactions).
- Conduct a pre-purchase price sensitivity analysis of any financial derivative before taking a position.<sup>1</sup>

### *Significant Transactions*

A significant transaction is any transaction (including one involving financial instruments other than complex securities) that is expected to increase a savings association's Sensitivity Measure by more than 25 basis points. Before undertaking any significant transaction, management should conduct an analysis of the incremental effect of the proposed transaction on the interest rate risk profile of the institution. The analysis should show the expected change in the savings association's net portfolio value (with and without the proposed transaction) that would result from an immediate parallel shift in the yield curve of plus and minus 100, 200, and 300 basis points. In general, a savings association should conduct its own

---

<sup>1</sup> The following financial derivatives are exempt from pre-purchase analysis: commitments to originate, purchase, or sell mortgages. To perform the pre-purchase analysis for derivatives whose initial value is zero (for instance, futures, swaps), the savings association should calculate the change in value as a percentage of the notional principal amount.

analysis. It may, however, rely on analysis conducted by an independent third-party (that is, someone other than the seller or counterparty) provided management understands the analysis and its key assumptions.

Savings associations with less than \$1 billion in assets that do not have an internal modeling capability to conduct such an incremental analysis may use the most recent quarterly NPV estimates for their institution provided by OTS. The association can use these NPV estimates to estimate the incremental effect of a proposed transaction on the sensitivity of its net portfolio value.<sup>2</sup>

### *Complex Securities and Financial Derivatives*

Before taking a position in a complex security or financial derivative, a savings association should conduct a price sensitivity analysis (that is, a pre-purchase analysis) of the instrument. At a minimum, the analysis should show the expected change in the value of the instrument that would result from an immediate parallel shift in the yield curve of plus and minus 100, 200, and 300 basis points. Where appropriate, the analysis should encompass a wider range of scenarios (for example, nonparallel changes in the yield curve, changes in interest rate volatility, changes in credit spreads, and in the case of mortgage-related securities, changes in prepayment speeds). In general, a savings association should conduct its own in-house pre-acquisition analysis. A savings association may, however, rely on an analysis conducted by an independent third-party provided management understands the analysis and its key assumptions.

---

<sup>2</sup> Savings associations that are exempt from filing Schedule CMR and that choose not to file voluntarily should ensure that no transaction – whether involving complex securities, financial derivatives, or any other financial instruments – causes the institution to fall out of compliance with its board of directors' interest rate risk limits.

*Risk Reduction*

In general, the use of financial derivatives with high-price sensitivity<sup>3</sup> is limited to transactions and strategies that lower a savings association's interest rate risk as measured by the sensitivity of net portfolio value to changes in interest rates. A savings association that uses financial derivatives for a purpose other than reducing portfolio risk should do so according to safe and sound practices and should:

- Obtain written authorization from its board of directors to use such instruments for a purpose other than to reduce risk.
- Ensure that, after the proposed transaction(s), the savings association's post-shock NPV Ratio would not be less than four percent.

The use of financial derivatives or complex securities with high price sensitivity for purposes other than to reduce risk by savings associations that do not meet the conditions above, constitutes an unsafe and unsound practice.

**Recordkeeping**

Savings associations must maintain accurate and complete records of all derivatives transactions according to 12 CFR § 562.1. Savings associations should retain any analyses (including pre- and post-purchase analyses) relating to investments and derivatives transactions and make such analyses available to examiners upon request.

In addition, for each type of financial derivative instrument the board of directors authorizes, the savings association should maintain records containing the following information:

- The names, duties, responsibilities, and limits of authority (including position limits) of em-

ployees authorized to engage in transactions involving the instrument.

- A list of approved counterparties with which transactions may be conducted.
- A list showing the credit risk limit for each approved counterparty.
- A contract register containing key information on all outstanding contracts and positions.

The contract registers should specify the following information:

- Type of contract
- Price of each open contract
- Dollar amount
- Trade and maturity dates
- Date and manner in which contracts were offset
- Total outstanding positions.

Where deferred gains or losses on derivatives from hedging activities are consistent with generally accepted accounting principles (GAAP), the savings association should maintain appropriate supporting documentation.

**GUIDELINES FOR THE BOARD OF DIRECTORS AND MANAGEMENT**

A savings association's board of directors must manage interest rate risk prudently (12 CFR § 563.176). Under Part 570 Appendix A II, Operational and Management Standards, savings associations must have prudent policies, practices, and systems. These requirements include management of interest rate risk, assessment of asset quality, maintenance of internal controls and information systems and appropriate internal audit systems. Savings associations also must maintain and make available to you an accurate and complete record of transactions involving derivative products (12 CFR Part 562).

<sup>3</sup> For purposes of TB 13a, complex securities with high price sensitivity include those whose price would be expected to decline by more than 10 percent under an adverse parallel change in interest rates of 200 basis points.

### Derivatives Guidelines

Savings associations that use derivatives should adhere to the following guidelines.

#### *Board of Directors' Approval*

The board of directors should adopt and enforce a written policy authorizing and governing the use of derivative products. The policy should (1) identify authorized derivative products and (2) mandate record-keeping systems detailed enough to permit internal auditors to determine whether personnel have operated according to the board's authorization.

Management should report periodically to the board regarding compliance with the board's policies on the use of derivative products.

#### *Interest Rate Risk Policy*

Savings associations must have a comprehensive policy detailing their overall interest rate risk management and investment strategy, pursuant to 12 CFR § 563.176. That plan should include a description of the savings association's derivative strategy and objectives.

#### *Internal Controls*

A savings association should establish the following internal controls and procedures:

- Periodic reports to management.
- Segregation of duties.
- Adherence to internal policies and procedures.
- Prevention of unauthorized transactions and other abuses.

#### *Segregation of Duties*

Internal systems and procedures should segregate duties between those responsible for execution, record keeping, and verification. Management should designate those authorized to transact derivatives.

### *Position Limits*

Management should establish specific position limits (expressed as dollar amounts, or as a percentage of assets or capital) for each major type of derivative product and for each counterparty. Savings associations can measure position limits in terms of either notional balances or value at risk (VAR). The VAR approach provides a more comprehensive indicator of credit and market risk because it considers the current market value and volatility of a derivative contract as well as its size. A ten-year swap has more credit risk and market risk than a two-year swap of the same notional balance because a given change in market interest rates has a greater effect on market value. The limits should be consistent with the following characteristics:

- The savings association's intent.
- Level of management expertise.
- Sophistication of internal control and monitoring systems.
- Asset/liability structure.
- Capacity to maintain liquidity and absorb losses out of capital.

The board of directors, an authorized committee thereof, or the savings association's internal auditors should monitor conformance with such limits. Internal auditors should report their reviews to the board of directors or a committee of the board on a regular basis.

#### *Aggregating Credit Exposures*

Savings associations should aggregate credit exposures to a counterparty considering enforceable netting arrangements. The savings association should regularly calculate credit exposures and compare them to credit limits.

#### *Marking-to-Market*

Savings associations should mark their derivatives positions to market on a regular basis for risk management purposes.

*Professional Expertise*

Savings associations must ensure that they have adequate staff to undertake their derivatives activities. The staff must have the appropriate experience, skill levels, and degrees of specialization.

Savings associations should not place undue reliance on, or delegate decision-making authority to third-party investment advisors. Savings associations must document decisions they make on the recommendations of third parties. (The use of investment advisors should be according to the guidance provided in Handbook Section 540, Investment Securities.)

