

This section contains product profiles of financial instruments that examiners may encounter during the course of their review of capital-markets and trading activities. Knowledge of specific financial instruments is essential for examiners' successful review of these activities. These product profiles are intended as a general reference for examiners; they are not intended to be independently comprehensive but are structured to give a basic overview of the instruments.

Each product profile contains a general description of the product, its basic characteristics and features, a depiction of the marketplace, market transparency, and the product's uses. The profiles also discuss pricing conventions, hedging issues, risks, accounting, risk-based capital treatments, and legal limitations. Finally, each profile contains references for more information.

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## GENERAL DESCRIPTION

Federal funds (fed funds) are reserves held in a bank's Federal Reserve Bank account. If a bank holds more fed funds than is required to cover its Regulation D reserve requirement, those excess reserves may be lent to another financial institution with an account at a Federal Reserve Bank. To the borrowing institution, these funds are *fed funds purchased*. To the lending institution, they are *fed funds sold*.

## CHARACTERISTICS AND FEATURES

Fed funds purchases are not government-insured and are not subject to Regulation D reserve requirements or insurance assessments. They can be borrowed only by those depository institutions that are required by the Monetary Control Act of 1980 to hold reserves with Federal Reserve Banks: commercial banks, savings banks, savings and loan associations, and credit unions. These transactions generally occur without a formal, written contract, which is a unique feature of fed funds.

Most fed funds transactions are conducted on an overnight-only basis because of the unpredictability of the amount of excess funds a bank may have from day to day. *Term fed funds* generally mature between two days to one year. *Continuing contracts* are overnight fed funds loans that are automatically renewed unless terminated by either the lender or the borrower—this type of arrangement is typically employed by correspondents who purchase overnight fed funds from respondent banks. Unless notified to the contrary by the respondent, the correspondent will continually roll the interbank deposit into fed funds, creating a longer-term instrument of open maturity. The interest payments on continuing contract fed funds loans are computed from a formula based on each day's average fed funds rate.

Fed funds transactions are usually unsecured. Nevertheless, an upstream correspondent bank that is selling funds may require collateralization if the credit quality of the purchaser is not strong.

All fed funds transactions involve only Federal Reserve Bank accounts. Two methods are

commonly used to transfer funds between depository institutions:

- The selling institution authorizes its district Federal Reserve Bank to debit its reserve account and credit the reserve account of the buying institution. Fedwire, the Federal Reserve's electronic funds and securities transfer network, is used to complete the transfer with immediate settlement. On the maturity date, the buying institution uses Fedwire to return the funds purchased plus interest.
- A respondent bank tells its correspondent that it intends to sell funds. In response, the correspondent bank purchases funds from the respondent by reclassifying the respondent's demand deposits as *federal funds purchased*. The respondent does not have access to its deposited money as long as it is classified as federal funds on the books of the correspondents. Upon maturity of the loan, the respondent's demand deposit account is credited for the total value of the loan plus interest.

## USES

Banks lend fed funds to other banks which need to meet Regulation D reserve requirements or need additional funding sources. Since reserve accounts do not earn interest, banks prefer to sell fed funds rather than keep higher than necessary reserve account balances. Community banks generally hold overnight fed funds sold as a source of primary liquidity.

## DESCRIPTION OF MARKETPLACE

Transactions may be done directly between banks, often in a correspondent relationship, or through brokers. They may be initiated by either the buyer or the seller. Many regional banks stand ready to buy all excess funds available from their community bank correspondents or sell needed funds up to a predetermined limit. Consequently, there is a large amount of demand in the fed funds market, with selling banks easily able to dispose of all excess funds. Correspondent banks may also broker funds as agent as long as their role is fully disclosed. Fed

funds, including the term fed funds, are nonnegotiable products and, therefore, there is no secondary market.

## Market Participants

Participants in the federal funds market include commercial banks, thrift institutions, agencies and branches of banks in the United States, federal agencies, and government securities dealers. The participants on the buy side and sell side are the same.

## Market Transparency

Price transparency is high. Interbank brokers disseminate quotes on market news services. Prices of fed funds are active and visible.

## PRICING

Fed fund yields are quoted on an add-on basis. All fed funds yields are quoted on an actual/360-day basis. The fed funds rate is a key rate for the money market because all other short-term rates relate to it. Bid/offer spreads may vary among institutions, although the differences are usually slight. The fed effective rate on overnight fed funds, the weighted average of all fed funds transactions done in the broker's market, is published in *The Wall Street Journal*. Thompson Bankwatch rates the general credit quality of banks, which is used by banks when determining credit risk for fed funds sold.

