In recent months, some governmental organizations have suffered substantial losses from their investments in "derivatives." For example, Orange County, California went bankrupt and Odessa College, Odessa, Texas, was unable to pay some bills. The public is understandably anxious that public funds not be risked. Several recent SAO reports address this issue in Texas; they are listed in the Bibliography to the main section of the report. However, this appendix is offered as a way to look at a complicated form of investment. Many of the questions that are asked with respect to derivatives are questions that could be asked about any form of investment. They are grouped here for special emphasis and for simplicity. Return to Table of Contents

DEFINITIONS

The State Securities Board defines derivative products (**derivatives**) as investment instruments in the form of a security or contract (including options, futures, options on futures, swap agreements, collateralized mortgage obligations, caps, collars, floors, to name a few) which derives its value from another security, currency, commodity or index. The values of derivatives are based on, or derived from, the value of an underlying asset, reference rate, or index--called the **underlying**. Common types of underlying assets are stocks, bonds, and physical commodities, such as wheat, oil, and lumber. An example of an underlying reference rate is the interest rate on the 3-month U.S. Treasury bill. An example of an underlying index is the Standard & Poor's 500 Index, which measures the performance of 500 common stocks (GAO, May 1994, p.24).

Some of the contracts frequently associated with derivatives are:

- **Forwards** and **futures** are contracts that obligate the holder to buy or sell a specific underlying at a specified price, quantity, and date in the future. Forwards are OTC (Over The Counter) contracts; futures are usually standardized contracts traded on organized exchanges (GAO, May 1994, p. 26).
- **Options** contracts, which can be either customized and privately negotiated or standardized, give the purchaser the right to buy (**call option**) or sell (**put option**) a specified quantity of a commodity or financial asset at a particular price (the exercise price) on or before a certain future date. For this right, the purchaser pays the seller (writer) an amount called the option premium. In general, purchased call options increase in value with increases in the market value of the underlying. Purchased put options generally increase in value with decreases in the market value of the underlying (GAO, May 1994, p. 27).
- **Swaps** are OTC agreements between counterparties to make periodic payments to each other for a stated time. The calculation of these payments is based on an agreed-upon amount, called the notional principal amount or simply the **notional amount**. The notional amount is not typically exchanged except in currency swaps. The periodic payments may be fixed or floating. Floating payments change with fluctuations in interest or currency rates or equity or commodity prices, depending on contract terms (GAO, May 1994, p.28). Reasons for participating in swaps have been described as reducing the overall cost of borrowing, locking in forward rates, reducing interest rate risk, and adjusting the ratio of variable- and fixed-rate debt liabilities. (Shapiro and Wright, 1992)

A bond class in a collateralized mortgage obligation is commonly referred to as a

tranche.

New Authoritative Pronouncements

Accounting for and reporting on derivatives transactions requires specialized accounting and reporting processes. Derivatives transactions are usually more complex than traditional investment transactions. We anticipate changes in the way that derivatives transactions are reported and disclosed in future financial statements. These changes are likely to require changes in entities' accounting and reporting processes.

At the time of this writing, several authoritative pronouncements pertaining to disclosure and accounting for derivatives transactions are in development. A GAO report issued May 1994 (*FINANCIAL DERIVATIVES - Actions Needed to Protect the Financial System*) played a part in prompting the primary accounting authoritative bodies (i.e. FASB, GASB) to accelerate their efforts to issue pronouncements pertaining to derivatives.

The GAO report indicated that Generally Accepted Accounting Principles are not adequate to ensure reliable and consistent financial reporting of derivatives activities. In particular, accounting rules for hedging activities are incomplete and inconsistent (GAO, p.12).

GASB Technical Bulletin No. 94-1, *Disclosures about derivatives and Similar Debt and Investment Transactions* provides guidance on financial statement disclosures and similar transactions.

The Financial Accounting Standards Board (FASB) has recently issued exposure draft No. 136-B *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*. The effective date is for financial statements for fiscal years ending after December 15, 1994, with a one-year delay for smaller entities. FASB also has other pronouncements relating to derivatives that are in different stages of completion.

Understanding Management of Derivatives

As part of gaining an understanding of the investment management process, consider the need to question investment policy practices. A specific example of this might be an entity's policy on the purchase of derivatives.

Because the value of derivatives is linked to that of other assets or rates, changes in interest rates, currency rates, and indexes affect the value of the derivative. Derivatives are typically used to offset potential losses due to swings in those rates and prices. Derivatives are also used to enhance investment yield. Derivatives can be enticing as they may initially show promise of high rates of return. But in investing, the potential for a higher return is accompanied by a higher level of risk. The risks include suffering a partial or even total loss of the investment.