*Counterparty Credit Analysis*

Savings associations should control counterparty credit risk by limiting transactions to financially strong counterparties. Savings associations should conduct a credit analysis of the counterparty before entering into a transaction. In addition, associations should investigate the dealer's general reputation for fair and honest dealings with customers. Savings associations should also conduct an inquiry of appropriate state or federal securities regulators and securities industry self-regulatory organizations concerning any formal enforcement actions against the dealer, its affiliates, or associated personnel.

Savings associations that use derivatives should assess both the benefits and costs of credit enhancement and related risk-reduction arrangements. If credit downgrades would trigger early termination or collateral requirements, an association should carefully consider its own capacity and that of its counterparties to meet the substantial funding needs that might result.

*Legal Review*

Management should ascertain the rights and obligations of all parties to derivative transactions by carefully reviewing all related contractual and account documents, including margin and collateral requirements, and recourse arrangements. Management should thoroughly understand those

rights and obligations to avoid possible misunderstandings.

*Master Agreements*

Savings associations that use derivatives should use one master agreement with each counterparty to document existing and future derivatives transactions, including options. Master agreements should provide for payments netting and closeout netting, using a full two-way payments approach.

*Evaluation of Hedging Transactions*

For hedging transactions, internal reports should show the market value of the derivative instruments and reconcile the gains and losses to the changes in the value of hedged balance sheet items. For example, if a savings association bought futures contracts to hedge the market value of a group of assets, the savings association should compare the performance of the futures contracts with the performance of the hedged assets to evaluate the overall performance of a hedging program. The savings association should perform an assessment of hedging effectiveness at least quarterly. Monthly assessment may be necessary for larger hedging transactions.

*TFR Reporting*

Savings associations report derivatives positions on Schedule CMR (Consolidated Maturity and Rate) of the Thrift Financial Report. In addition, savings associations indicate whether they have any outstanding futures and options positions on Schedule SQ (Consolidated Supplemental Questions).

**Hedging Guidelines**

There are numerous ways to hedge. Management must select the optimal method for hedging based on the institution's level of risk and the level of in-house expertise. Management must assess the potential costs and benefits of a hedge strategy before its implementation. The savings association must analyze the yield and price characteristics of the hedging instrument(s) and compare these characteristics to those of the hedged assets, li-

abilities, or off-balance sheet positions. Management should evaluate and document the pre-hedging analysis with various examples of the intended strategies and how these strategies would perform under varying interest rate scenarios.

The board of directors and management must consider the level of expertise needed to implement a hedge strategy. If using outside consultants, the savings association must have in-house personnel who thoroughly understand the consultants' recommendations. Management must maintain the final decision-making authority, but they can use the information provided by consultants and brokers. Following the advice of an outside consultant without a thorough understanding of the strategy is not an acceptable practice. Management should not rely solely on the advice of a broker to determine hedge ratios or when to establish or offset hedge positions. Since the broker's commissions depend on transaction volume, there may be an inherent conflict.

One of the keys to a successful hedging program is the expertise of management. Management must have adequate knowledge of various hedging instruments, a thorough understanding of asset/liability management techniques, and the savings association's current interest rate risk position under different interest rate scenarios. Management must also be able to explain the strategies and the methods used to evaluate the effectiveness of the hedging program without relying on assistance from outside consultants or brokers.

#### *Policies, Procedures, and Recordkeeping Requirements*

Savings associations that engage in hedging transactions must have specific written policies and internal control procedures regarding these activities. Policy objectives must be specific enough to outline permissible strategies and take into account:

- The price and yield correlations between assets or liabilities and the hedging instruments with which they are matched (that is, the hedge ratio).

- The relationship of the strategies to the institution's operations.
- How the strategies reduce interest rate risk.

If the hedging program involves complex strategies, documentation should include examples of the intended strategies. The hedging policy should reflect changes in hedging strategies.

The written policy should establish position limits and the parameters by which the board of directors and management will monitor the effectiveness of the hedging program. The board should authorize the individual(s) responsible for executing hedging transactions and establish limits of authority for the individual(s). The board should also approve the selection of consultants and brokers and set specific limitations on the level of authority granted. Policies and procedures should include the segregation of duties between the execution of hedge positions and the transfer of funds. Monthly monitoring reports should detail the volume of transactions, all outstanding positions, the unrealized gains or losses on these positions, and the realized gains or losses from closed positions.

Savings associations must document and monitor all facets of hedging programs, and maintain contract registers for all financial derivatives. The contract registers should specify the type of contract, the price of each open contract, the dollar amount, the trade and maturity dates, the date and manner in which contracts offset each other, the offset gain or loss, and the total outstanding positions. Savings associations must maintain a schedule of the hedged assets and/or liabilities and document the method used to determine the dollar amount of the hedging instrument. The savings association must also maintain documentation on the following:

- Deferred gains or losses from hedge positions.
- Correlation between the gain or loss from the hedging instrument.
- Change in value of the item hedged during the hedge period.

- Method used to amortize any deferred gains or losses from hedge positions.

## TYPES OF DERIVATIVE INSTRUMENTS

### Swaps

#### *Interest Rate Swaps*

Interest rate swaps are the most common type of financial derivative used by savings associations. An interest rate swap is an agreement between two parties to exchange a series of cash flows (based on notional principal amounts) at specified intervals known as payment or settlement dates. The parties do not exchange actual principal amounts. Instead, the parties usually net interim payments, with the net amount being paid to one party or the other.

Savings associations use interest rate swaps primarily to manage interest rate exposure and to reduce debt-financing costs. Swaps transform an existing cash flow stream into a more desirable one from the point of view of a financial institution. For example, a savings association can use a swap to transform floating-rate liabilities into fixed-rate liabilities. Because the parties negotiate swap contracts, they can swap virtually any kind of payment stream. The most common type of swap is the fixed-for-floating interest rate swap.

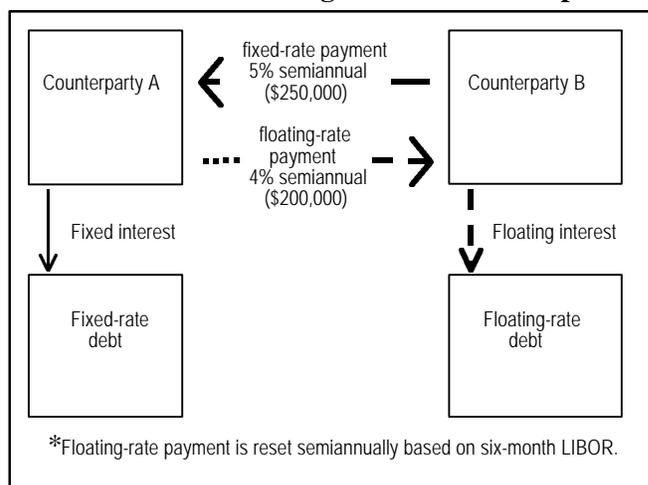
With a fixed-for-floating interest rate swap, one party exchanges a fixed-rate interest payment stream for a floating-rate payment stream. The party that agrees to make fixed-rate payments is the fixed-rate payer, and the party that makes the floating-rate payments is the floating-rate payer. In this instance, a fixed-for-floating swap enables the fixed-rate payer to transform floating-rate liabilities into fixed-rate liabilities. A party could also transform fixed-rate assets into floating-rate assets.