Rates on term fed funds are quoted in the broker's market or over the counter. In addition, money market brokers publish indicative quotes on the Telerate screen.

## HEDGING

Due to the generally short-term nature of fed funds, hedging does not usually occur, although fed funds futures contracts may be used as hedging vehicles.

## RISKS

### Interest-Rate Risk

For nonterm fed funds, interest-rate risk is

minimal due to the short maturity. For term fed funds, interest-rate risk may be greater, depending on the length of the term.

### Credit Risk

Fed funds sold expose the lender to credit risk. Upstream correspondent banks may require collateral to compensate for their risks. All banks should evaluate the credit quality of any bank to whom they sell fed funds and set a maximum line for each potential counterparty.

### Liquidity Risk

The overnight market is highly liquid. As there is no secondary market for term fed funds rates, their liquidity is directly related to their maturity.

Banks may purchase fed funds up to the maximum of the line established by selling financial institutions. Those lines are generally not disclosed to purchasing banks. Active users may need to test the availability of funds periodically to ensure that sufficient lines are available when needed.

## ACCOUNTING TREATMENT

Fed funds sold should be recorded at cost. Term fed funds sold should be reported as a loan on the call report.

## RISK-BASED CAPITAL WEIGHTING

A 20 percent risk weight is appropriate for fed funds. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

A bank may sell overnight fed funds to any counterparty without limit. Sales of fed funds with maturities of one day or less or under continuing contract have been specifically

excluded from lending limit restrictions by 12 CFR 32. Term fed funds are subject to the 15 percent lending limit with any one counterparty and may be combined with all other credit extensions to that counterparty. Sales of fed funds to affiliates are subject to 12 USC 371c, "Loans to Affiliates."

## REFERENCES

Federal Reserve Bank of New York. *Fedpoints* #15. New York, June 1991.

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Stigum, Marcia. *The Money Market*. 3rd ed. Homewood, Illinois: Business One Irwin, 1990.

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**GENERAL DESCRIPTION**

Commercial paper (CP) is a short-term, fixed-maturity, unsecured promissory note issued in the open markets as an obligation of the issuing entity. CP is usually issued with maturities of less than 270 days, with the most common having maturities of 30 to 50 days or less. CP is sold either directly by the issuer or through a securities broker. For entities with a sufficient credit rating, CP is generally backed by bank lines of credit or letters of credit. However, some entities with lesser-quality credit will issue CP without credit enhancements. These issues are typically through private placements and are generally not rated. Foreign corporations may also issue CP. Banks are active in the CP market as issuers, investors, dealers, and lenders on lines of credit used to back CP issuance.

**CHARACTERISTICS AND FEATURES**

CP is issued in maturities that range anywhere from a few days to 270 days (the Securities and Exchange Commission (SEC) does not generally require registration of securities due in less than 270 days), depending on the funding needs of the issuer. Most CP matures in less than 30 days. Issuers prefer to issue CP with a maturity of less than 90 days so that banks can use the CP as collateral at the Federal Reserve discount window. Most issuers need ongoing financing and roll the CP over at maturity, using the new proceeds to pay off the maturing CP. The minimum round-lot transaction is \$100,000. Some

issuers will sell CP in denominations of \$25,000. CP is quoted on a 360-day discount basis. A small amount of CP is issued in interest-bearing form; the rate paid on this paper is the quoted discount rate converted to the equivalent simple interest rate. CP is typically issued in bearer form, but it may also be issued in registered form.

**CP Credit Ratings**

Credit ratings are crucial to the CP market because most investors restrict their CP investments to high-quality CP or will only buy rated CP. The CP ratings are assessments of the issuer’s likelihood of timely payment. Table 1 summarizes CP ratings from the major rating agencies.

Superior-rated issues are considered to have a high likelihood of repayment, satisfactory-rated issues are considered to have satisfactory likelihood, and so on. Before they will assign a rating, the credit agencies require issuers to prove that they have adequate short-term liquidity. Some issuers raise their credit ratings by obtaining credit support to guarantee payment, such as a letter of credit (credit-supported commercial paper), or by collateralizing the issue with high-quality assets (asset-backed commercial paper).