Market participants use derivatives (1) to hedge, or to protect against adverse changes in the values of assets or liabilities; (2) to speculate, or to assume risk in

attempting to profit from anticipating changes in market rates or prices; and (3) to obtain more desirable financing terms. Institutions may also use derivatives to change the asset mix of their portfolios. They use derivatives because their costs are lower than those of buying or selling the underlying (GAO, May 1994).

Mortgage-backed securities (MBSs) and Collateralized Mortgage Obligations (CMOs) fit the broad definition of derivatives and are traded in the form of a security. They are currently in the portfolios of the pension agencies (ERS and TRS), Texas Education Agency (i.e., Permanent School Fund), The University of Texas (i.e., Permanent University Fund), and other state agencies and universities

Mortgage-backed securities (MBSs) are formed by pooling mortgage loans that originate at banks, savings and loans, and mortgage companies. The loans are pooled by Government National Mortgage Association (GNMA), Federal Home Loan Mortgage Corporation (FHLMC), and Federal National Mortgage Association (FNMA) which are government-sponsored agencies. Banks, mortgage companies, etc., service the loans for a fee. GNMA, FHLMC, and FNMA charge a fee for their guarantee of the MBSs issued and pass the principal and interest payments through to the investors. This is why a MBS is sometimes referred to as mortgage pass-through security. The mortgage loans making up a MBS pool are the collateral for that security.

Collateralized mortgage obligations are formed by pooling a group of MBSs. CMOs are created and issued by the government sponsored agencies and private entities (commonly called private-label CMOs). The CMOs are divided into bond classes called tranches. The tranches are set up to better predict maturity and cash flow of the mortgage security. The collateral for a CMO is the pool of MBSs creating the pool.

The most common CMO structures (tranches) are:

- Sequential pay
- Planned amortization class (PAC)
- Very accurately defined maturity (VADM)
- Targeted amortization class (TAC)
- Companion
- Z bond
- Floating and inverse floating rate
- Stripped (i.e. principle only and interest only CMOs)

Many other tranches may be created using hybrids of these major tranches.

Cash flows from both MBSs and CMOs are monthly and consist of three components: (1) interest, (2) scheduled principal repayment, and (3) payments in excess of the regularly scheduled principal repayment. The third component, payments in excess of the scheduled principal repayment, is referred to as a prepayment. It is the amount and timing of this element of the cash flow from a mortgage that makes the analysis of mortgages and mortgage securities complicated. Uncertainty about the amount and timing results in prepayment risk (Fabozzi, 1993, p. 4).

Prepayment risk is shared equally among all investors of a MBS. Unscheduled repayment of principal can be caused by a drop in interest rates, prompting homeowners to refinance their loans. Homeowners who buy new homes will pay off their old home loans which will also cause prepayment of principal. The total amount of prepayment risk does not change when a CMO is created. However, the distribution of that risk among investors can be altered. The tranches created in a CMO is what alters prepayment risk among the investors. Investors have the option to purchase the tranche that best fits their investment needs.

There are generally accepted market conventions for anticipating the speed at which prepayments will occur. An attempt is made to anticipate prepayments to estimate cash flows that can be expected from a MBS or CMO.

One benchmark used is the Constant Prepayment Rate (CPR). This benchmark requires assuming that some fraction of the remaining principal in the pool is prepaid each month for the remaining term of the mortgage. CPR is based on the characteristics of the pool (including its historical prepayment experience) and the current and expected future economic environment. The CPR is an annual prepayment rate. To estimate monthly prepayments, the CPR must be converted into a monthly prepayment rate, commonly referred to as the single-monthly mortality rate (SMM) (Fabozzi, 1993, pp. 30-31).

A second and commonly used benchmark is the Public Securities Association (PSA) prepayment benchmark. The PSA prepayment benchmark is expressed as a monthly series of annual prepayment rates. The basic PSA model assumes that prepayment rates are low for newly originated mortgages and then will speed up as the mortgages become seasoned (Fabozzi, 1993, p. 31).

The formulas used to determine CPR, SMM, and PSA and examples of their use are published in several books including the book cited in this module (see *Collateralized Mortgage Obligations--Structures and Analysis* by Frank J. Fabozzi in this module's bibliography).

It is important to understand prepayment risk because yield, maturity, and value of a MBS or CMO can be significantly affected by unanticipated prepayments (prepayments that are either faster or slower than anticipated).

Credit risk is not a major concern for MBSs and CMOs issued by GNMA, FHLMC, and FNMA because all have a guarantee that principal and interest will eventually be paid. The GNMA is the most credit risk free because they are backed by the full faith and credit of the U.S. Government and guarantees timely payment of principal and interest. The FNMA is not backed by the U.S. Government, but guarantees timely payment of principal and interest. The FHLMC is not backed by the U.S. Government, but it guarantees timely payment of interest and eventually payment of principal. FHLMC has a Gold program that does guarantee timely payment of both principal and interest.