Figure 1 shows an example of a fixed-for-floating interest rate swap. In this example, Counterparty A has \$10 million of fixed-rate borrowings that it wants to convert into floating-rate borrowings. Counterparty B has \$10 million of floating-rate borrowings that it wants to convert into fixed-rate

borrowings. Both parties agree to enter into an interest rate swap with a notional amount of \$10 million. The agreement requires Counterparty B to make semiannual payments to Counterparty A at a fixed rate of five percent for three years. In exchange, Counterparty A agrees to make floating-rate payments based on the six-month London Interbank Offered Rate (LIBOR) with an initial rate of four percent.

In the example, B (the fixed-rate payer) will make a net payment of \$50,000 to A (the floating-rate payer) on the first semiannual payment date. On that date, the floating rate for the next six months resets based on the prevailing six-month LIBOR. If six-month LIBOR increases after the swap is initiated, A's cost of funds will rise because it is obligated to make floating-rate payments to B. On the other hand, B, will benefit if rates rise, since it will receive higher floating-rate payments, while its payments remain fixed at five percent of the notional amount. Savings associations exposed to rising rates (for example, the typical savings association holding interest-bearing deposits) can reduce their exposure by entering into fixed-for-floating swaps as the fixed-rate payer.

**Figure 1**  
**Fixed-for-Floating Interest Rate Swap**



### *Basis Swaps*

Basis swaps involve the exchange of payments based on two different floating-rate indices, such as one-month LIBOR against the Eleventh District Cost of Funds Index (COFI). For example, a pay-COFI, receive-LIBOR swap effectively converts a COFI ARM into a LIBOR ARM, allowing the savings association to match LIBOR-indexed borrowings more closely. The market also calls basis swaps floating-for-floating swaps.

### *Swap Termination*

A savings association may wish to reverse or terminate (unwind) a swap before maturity. There are two ways to unwind a swap position. One way is to negotiate a termination settlement with the original counterparty. The other is to enter into a new swap that is a mirror image of the existing swap to offset the existing position.

### *Swap Variations*

Most swaps have a specified maturity date and a fixed notional amount. Some swaps, however, have notional amounts that amortize over time. Swaps can also be callable, where one of the counterparties has an option to terminate the swap if interest rates increase or decrease beyond the strike rate. A forward swap is a firm commitment to enter into a swap at a specified future date.

### *Uses and Evaluation of Swaps*

Swaps can synthetically extend the term of a matched liability over the term of the swap in much the same way as futures contracts are used to fix financing costs. However, swaps do not require the same active management that futures or options positions require. Swaps are not as liquid as futures contracts. A savings association can offset a swap position and, in effect, cancel it if they negotiate an offset with the counterparty or enter into a reverse swap with terms that are similar to the original swap agreement.

To evaluate the appropriateness of a swap agreement, management should monitor the correlation of the effective spread from the assets and liabili-

ties being hedged by using a swap with a fixed-rate payable and a variable-rate receivable. For example, if a savings association enters into a five-year swap where the fixed interest rate is nine percent and the variable rate on the first payment date is seven percent, the savings associations must pay 200 basis points. However, if the savings association matches the swap, you should compare the variable rate with the rate paid on the matched short-term liability to determine how closely the variable rate received from the swap correlates. If these rates correlate well and the assets funded by the matched liability have a duration of approximately five years, the association may achieve a “locked-in” spread.

### **Forward Contracts**

A forward contract obligates one counterparty to buy, and the other to sell, a specific underlying financial instrument at a specific price, amount, and date in the future. Contracts specifying settlement in excess of 30 days after the trade date are forward contracts. Forward contracts exist for a multitude of underlying assets, including currencies, commodities, and mortgages. Forward contracts trade over-the-counter and counterparties customize these contracts to fit their particular objectives.

**Figure 2**  
**Profit of Forward Contract - Long Position**

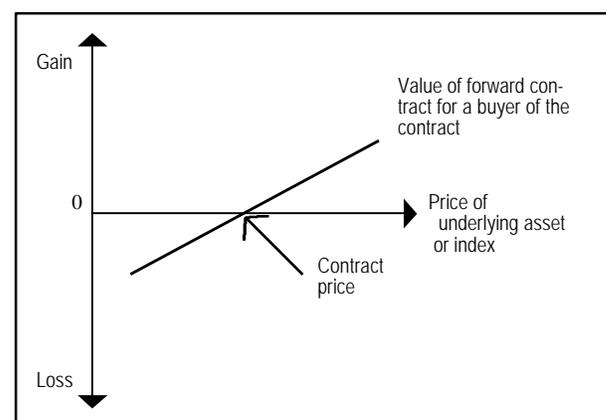


Figure 2 shows the payoff profile of a forward contract. As shown, the change in the value of a forward contract is roughly proportional to the change in the value of the underlying asset or index. The value of the contract conveys at maturity through cash settlement or delivery. If, at maturity, the price of the underlying is higher than the contract price, then the buyer makes a profit. The gain to the buyer equals the loss to the seller.

Forward contracts create two-way credit risk. The counterparty on the side of the contract that has a positive replacement value confronts the credit risk of the other party. However, the market value of a contract can change from a positive value to a negative value, and vice versa. Therefore, each party must assess the creditworthiness of its counterparty because each side may experience a potential gain or loss. The value of the forward contract conveys on the maturity date of the contract. Neither party makes payments at origination or during the life of the contract. The contract owner will either receive or make a payment at maturity, depending on the price movement of the underlying asset or index.

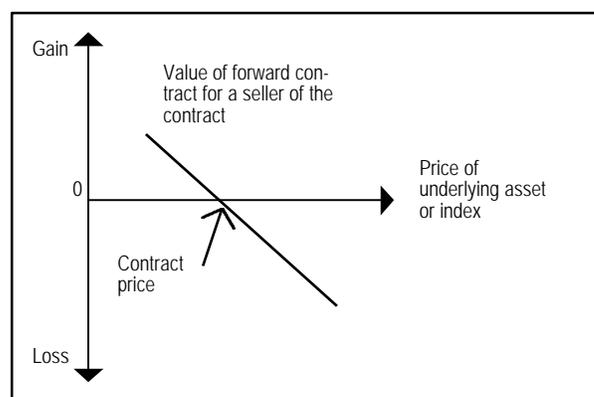
Mortgage bankers often use forward contracts to hedge the price risk of holding loans temporarily. The forward sale of mortgage loans transfers the price risk of holding mortgages in the pipeline to the counterparty. Figure 3 shows the payoff profile of a forward sale. The seller of the forward contract is short the underlying asset, and therefore gains if the value of the underlying asset declines. In a short position, the writer (seller) of a forward contract must fulfill the obligation of the contract.

Forward contracts to sell mortgage production can be either firm or optional commitments. Firm commitments require both parties to perform on the contract (delivery of mortgages or cash settlement), regardless of market conditions. In contrast, optional commitments, such as standbys, require performance only at the option of the party that purchased the option.

Savings associations typically attempt to match the terms of the forward agreement to the terms of the underlying asset that causes the risk exposure.

For example, assume a savings association originates 30-year fixed-rate mortgages and expects to close most of these loans within a 45-day period. As loan production accumulates, the savings association enters into a firm forward commitment to sell 30-year loans with a settlement date 45-days in the future. For the portion of the pipeline that is uncertain as to closure, the savings association may use a standby agreement to hedge the interest rate risk.