**USES**

**Investors**

CP is generally purchased as a short-term, liquid, interest-bearing security. The short

Table 1—Commercial Paper Ratings

	<i>Moody’s</i>	<i>S&amp;P</i>	<i>Duff &amp; Phelps</i>	<i>Fitch</i>
Superior	P-1	A-1+/A-1	Duff 1, Duff 1,	F-1
Satisfactory	P-2, P-3	A-2	Duff 1+	F-2
Adequate	P-3	A-3	Duff 2	F-2
Speculative	NP	B, C	Duff 4	F-3
Defaulted	NP	D	Duff 5	F-5

maturity structure, low credit risk, and large number of issuers make CP an attractive short-term investment alternative for short-term portfolio managers and for the liquid portion of longer-term portfolios. CP is particularly attractive when interest rates are volatile, as many investors are unwilling to buy long-term, fixed-rate debt in a volatile interest-rate environment.

Investors wishing to take a position in short-term rates denominated in a foreign currency without taking the risks of investing in an unfamiliar counterparty or facing country risk often invest in an instrument such as Goldman Sachs's Universal Commercial Paper (UCP) or Merrill Lynch's Multicurrency Commercial Paper (MCCP). With UCP or MCCP, the dealer creates synthetic foreign currency-denominated paper by having a U.S. issuer issue CP in a foreign currency. The dealer then executes a currency swap with the issuer, which eliminates foreign-exchange risk for the issuer. The investor is therefore left with a short-term piece of paper denominated in a foreign currency and that is issued by a U.S. counterparty, thus eliminating country risk.

## Banks and Bank Holding Companies

Bank holding companies (BHCs) are active issuers of CP. The money raised is often used to fund nonbank activities in areas such as leasing and credit cards and to fund offshore branches.

BHCs use commercial paper in sweep programs. On a BHC level, the sweep programs are maintained with customers at the bank level, and the funds are upstreamed to the parent as part of the BHC's funding strategy. Sweep programs use an agreement with the bank's deposit customers (typically corporate accounts) that permits them to reinvest amounts in their deposit accounts above a designated level in overnight obligations of the parent bank holding company, another affiliate of the bank, or a third party. These obligations include instruments such as commercial paper, program notes, and master-note agreements.

## DESCRIPTION OF MARKETPLACE

### Investors

The short-term nature of commercial paper,

together with its low credit risk and large number of issuers, makes it an attractive short-term investment for many investors. Investment companies, especially money funds, are the largest investors in the CP market. Other significant investors include the trust departments of banks, insurance companies, corporate liquidity portfolios, and state and local government bodies. If CP carries a rating of A-2, P-2, or better, thrifts may buy CP and count it as part of their liquidity reserves.

### Issuers

Issuers of CP include industrial companies, such as manufacturers, public utilities, and retailers, and financial institutions, such as banks and leasing companies. Financial issuers account for approximately 75 percent of CP outstanding, with industrial issuance making up the remainder. Approximately 75 percent of the CP outstanding carries the highest credit rating of A-1/P-1 or better, while only approximately 5 percent of CP outstanding carries a credit rating of A-3/P-3 or below. In the U.S. market for CP, domestic issuers account for approximately 80 percent of issuance, with foreign issuers making up the remainder.

Several large finance companies and bank holding companies place their paper directly with the investor without using a dealer. Approximately 40 percent of all CP outstanding is placed directly with the investor.

### Primary Market

The primary market consists of CP sold directly by issuers (direct paper) or sold through a dealer acting as principal (dealer paper). Dealer paper accounts for most of the market. As principals, dealers buy and immediately sell the CP (with a small markup called the dealer spread). Sometimes the dealers hold CP as inventory for a short time as a service to issuers in need of immediate funds. Dealers are mostly large investment banks and commercial banks with subsidiaries that underwrite and deal in securities.

Although dealers do not normally inventory positions in CP, at times they will agree to position any paper that the issuer posted but did not sell on a particular day. The amount unsold is usually small, and the positions assumed are

usually on an overnight basis only. If the market moves, most issuers give dealers the discretion to sell CP within established bands set by the issuer.

Issuers of CP have their own dedicated sales force to market their paper. Direct issuers also post their rates on services such as Telerate and Reuters and often post rates with bank money desks. Sometimes a company sells direct paper under a master-note agreement, under which the investor can buy and sell CP daily, up to a specific amount, for a specific interest rate that is set daily. The return on the master-note CP is slightly higher than that on an overnight repo.