Credit risk is a concern for MBSs and CMOs issued by private-label companies. Unlike the government-sponsored entities (GNMA, FHLMC, and FNMA), private entities have no backing by the government. CMOs issued by private entities are rated by commercial rating agencies. There are various ways that such issues can be credit enhanced, such as through over-collateralization (i.e., collateral with a greater par value than the total par value of all the bond classes in a CMO structure), private mortgage insurance, or a letter of credit (Fabozzi, 1993, p. 10).

Most, if not all, state entities have legal constraints that prohibit the purchase of investments that are not in the form of a security. This could eliminate many of the derivatives products from the selection process because derivatives products are often in the form of a contract. These contracts (i.e. forwards, futures, options, swaps, etc.) are traded both on the exchanges (NYSE, AMEX, etc.) and over-the-counter (OTC).

Recently, the Employees Retirement System requested an opinion from the Office of the Attorney General pertaining to whether ERS may invest its funds in equity swap contracts. The Office of the Attorney General responded with the following summary (Letter opinion No. 94-052 dated June 9, 1994):

> *The Employees Retirement System of Texas may invest its funds in an equity swap contract or an interest rate swap contract if the particular transaction constitutes a "security" under the definition of "security" in article 581-4(A) of the Texas Securities Act, V.T.C.S. tit. 19, or under the definitions of "security" in the federal securities laws, 15 U.S.C. 77b(1), 78c(a)(10).*

The substance of the opinion indicated that neither the Texas State Securities Board nor the Federal government (i.e. Securities and Exchange Commission) has determined whether a swap contract is a security for purposes of state securities laws or federal securities laws. The Attorney General advised the executive director of ERS to invest ERS funds only in those "securities that the ERS board may consider prudent investments" until the Securities and Exchange Commission or the State Securities Board makes a determination pertaining to whether swap contracts are securities. Therefore, the legality of any investment that is not clearly in the form of a security is highly questionable at the time of this writing.

AICPA Questions

The American Institute of Certified Public Accountants (AICPA) has published an alert to governments and the private sector which encourages a better understanding of derivatives. Following are specific questions the AICPA has developed to help top management and other interested parties to gain a better understanding of an entity's derivatives activities (AICPA, pp. 1 and 3):

1. **Has the board established a clear and internally consistent risk management policy, including risk limits (as appropriate)?**
   Are our objectives and goals for derivatives activities clearly stated and communicated? To what extent are our operational objectives for derivatives

being achieved? Are derivatives used to mitigate risk or do they create additional risk? If risk is being assumed, are trading limits established? Is the entity's strategy for derivatives use designed to further its economic, regulatory, industry and/or operating objectives?

2. **Are management's strategies and implementation policies consistent with the board's authorization?**

   Management's philosophy and operating style create an environment that influences the actions of treasury and other personnel involved in derivatives activities. The assignment of authority and responsibility for derivatives transactions sends an important message. Is that message clear? Is compliance with these or related policies and procedures evaluated regularly? Does the treasury function view itself, or is it evaluated, as a profit center?

3. **Do key controls exist to ensure that only authorized transactions take place and that unauthorized transactions are quickly detected and appropriate action is taken?**

   Internal controls over derivatives activities should be monitored on an ongoing basis, and should also be subject to separate evaluations. Who is evaluating controls over derivatives activities? Do they bring the appropriate technical expertise to bear? Are deficiencies being identified and reported upstream? Are duties involving execution of derivatives transactions segregated from other duties (for example, the accounting and internal audit functions)?

4. **Are the magnitude, complexity and risks of the entity's derivatives commensurate with the entity's objectives?**

   What are the entity's risk exposures, including derivatives? Internal analyses should include quantitative and qualitative information about the entity's derivatives activities. Analysis should address the risks associated with derivatives, which include:

   - Credit risk (the possible financial loss resulting from a counterparty's failure to meet its financial obligations)
   - Market risk (the possible financial loss resulting from adverse movements in the price of a financial asset or commodity)
   - Legal risk (the possible financial loss resulting from a legal or regulatory action that could invalidate a financial contract)
   - Control risk (the possible financial loss resulting from inadequate internal control structure)

   Are our derivatives transactions standard for their class (that is, plain vanilla) or are they more complex? Is the complexity of derivatives transactions inconsistent with the risks being managed? The entity's risk assessment should result in a determination about how to manage identified risks of derivatives activities. Has management anticipated how it will manage potential derivatives risks before assuming them?