**Figure 3**  
**Profit of Forward Contract - Short Position**



In general, forward contracts to buy mortgages or mortgage-backed securities will increase the overall interest rate risk exposure of a typical savings association. You should examine long forward positions to determine if they are being used for speculative purposes. In a long position, the purchaser (holder) of an option contract has the right to exercise the option against the option writer.

#### *Hedging with Forward Commitments*

Savings associations can use firm or standby forward commitments to sell loans or securities as an economic hedging vehicle to reduce the interest rate risk of holding long-term, fixed-rate mortgages or securities in portfolio or in the loan pipeline. (Refer to the Mortgage Banking sections of the Thrift Activities Handbook.) Commitments to sell at the current market price can provide protection against the risk of declining market value associated with rising interest rates. Some savings associations enter into firm commitments to sell

securities (short positions) with a dealer, but rather than deliver the securities at settlement, pair off (offset/buy back) the short positions. If interest rates rise during the commitment period, the commitments can usually be paired off at a gain.

Standby commitments to sell provide flexibility since the savings association can select the amount and cost of coverage. The maximum loss for a standby commitment to sell is the amount of the fee. The amount of the fee depends on the length of the commitment, the relationship between the market value of the underlying security and the commitment price, and the volatility of the underlying security. To determine the appropriateness of using standby commitments to sell, you should assess the cost of the option versus the amount of protection obtained.

You should review forward commitment and pair-off activity for safety and soundness. Significant losses can result from improper use of commitment contracts.

You should check for pair-off positions, where the savings association closes out forward positions before settlement with offsetting forward contracts, usually at a profit. You should review pair-offs in a held-to-maturity portfolio to determine if they constitute trading activity. While pair-offs can represent an acceptable element of a mortgage pipeline-hedging program, excessive pair-off activity may indicate an inefficient hedging process and should receive additional scrutiny. Regulators should determine whether the activity represents an economic hedging strategy or simply a speculative trading activity. To be considered a prudent economic hedging activity, the hedged items (existing or anticipated) the association must meet the following criteria:

- Identify the hedged item.
- Document the purpose of the hedge.
- Justify the hedge ratio based on historic correlation.
- Monitor and maintain the correlation throughout the hedge period.

- Evaluate and justify the effectiveness of the strategy for risk exposure.

Savings associations that use commitments (firm or standby) to hedge the loan pipeline must also document the estimate of fallout since this variable will materially affect the outcome of the hedge. Conversely, you can identify speculative trading activity by the following indicators:

- High volume of purchase and sale and/or pair-off activity.
- Positions held for only short periods.
- The lack of requisite documentation.
- Correlation analysis appropriate to a prudent economic hedging strategy.

### Futures Contracts

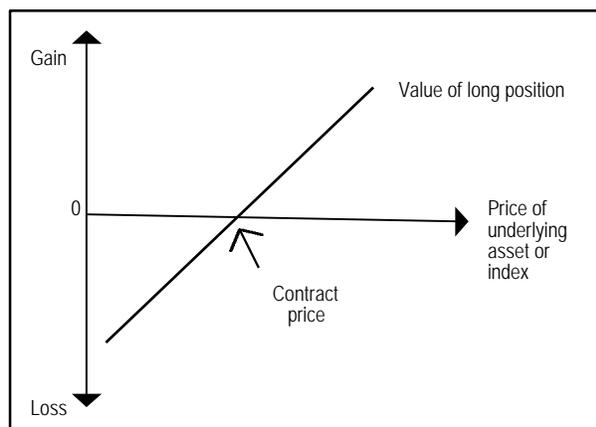
A futures contract is a legally binding agreement to make or take delivery of a standardized quantity and quality of a commodity or financial instrument on a specified date in the future. The value of a futures contract reacts to changes in the price of the underlying commodity or financial instrument in much the same manner as the value of forward contracts. Futures contracts trade on recognized exchanges, and an exchange clearinghouse is the counterparty to each trade.

Futures contracts based on a financial instrument or a financial index are financial futures. Financial futures include interest rate futures, stock futures, and currency futures. Financial futures can be an effective means of controlling interest rate risk for savings associations. The most commonly used interest rate futures are those with Treasury bills, notes, and bonds, and Eurodollar CDs as the underlying asset.

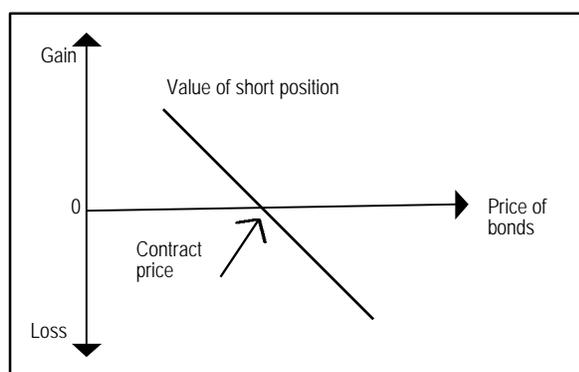
The buyer of a futures contract takes a long position in the market and is long on the futures contract. The buyer can sell the contract at any time before settlement. In the case of an interest rate futures contract, such as a Treasury bond contract, a long position will make a profit if interest rates decline. Lower interest rates mean higher contract prices because there is an inverse rela-

relationship between interest rates and bond prices. Conversely, an increase in interest rates will produce a loss on a long position. The payoff profile of a long futures position is the same as that of a long forward contract position (see Figure 4). Note that futures contracts obligate their owners to purchase a specified asset at a specified exercise price on a specified maturity date.

**Figure 4**  
**Profit of Futures Contract - Long Position**



**Figure 5**  
**Profit of Treasury Bond Futures Contract - Short Position**



The seller of a futures contract takes a short position in the market. In essence, the seller promises to deliver a commodity or financial asset even though he/she may not own the asset. A short position in a Treasury bond contract will produce a

profit if Treasury bond prices decline (that is, if Treasury bond yields increase). Selling a futures contract (a short position) is an example of a hedging strategy that savings associations can use to reduce their interest rate risk exposure if the savings association will lose value when interest rates rise. Figure 5 shows the payoff profile of a short futures position in Treasury bonds. Compared with swaps and forwards, the credit risk of futures contracts is minimal for three reasons:

- Values of futures contracts reflect daily marked-to-market changes. Any change in the value of the futures contract conveys, (that is, settled in cash) at the end of each trading day. In contrast, the value of a forward contract conveys in a single payment at maturity. With a swap contract, changes in value convey periodically throughout the life of the swap on each settlement date.
- Buyers and sellers of futures contracts must post a performance bond, known as initial margin, with their brokers. The customer must establish an initial margin account when opening the contract. The broker adds or subtracts gains and losses on the futures contract from the margin account at the end of each day. If losses cause the margin account to fall below a specified level, the customer must post additional margin, or the broker will close out the account.
- An exchange clearinghouse is the counterparty to each futures transaction.