## Secondary Market

The CP market is larger than the market for other money market instruments, but secondary trading is only moderately active. Most investors have purchased CP tailored to their short-term investment needs and hold it to maturity. If an investor chooses to sell CP, he can usually sell it back to the original seller (dealer or issuer). Although CP is not traded on an organized exchange, price quotes for most of the significant issues can be obtained from security brokers. Average yields on newly issued CP are published in the *Wall Street Journal*.

## PRICING

Each issue is priced based on the strength of the credit rating of the issuer. CP is a discount instrument, which means that it is sold at a price less than its maturity value (though occasionally, CP is issued as interest-bearing paper). The difference between the maturity value and the price paid is the interest earned by the investor. When calculating commercial paper, a year is assumed to have 360 days.

The yield on CP tracks that of other money market instruments. CP yields are higher than those offered on comparable T-bills—the higher credit risk is due to less liquidity and the state and local income tax exemption of T-bills. The rate on CP is also slightly higher than that offered on comparable certificates of deposit (CDs) due to the poorer liquidity of CP relative to CDs.

## HEDGING

As mentioned above, dealers do not usually inventory positions in CP. When they do, these positions tend to be small and are usually held only overnight. Because of the short-term nature of CP, dealers often do not hedge these open positions. When these positions are hedged, dealers generally use instruments such as T-bill futures or Eurodollar futures to hedge their residual exposure. However, use of these products may subject the dealer to basis risk to the extent that the underlying instrument and the hedge instrument do not move in tandem.

## RISKS

### Credit Risk

Given that CP is an unsecured obligation of the issuer, the purchaser assumes the risk that the issuer will not be able to pay the debt at maturity. This credit risk is generally mitigated by the financial strength of most issuers and by some form of credit enhancement (unused bank lines of credit, letters of credit, corporate guarantees, or asset collateralization). Historically, the default rate on CP has been extremely low.

### Liquidity Risk

As most investors hold CP until maturity, trading in the secondary market is relatively thin. As a result, only the highest-rated issues may be readily marketable in the secondary market. Privately placed CP is subject to further legally mandated restrictions on resale, which presents additional impediments to marketability.

### Interest-Rate Risk

Like all fixed-income instruments, CP is subject to interest-rate risk. However, this risk is usually minimal given CP's short-term nature.

### Foreign-Exchange Risk

CP denominated in foreign currency may expose the purchaser to foreign-exchange risk.

## ACCOUNTING TREATMENT

The accounting treatment for investments in commercial paper is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

CP is generally weighted at 100 percent unless it is backed by a bank letter of credit, in which case the asset weight would be 20 percent. Tax-exempt CP may carry weights of 20 percent or 50 percent, depending on the issuer (that is, depending on whether the obligation is a general obligation or a revenue obligation). For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

CP is considered a loan to the issuer and is therefore subject to the applicable lending limit of the purchasing institution. One exception would be general obligation tax-exempt CP, which can be held without limitation. Holdings of CP issued by an affiliate are subject to the limitations of section 23A of the Federal Reserve Act regarding loans to affiliates.

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### GENERAL DESCRIPTION

A repurchase agreement (repo) involves the sale of a security to a counterparty with an agreement to repurchase it at a fixed price on an established future date. At initiation of the transaction, the buyer pays the principal amount to the seller, and the security is transferred to the possession of the buyer. At expiration of the repo, the principal amount is returned to the initial buyer (or lender) and possession of the security reverts to the initial seller (or borrower). Importantly, the security serves as collateral against the obligation of the borrower and does not actually become the property of the lender. Given the short tenor of a typical repo and the need to make proper custody arrangements for the securities involved, operational issues are important to proper management of repo activities. At times, in addition to being a counterparty in some transactions, a bank may serve as third-party custodian of securities collateral in other transactions as a service to the buyer and the seller.

In a repurchase agreement, a bank borrows funds when it “sells” the security and commits to “repurchase” it in the future. In a reverse repurchase agreement, the bank lends funds when it “buys” the security and commits to “resell” it in the future. A reverse repo is sometimes termed a resale agreement or a security purchased under agreement to resell (SPAR). The terms “repo” and “reverse repo” thus describe the same transaction, but from the perspective of each counterparty.

A closely related instrument is a dollar roll, which is identical to a repurchase agreement except that the “repurchase” leg of the transaction may involve a *similar* security rather than the specific security initially “sold.” In a dollar roll, the transaction contract explicitly allows for substitution of the collateral. The borrower of funds in this transaction thus runs the risk that at the closing of the transaction he or she will own a security that is generally comparable but inferior in some material way to the original security.