5. **Are personnel with authority to engage in and monitor derivative transactions**

well qualified and appropriately trained?
Who are the key derivatives players within the entity? Is the knowledge vested only in one individual or a small group? The complexity of derivatives activities should be accompanied by development of personnel. For example, do employees involved in derivatives activities have the appropriate technical and professional expertise? Are other employees being appropriately educated before they become involved with derivatives transactions? Does the entity have personnel who have been cross-trained in case of the absence or departure of key personnel involved with derivatives activities? How do we ensure the integrity, ethical values and competence of personnel involved with derivatives activities?

6. **Do the right people have the right information to make decisions?**
What information about derivatives activities are we identifying and capturing, and how is it being communicated? The information should address both external and internal events, activities and conditions. For example, are we capturing and communicating information about market changes affecting derivatives transactions and about changes in our strategy for the mix of assets and liabilities that are the focus of risk management activities involving derivatives? Is this information being communicated to all affected parties?

Are the analysis and internal reporting of risks the company is managing and the effectiveness of its strategies comprehensive, reliable and well designed to facilitate oversight? The board should consider derivatives activities in the context of how related risks affect the achievement of the entity's objectives--economic, regulatory, industry or operating. For example, do derivatives activities increase the entity's exposure to risks that might frustrate, rather than further, achievement of these objectives?

Do we mark our derivatives transactions to market regularly (and, if not, why not)? Do we have good systems for marking transactions to market? Have the systems been tested by persons independent of the derivatives function? Do we know how the value of our derivatives will change under extreme market conditions? Is our published financial information about derivatives being prepared reliably and in conformity with generally accepted accounting principles?

SAO Questionnaire

The SAO developed a questionnaire which was based on some of the questions posed by the AICPA. It follows:

I. **The objective of these questions is to determine whether the Board/management has an understanding of the different investments purchased by the entity and the related risk associated with these investments.**

- Has an investment policy been established that clearly documents the entity's

expectations regarding risk management of public funds?

- Are investment polices and practices designed to help fulfill the mission of the entity?
- Is the entity's investment strategy for derivatives use designed to further the economic, regulatory, industry, operating, or legislative objectives?
- Do derivative activities increase the entity's exposure to risks that might frustrate, rather than further achievement of objectives?
- Is the Board aware of the different types of derivative investments acquired by the entity and the associated risk of each type?
- Does the Board and management receive an assessment of the various risks associated with the derivative investments (i.e. credit risk, market risk, legal risk, control risk, extension risk)?
- Are derivatives used to mitigate risk, or do they create additional risk? If risk is assumed, are trading limits established?
- Does the entity have limits on the extent of risk associated with the various types of collateralized mortgage obligations (CMOs) (i.e. IOs, POs, floaters, inverse floaters, PACs, support bonds, etc.)?

II. **The objective of these questions is to determine if the investment personnel have the appropriate knowledge and expertise to make decisions regarding derivative investments.**

- Does the investment officer have sufficient experience and training related to derivative investments?
- Do the employees involved in derivative transactions have the appropriate technical and professional expertise?
- Are personnel with authority to engage in and monitor derivative transactions well qualified and appropriately trained?
- Is the knowledge about derivative investments vested in only one individual or a small group?
- How does the Board/management ensure the integrity, ethical values, and competence of personnel involved with derivative activities?

III. **The objective of these questions is to help the Board and management determine if adequate controls are in place and working to ensure that only authorized transactions take place.**

- Are internal controls over derivative activities monitored on an ongoing basis?
- Does someone external of investment activities (i.e. internal auditor) evaluate the controls over derivative investments? Does this person have the appropriate technical expertise to properly evaluate the controls?
- Are duties involving the execution of derivative transactions segregated from other duties (i.e. accounting and internal audit functions)?
- Do the controls in place ensure that unauthorized transactions are quickly detected and appropriate action is taken?

IV. **The objective of these questions is to determine the entity's current status regarding derivative investments.**

- Will any investments, originally acquired as short-term investments, be reclassified as long-term investments? If so, how much and what percentage of short-term investments will the reclassification represent?

  Book value $_____

  Market Value $_____

  Percentage _____

- What benefit(s) do the derivative investments provide the entity that could not be achieved through more traditional investments?
- Will the entity's cash flow be adversely affected due to derivative investments? If so, what is the affect?
- How often does the entity mark the derivative investments to market value (i.e. daily, weekly, monthly)?
- What method of assessing value is used for derivative investments (i.e. inhouse investment models, purchased software, broker firms, etc)?

Both sets of questions above can be used as a starting point for understanding the management process over derivatives activities. Additional research may be required to identify the various types of derivatives products in an entity's portfolio. The auditor must also gain an understanding of each derivatives product, including its cash flows and how its value is determined.