#### *Hedging with Future Contracts*

There are numerous hedging strategies using futures contracts. You must evaluate each strategy on a case-by-case basis. A description of some of the commonly used strategies and some of the risks of these strategies follows:

- Savings associations that attempt to hedge fixed-rate mortgages or mortgage-backed securities (MBS) with futures contracts based on either Treasury bond or Treasury note futures contracts have significant cross-hedging

risk. Treasury bond futures contracts provide greater liquidity. When interest rates decline, Treasury bond futures contracts will increase in value because these contracts track cash market Treasury bonds. These bonds have set maturity dates. Therefore, when interest rates decline, these securities will increase in value much more than a MBS with the same stated maturity (positive convexity). However, the potential for value changes in the MBS will depend on the duration of the MBS, which will vary based upon the prepayment experience of the underlying mortgages (increased prepayments yield a shorter duration).

Because the price of the MBS exceeds the par value, price appreciation is limited (due to negative convexity). This occurs because a premium MBS results when the coupon rate exceeds the comparable interest rate for current mortgages. If the interest rate on the mortgages underlying the MBS significantly exceeds the prevailing mortgage interest rate, the probability of refinance increases. This causes the duration of the MBS to decrease faster than the duration of the Treasury bond that underlies the futures contract. If interest rates decrease, the losses from the futures positions could significantly exceed the appreciation on the MBS.

You should closely review any hedging strategy that uses Treasury futures matched against MBSs. You should also scrutinize the methods used to determine the number of futures contracts and the monitoring techniques used by management.

- Savings associations engaged in fixed-rate mortgage lending activity may attempt to protect the value of the loan pipeline by hedging. The savings association must estimate the amount of loans expected to close and quantify the risk. They may use futures contracts.
- Some savings associations attempt to synthetically extend the terms of their short-term liabilities by matching futures contracts based on short-term instruments

against them. They normally use Eurodollar and Treasury bill futures contracts (par value of \$1 million) based on 90-day instruments. In this strategy, one determines the number of contracts by comparing the maturity of the hedged liability with the maturity of the instrument underlying the futures contract used. If the maturity of the liabilities and the instruments underlying the futures contract are equal (for example, both 90 days), the savings association uses a one-to-one hedge ratio. That is, for each \$1 million of liabilities hedged, there is one futures contract. If the association hedges liabilities with a maturity of six months, there are two 90-day futures contracts for each \$1 million of hedged liabilities. There is a high correlation between the savings association's method for setting the interest rates on its liabilities compared with the money market interest rate that determines the yield on the instruments that drive the futures contracts used.

#### Contract Placement of Futures

Once the savings association determines the number of contracts, the savings association must select the maturity date of the futures contract. If the savings association decides to place the hedge position in futures contracts that mature at approximately the same time that the liabilities reprice/roll over, this produces a stripped hedge. If the savings association decides to concentrate all or most of the contracts in the futures contract with the most recent contract maturity, this produces a stacked hedge.

To illustrate the structure of a stripped versus a stacked hedge, assume that on June 15, 2001, a savings association decides to hedge for one year \$10 million of 90-day certificates of deposit (CDs) that will next reprice/roll over on September 1, 2001. To establish a stripped hedge, the savings association sells ten September 2001, ten December 2001, ten March 2002, and ten June 2002 futures contracts. At each contract maturity date, ten contracts will close. To establish a stacked hedge, the savings association does not

place the contracts evenly by contract month over the hedge period. Instead, the savings association places all forty contracts in the nearby September 2001 contracts. When the CDs roll over in September, the association closes out ten of the futures contracts, but rolls forward thirty into December 2001 contracts. Similarly, in December 2001, an additional ten contracts close and the remaining twenty roll into March 2002 contracts. The last ten contracts close in June 2002.

Stacking contracts, as opposed to selling a strip of contracts covering the hedge period, involve decisions pertaining to the yield curve and contract liquidity. A hedge manager may establish a hedge position in a nearby contract because these contracts are normally more liquid than the more distant contracts. The hedge manager may stack the hedge position if he anticipates that the yield curve will steepen, as these contracts should provide a greater future gain relative to the nearby contracts. The manager may stack the hedge position in the nearby contracts, if he anticipates that the yield curve will flatten or invert. When reviewing stack hedges, it is important to determine that the motivation for the hedge transactions is to reduce the risk of the hedged item and to achieve a high level of correlation, and not to speculate on yield curve fluctuation.

#### Margin Requirements on Futures Contracts

The savings association must post the initial margin when they establish a futures position. This can be cash, pledged government securities, or irrevocable standby letters of credit. Initial margin requirements for Treasury bonds, Treasury bills, Eurodollars, and futures contracts are normally less than two percent of the contract par value. This margin serves as a good faith deposit, guaranteeing performance.

The value of the futures contract is marked-to-market-daily, and all changes in value settle daily in cash. The daily dollar value that changes hands is the variation margin. If the futures positions have losses, the savings association must post additional margin. The savings association may also withdraw funds equal to the unrealized gains from the margin account.

A savings association must have sufficient funds to cover any calls for variation margin. If the savings association has a large open short futures position, there is the potential for large unrealized losses if interest rates decline. You should consider the opportunity cost of variation margin deposits when evaluating the effectiveness of the hedging program.

#### **Options**

The writer (or seller) of an option sells this contract to a buyer in exchange for a sum of money called the option premium, or the option price. The holder can exercise an American option at any time during the life of the contract. A holder can only exercise a European option on the expiration date. Option contracts trade on exchanges and in the OTC (over-the-counter) markets.

For exchange-traded options, the exchange establishes standardized terms. Conversely, the terms for OTC options (for example, standby commitments) will vary significantly depending on the participants of the agreement. Usually, exchange-traded options will have more liquidity than OTC options once market participants have accepted the contract. However, exchange-traded options track only a limited number of cash market instruments.

#### *Characteristics of Options*

A savings association can purchase (long position) or sell (short position) an option. Options differ from futures in that the holder of a option has the right to purchase or sell versus the obligation to purchase or sell with futures. In return for the right to buy or sell securities, put and call option buyers pay a negotiated premium to put and call option sellers. The seller of the option must perform if the holder exercises the option. Options can provide more flexibility than futures because the savings association can establish a wide variety of positions.

Mathematical models that represent the fair value of options use variables such as the relationship between the market and strike price, the term remaining until option expiration, marketplace

volatility, and short-term interest rates. These models are based on the concept that the option premium has two components: an intrinsic or in-the-money value and time value. Intrinsic value is the amount by which the current market price of the underlying security is above the strike price for calls and below the strike price for puts. Time value is the amount by which the premium exceeds the intrinsic value.

Because option buyers have no obligation to perform after paying the premium, there is no additional margin required. Option writers undertake a firm commitment to assume a long or short position in the market at the strike price if they exercise the option. Because the seller/writer must perform, a margin deposit is required when a position is opened.

Sellers can structure OTC option transactions to meet the specific requirements of the purchaser, thereby providing more flexibility than exchange-traded options. The trade-off is that OTC options are not standardized and usually must be offset by the original counterparty, thereby limiting their liquidity. OTC transactions most commonly involve options on MBSs.

The buyer of an option holds a long position, while the seller (writer) holds a short position. When the writer of the option owns the underlying asset, the option position is covered. When the writer does not own the underlying asset, the writer's position is naked. An option is in the money, if exercising the option produces a gain, while an option is out of the money if exercising the option does not produce a gain.

The following five factors influence the value of an option:

- Strike price.
- Current price of the underlying instrument.
- Time to expiration of the contract.
- Expected volatility of yields (or prices) over the remaining life of the option.

- Short-term risk-free interest rate over the remaining life of the option.

#### *Hedge Ratios for Options*

As with other hedging instruments, some savings associations use the par value approach, thereby matching the contract par value of the options with the hedged item. This method of determining a hedge ratio can be flawed. However, regardless of the approach, if the savings association uses long puts or calls, the maximum losses are the amount of the option premium. Therefore, the savings association knows the potential losses from basis risk.

Some savings associations use the delta of an option to determine the necessary number of contracts to use in hedging. Option valuation models generate the delta of an option. It represents the expected change in the option premium for a given change in the price of the underlying instrument. For example, a delta of 0.5 indicates that if the price of the underlying instrument changed by one dollar, the option premium would change by only 50 cents. A savings association using the delta would use the reciprocal of the delta to determine the number of options contracts. In this example, 1.0 divided by 0.5 would equal two options contracts.

Savings associations should be careful when relying on this measure to determine the number of option contracts. The delta changes frequently, resulting in a continually changing hedge ratio. If the option is out-of-the-money [exercise price is lower (higher) than market price for puts (calls)], this could result in a significant number of option contracts. For example, if the delta were 0.1, the option premium would change 10 cents for each dollar change in the price of the underlying instrument. If a savings association used this strategy to offset the price sensitivity of the instrument underlying the option, they would use a ratio of 10 option contracts for each dollar of matched items. However, the savings association may not hold in portfolio the security that underlies the option. If the savings association matched the option position against an asset or liability that

differs from the instrument underlying the option, the delta will not be as accurate.

### *Basic Strategies using Options*

Numerous strategies use options, including complex combinations of option positions and combinations of options and futures positions. The following subsections describe these strategies.

#### Caps, Floors, and Collars

Customized interest rate options that savings associations use to manage interest rate risk include interest rate caps, floors, and collars. A cap is a contract that provides a buyer with protection against a rise in interest rates above some specified rate. The contract specifies an underlying interest rate index. The most common index is LIBOR. The buyer pays a premium for the option. The contract will specify the notional amount of the contract, the maturity, the settlement frequency, the interest rate index, and the level of protection (for example, the strike rate of the cap). A strike price is the price one can buy, sell, or settle the underlying instrument upon exercise of the option contract.

A savings association can use a cap to set synthetically a maximum rate, or cap, on floating-rate borrowings. If rates rise above the cap rate, the savings association will receive a payment that will offset the increase in interest expense on the floating-rate borrowings above the cap rate. Thus, a savings association can use a cap to fix the maximum rate that it would pay out on a floating-rate obligation, while allowing the savings association to benefit from a decline in rates. (A savings association can also sell a cap to generate income through receipt of a premium. You can consider the sale of caps inappropriate if it exposes the savings association to an excessive amount of interest rate risk.)

A floor is an option contract that provides the buyer with protection against declining interest rates.

A commercial bank with a relatively large portfolio of floating-rate loans might, for example, buy a

floor to protect its net interest earnings against a decline in rates. For a premium, the buyer of a floor receives the difference between the strike rate (floor) and the actual rate on the index if the index falls below the floor. No payments exchange hands if the strike rate on a floor is greater than the current index rate. The seller of a floor receives a premium. You can view a floor as a series of call options.

A collar is a combination of the purchase of a cap at one rate and the sale of a floor at another rate. The cap and floor rates usually ensure that the cost of the cap equals the premium on the floor, resulting in a zero cost collar. For a savings association exposed to rising rates, a collar provides protection if interest rates increase above the strike rate on the cap. But, in exchange for that protection, the savings association gives up the benefits of lower funding costs if rates fall below the strike rate on the floor.

#### Swaptions

A swaption (or swap option) is an option on a swap. It gives the buyer the right, but not the obligation, to enter into a specified swap at a future date.

#### Standby Agreements

A standby agreement is an OTC put option on mortgages or mortgage-backed securities. Usually mortgage bankers use these agreements to offset the risk of loans that they expect to close if interest rates increase, but are otherwise uncertain as to the closure date. A savings association pays a fee to purchase this protection.

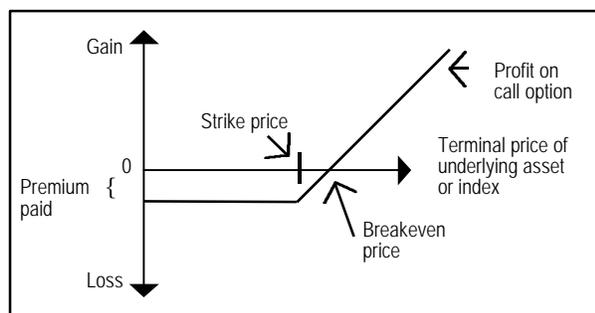
Short standby positions (short puts) involve the receipt of a fee up front for assuming the risk of having to purchase loans at a price above market price. Short puts are usually speculative. You should view them as speculative, unless a savings association can demonstrate otherwise.

#### Calls

A call option gives the holder (the buyer or long position) the right to buy the underlying asset at a

predetermined strike price at a specified time. The buyer of a call option benefits if the price of the underlying asset rises above the strike price by an amount sufficient to cover the option premium. If the holder does not exercise the option before expiration, the option will expire worthless. The profit potential of the long call position is substantial, while the option premium is the maximum loss possible on the option. Figure 6 shows the payoff profile of a long call position.

**Figure 6**  
**Profit on Call Option - Long Position**



**Figure 7**  
**Profit on Call Option - Short Position**

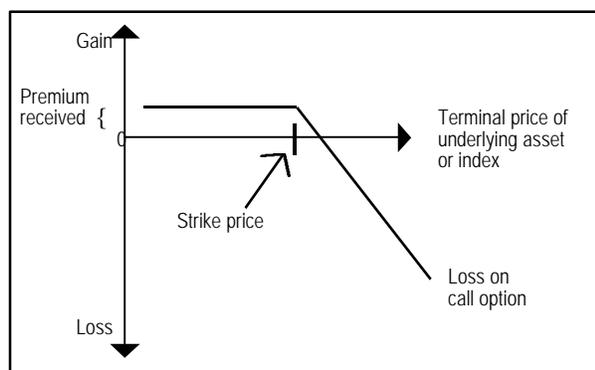


Figure 7 shows the payoff profile of the seller of a call option (the short position). Note that the payoff profile of a short call option position is the opposite of a long call position. Also, the profit potential of a short call position is only the amount of the option premium, while the loss potential is unlimited.

- Writing Calls

This strategy enhances the yield of securities in a portfolio. In return for a specified option premium, the savings association commits to deliver securities at a specified price within a specified time at the option of the purchaser. The savings association also receives the interest income from the securities and records any discount or premium for the securities during the term of the option. If interest rates remain stable, the time value component of the option premium will decline in value, thus benefiting the call writer. This decrease in the value of the option premium enhances the call writer's yield.

Call writing does not provide a hedge. If interest rates increase, the only protection the strategy provides is the amount of the option premium. To reduce risk in call writing, the savings association should hold in portfolio the security that underlies the call option contract. The exercise price of the call agreement should equal or exceed the book value of the securities in portfolio. If interest rates decrease and the market value of the underlying instrument exceeds the commitment price, the option is exercised. If the savings association has the underlying security in portfolio and the exercise price of the call agreement exceeds the book value, the savings association will have only an opportunity loss. If the book value is greater than the exercise price and the securities are called away, the savings association must recognize the losses. Pursuant to SFAS 115, the savings association must classify the securities matched with short calls as either available for sale or trading.

An uncovered, or naked, short call option position can entail significant risk. This strategy involves selling call options matched against a security in portfolio that is not deliverable into the call option. One high-risk strategy is to short calls on Treasury bond futures and match this position against fixed-rate mortgages. If interest rates decline, the losses from the call positions driven by Treasury bond futures contracts can greatly exceed any benefit from the matched asset. The risks of matching Treasury bond futures against MBSs are discussed in the futures section.

- Purchasing Calls

For most savings associations with long-term assets and short-term liabilities, OTS does not consider the purchase of call options to be a hedge. The call provides the right to purchase the underlying securities at a specified price within a set time. When interest rates increase, call values decline, thereby providing no protection against rising interest rates.

Although not considered a hedge, some savings associations buy call options as a proxy for an investment in long-term assets. Instead of buying long-term securities, the savings association purchases call options with a portion of the funds and invests the remainder in short-term assets. If interest rates increase, the return from this strategy will be the interest income from the short-term investment reduced by the cost of the calls. This eliminates the unrealized losses that would have occurred on long-term securities. If interest rates decrease, the return will equal the interest income from the short-term investment plus the gain from the call options. For strategies of this type, the savings association should establish reasonable limits on the amount of the premium invested.

Other strategies involving long calls include buying call options to offset the losses that can result from mortgage loan pipeline fallout, prepayment risk from a mortgage portfolio, or prepayment risk from a servicing portfolio. Some savings associations that have structured their balance sheets with longer-term liabilities and shorter-term assets may also use long calls to reduce the risk of decreasing interest rates.

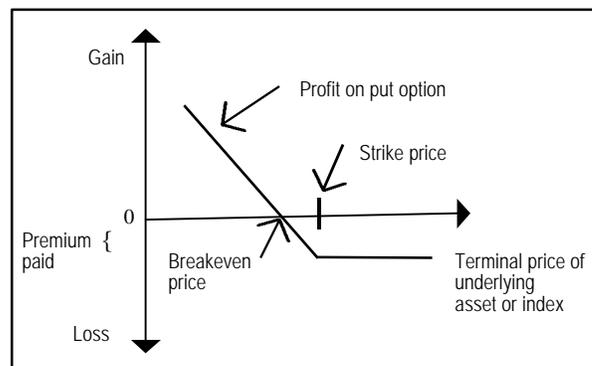
You should consider any strategy involving long calls in conjunction with the regulatory capital position and the overall asset liability structure of the savings association. The savings association should have sufficient capital after providing for the write-off of the entire dollar amount of the option premium.

### Puts

A put option gives the holder (the buyer, or long position) the right to sell a designated asset (or

instrument) to the option writer at a specified price at a specified time. The buyer of a put option benefits if the price of the underlying asset or investment declines by an amount sufficient to cover the option premium. Figure 8 shows the payoff profile of a long put position.

**Figure 8**  
**Profit on Put Option - Long Position**



**Figure 9**  
**Profit on Put Option - Short Position**

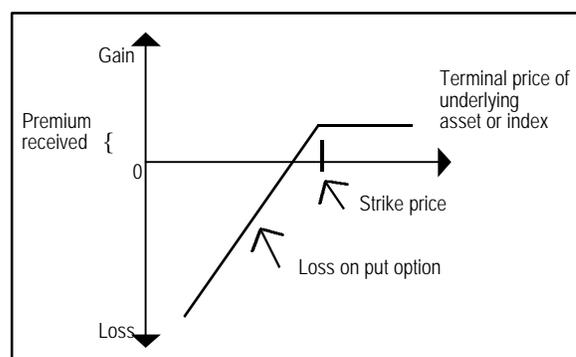


Figure 9 shows the payoff profile of a short put option. Like a short call, the profit potential on a short put is only the premium received for writing the option. However, while the downside potential is substantial, unlike a short call, it is limited.

- Short Puts

For most savings associations, OTS considers short put positions to be speculative transactions. In this strategy, the savings association receives a

fee. In return, the savings association must buy the underlying security within the specified time at the strike price should the holder exercise the put option. The savings association expects interest rates to decline or remain stable. The maximum gain is the option premium received. The risk is equivalent to the amount by which the underlying instrument could potentially decrease in value during the term of the option if interest rates increase.

The regulations also require that the savings association record these positions at their immediate exercise value. If interest rates increase and the value of the instrument underlying the option decreases below the exercise price of the option, the savings association must record the difference as a loss through operations. The savings association must periodically adjust losses while the short put positions remain outstanding.

#### *Combination Strategies using Options*

Certain strategies involve the simultaneous purchase and sale of various options positions with different exercise prices and/or different settlement dates. For example, a savings association could purchase both a put and a call. This strategy attempts to profit from interest rate volatility. Other examples could involve the savings association simultaneously buying put or call options with different exercise prices. You must closely review any activity of this type to assess the rationale for the transactions, the risk and gains or losses.

#### **Mortgage-Derivative Products**

Some savings associations attempt to establish an economic hedge using the following instruments as hedging vehicles:

- Mortgage derivative securities such as interest only (IO) and principal only (PO) stripped mortgage-backed securities.
- Residuals and principals of real estate mortgage investment conduits (REMICs).
- Collateralized mortgage obligations (CMOs).

As hedging transactions, management should maintain reports tracking the market value of the derivative instruments and reconcile the gains and losses to the changes in the value of the hedged balance sheet items. For example, if a savings association bought \$100 million in premium IOs to hedge the market value of \$300 million of MBSs the savings association should compare the gains (losses) on the IOs with the losses (gains) on the MBSs to determine the net gain or loss from the transaction.

You should evaluate the appropriateness of using mortgage derivative products in the context of a savings association's total portfolio. In general, savings associations should limit the use of derivatives to transactions that lower or do not increase their overall exposure to interest rate risk.

Savings associations may use mortgage derivatives as an economic hedge; however, OTS considers them to be cash market instruments that do not qualify as a hedge for accounting purposes. The hedging instrument (for example, IO) may require adjustment from time to time to reflect changes in prepayments and differences in convexity. Management should consult with its independent auditor to assure compliance with GAAP.

In addition to SFAS 133, Emerging Issues Task Force (EITF) Bulletin 89-4 provides guidance on the GAAP treatment for CMO residuals and IOs.

#### **REFERENCES**

##### **Code of Federal Regulations (12 CFR)**

Part 562	Regulatory Reporting Standards
§ 563.170	Examinations and audits
§ 563.172	Financial Derivatives
§ 563.176	Interest Rate Risk Management Procedures

##### **Financial Accounting Standards Board, Statement of Financial Accounting Standards (SFAS)**

SFAS No. 52	Foreign Currency Translation (amended and certain paragraphs)
-------------	---

	superseded by No. 133 as amended)	<b>FFIEC</b>	
SFAS No. 80	Accounting for Futures Contracts (superseded)		Supervisory Policy Statement on Investment Securities and End-User Derivative Activities – 63 FR 20191 (April 23, 1998)
SFAS No. 105	Disclosure of Information about Financial Instruments with Off-Balance Sheet Risk and Financial Instruments with Concentrations of Credit Risk (superseded)		Joint Release: Interim Regulatory Reporting and Capital Guidance on SFAS 133, Accounting for Derivative Instruments and Hedging Activities (December 29, 1998)
			<b>Office of Thrift Supervision Bulletins</b>
SFAS No. 107	Disclosures about Fair Value of Financial Instruments (as amended by No. 133)	TB 13a	Management of Interest Rate Risk, Investment Securities, and Derivative Activities
SFAS No. 115	Accounting for Certain Investments in Debt and Equity Securities (as amended by No. 133)	TB 13a-2	Structured Advances
SFAS No. 119	Disclosure about Financial Instruments and Fair Value of Financial Instruments (superseded)		
SFAS No. 133	Accounting for Derivative Instruments and Hedging Activities (supersedes SFAS Nos. 52, 80, 105, and 119)		
SFAS No. 137	Accounting for Derivative Instruments and Hedging Activities – Deferral of the Effective Date of FASB Statement No. 133 (amends SFAS No. 133 with regard to effective date)		
SFAS No. 138	Accounting for Certain Derivative Instruments and Certain Hedging Activities (amends certain paragraphs of No. 133)		
			<i>Emerging Issues Task Force (EITF)</i>
No. 89-4	Accounting for a Purchased Investment in a Collateralized Mortgage Obligation Instrument or in a Mortgage-Backed Interest Only Certificate		

---

# Derivative Instruments and Hedging Program

---

## Examination Objectives

Determine if the board of directors has adopted a comprehensive hedging policy.

Determine if the association's policies adequately detail the various strategies involving derivatives and hedging.

Determine if the board of directors designates individuals responsible for transactions and specifies appropriate limits of authority.

Determine if management has the expertise to execute the program in conformance with the association's policies.

Determine if the use of derivatives and hedging activity is reasonable based on the association's operations, liquidity position, asset/liability structure, and capital position.

Determine if management and the board of directors adequately monitor the use of derivatives and hedging activity.

Determine if the association complies with regulations, maintains adequate documentation, and accounts for transactions properly.

Determine if there is risk from excessive hedging positions or low correlation between the hedged items and the hedging positions.

Determine if any of the hedging activity is speculative.

## Examination Procedures

Wkp.Ref.

### Level I

1. Review scoping materials applicable to derivative instruments and hedging. Some scoping materials include: the regulatory profile, previous examination report(s), correspondence, agreements, audit report, management letter, applicable work papers from previous examinations, management discussions from previous examinations, notes on interim monitoring, and agreements with investment consultants or brokers.

---

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Derivative Instruments and Hedging Program

---

Wkp.Ref.

2. Obtain the association's policies and procedures relating to derivatives use and hedging. Determine if the policies and procedures contain the following information:

- A description of the intended strategies.
- A list of individuals responsible for executing the transactions for each derivative instrument and established limits of their authority.
- Maximum amount of outstanding position by type (position limits).
- Adequate detail of the rationale for determining the hedge ratios.
- Description of the methods used to monitor the activity.

---

3. Review the board minutes to determine that the board of directors receives monthly reports on the association's use of derivatives and hedging activity. Determine if the reports are adequate for decision-making and allow the board of directors to monitor compliance with established guidelines. Board reports should contain the following information:

- Positions established and offset (volume) by type during the month and realized gains or losses on these positions.
- Open positions at the reporting date and the unrealized gains or losses.

---

4. Determine if management has the expertise to use derivatives and execute a hedge program in accordance with the objectives in the policies and procedures.

---

5. Review the association's IRR Exposure Report to determine if it is using derivatives and hedging activity to lower its interest rate risk.

---

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Derivative Instruments and Hedging Program

---

Wkp.Ref.

6. Summarize findings. Identify areas of concern and management's responses. Update the CEF, if applicable, with any information that will facilitate future examinations. File any exception sheets in the general file.

---

7. Review Level II procedures and perform those necessary to test, support, and present conclusions.

---

### Level II

8. Obtain a listing of each of the general and subsidiary ledger accounts for each derivative instrument. Perform the following procedures:
  - Review a history of the significant transactions for each account to determine the purpose of the transaction and whether it was effective.
  - Compare the actual activity reported on brokers' statements, contract registers, and reports to the board of directors, with the general and subsidiary ledgers.
  - Determine if the association concealed any losses in an account recorded as an asset.
  - Determine the method of accounting used. For instance, deferral, lower of cost or market, marked to market, and determine if it is appropriate.

---
9. Review interest rate swaps and determine the following:
  - Whether the spread between the fixed rate and variable rate is reasonable and the matched asset has a positive spread taking into account the net cost of the swap.
  - The amount of the collateral requirements for the interest rate swaps and the location of the collateral.

---

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Derivative Instruments and Hedging Program

---

Wkp.Ref.

10. Assess the overall effectiveness of the program by identifying, analyzing, and determining the following:
- The assets or liabilities hedged, including dollar amount, maturity, and interest rate.
  - The specific intent of each transaction. For example, was the intent to shorten the term of the asset or extend the term of the liability? Ascertain if each transaction reduced the association's interest rate risk.
  - The method used to derive the hedge ratios and if these ratios are reasonable.
  - The change in value of the hedged asset or liability during the hedge period by comparing the change in the interest rates of the liabilities or market values of the assets during the hedged period.
  - The change in value of the hedged item compared with the gain or loss from the hedging contracts.
  - The effectiveness between the hedging instrument and the matched asset or liability, by comparing the gains or losses from the hedging instrument with the increase or decrease in value of the asset or liability hedged.
  - The effect of the hedge on the overall operation of the thrift.
  - The opportunity cost (gain) of variation margin deposits if significant.

- 
11. Prepare report comments. Identify transactions or matters that raise safety and soundness concerns. Provide the following information:
- A summary of overall finding.
  - A description of deficiencies.
  - Management's proposed corrective actions.
- 

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Derivative Instruments and Hedging Program

---

Wkp.Ref.

12. Ensure that your review meets the *Objectives* of this Handbook Section. State your findings and conclusions, and appropriate recommendations for any necessary corrective measures, on the appropriate work papers and report pages.
- 

### Level III

13. Contact the regional capital markets specialist or other designated individual(s) for consultation on reviewing any of the hedging strategies. Assistance could involve the following items:

- Expanding the scope of review based on the amount of activity.
  - Determining the reasonableness of hedging strategies.
  - Selecting specific transactions for financial modeling.
  - Participation in management discussions that could involve the thrift's consultants or broker/dealers.
  - Structuring comments for the report of examination.
- 

14. Contact the regional accountant or the accounting policy division at OTS Washington to discuss the association's accounting for any of the hedging transactions.
- 

15. Determine if the association has stock that is publicly traded. If so, review the reports filed with the Securities and Exchange Commission, including the 10K (annual) and the 10Q (quarterly) for any mention of derivatives use or hedging activity. Descriptions of activity should be consistent with actual transactions.
- 

16. Determine the creditworthiness of the counterparties if there is reason for concern about the counterparties' financial strength.
- 

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_

---

## Derivative Instruments and Hedging Program

---

Wkp.Ref.

17. If the association conducts a high level of futures and options trading, review auditors' work papers to determine that they performed an appropriate level of verification of outstanding contracts with various brokers.

---

18. If the association conducts active trading, determine the following through observations and discussions with management and other personnel:

- Is there a significant amount of activity with positions open for very short periods?
  - Does the association ensure that the trading and accounting functions are segregated?
- 

**Exam Date:** \_\_\_\_\_  
**Prepared By:** \_\_\_\_\_  
**Reviewed By:** \_\_\_\_\_  
**Docket #:** \_\_\_\_\_