### CHARACTERISTICS AND FEATURES

Most repos are conducted with U.S. Treasury or

agency securities as collateral. Repos of mortgage pass-through securities and collateralized mortgage obligations (CMOs) issued or guaranteed by U.S. government agencies are less common but occur frequently. Repos of other securities or loans are not common, in part because the Federal Reserve System generally considers repos with other assets to be deposits of the selling institution and subject to Regulation D reserve requirements.

Repos can be conducted on an overnight basis, for a longer fixed term, or on an open-account basis. Overnight repos, or one-day transactions, represent approximately 80 percent of all repo transactions. Anything longer (called a “term repo”) usually extends for less than 30 days. Repo agreements “to maturity” are those that mature on the same day as the underlying securities. “Open” repo agreements have no specific maturity, so either party has the right to close the transaction at any time.

### USES

In general, repos are attractive to a variety of market participants as (1) a low-cost source of short-term funding for borrowers and (2) an asset with high credit quality regardless of the counterparty for suppliers of funds. Participation in this market requires proper operational and administrative arrangements as well as an inventory of eligible collateral.

### Dealers

Repos can be used to finance long positions in dealers’ portfolios by short-term borrowing. The repo market is a highly liquid and efficient market for funding dealers’ bond inventory at a short-term rate of interest. Dealers may also use repos to speculate on future levels of interest rates. The difference between the coupon rate on the dealer’s bond and the repo rate paid by the dealer is called “carry,” and it can be a source of dealer profit. Sometimes the borrowing rate will be below the bond’s coupon rate (positive carry), and sometimes the borrowing rate will be above the bond’s coupon rate (negative carry).

Dealers may use reverse repos to cover short positions or failed transactions. The advantage

of the reverse repo is that a dealer may borrow a security it has sold short with either positive or negative carry. A problem arises, however, when demand exceeds supply for a specific bond issue (collateral), and it goes on “special.” This means that those who own the security can earn a premium by lending it to those needing to deliver on short positions. These “lenders” are compensated by paying a below-market borrowing rate on the cash side of the transaction (the repo rate is lower on “specials” because the owner of the special security is the borrower of cash funds and is seeking the lowest lending rate possible).

### Bank Nondealer Activity

Like dealers, a bank can use repos to fund long positions and profit from the carry. The market also gives a bank the means to use its securities portfolio to obtain additional liquidity—that is, funding—without liquidating its investments or recognizing a gain or loss on the transaction. For money market participants with excess funds to invest in the short term, reverse repos provide a collateralized lending vehicle offering a better yield than comparable time deposit instruments.

### Commercial Depositors

Repos have proved to be popular temporary investment vehicles for individuals, firms, and governments with unpredictable cash flows. Repos (like other money market instruments) can also be used as a destination investment for commercial depositors with sweep accounts, that is, transaction accounts in which excess balances are “swept” into higher-yielding non-bank instruments overnight. Again, as collateral for the corporation’s investment, the counterparty or bank will “sell” Treasury bills to the customer (that is, collateralize the loan).

## DESCRIPTION OF MARKETPLACE

On any given day, the volume of repo transactions amounts to an estimated \$1 trillion. Important lenders of funds in the market include large corporations (for example, General Motors) and mutual funds. Borrowers generally include large

money-center or regional banks with a need for funding.

Repos are not traded on organized exchanges. There is no secondary market, and quoted market values are not available. The Public Securities Association has produced a standard master repo agreement and supplements that are used throughout the industry. Although the transactions themselves are not rated, the entities undertaking repos (such as larger banks and dealers) may be rated by Moody’s, Standard & Poor’s, or other rating agencies.

## PRICING

Repo rates may vary somewhat with the type of collateral and the term of the transaction. Overnight repos with U.S. government collateral, however, generally take place at rates slightly below the federal funds rate. Interest may be paid explicitly, so that the “sale” price and “repurchase” price of the security are the same, or it may be embedded in a difference between the sale price and repurchase price.

The seller of a security under a repo agreement continues to receive all interest and principal payments on the security while the purchaser receives a fixed rate of interest on a short-term investment. In this respect, interest rates on overnight repo agreements usually are lower than the federal funds rate by as much as 25 basis points. The additional security provided by the loan collateral employed with repos lessens their risk relative to federal funds.

Interest is calculated on an actual/360 day-count add-on basis. When executed under a continuing contract (known as a demand or open-basis overnight repo), repo contracts usually contain a clause to adjust the interest rate on a day-to-day basis.

## HEDGING

Since repo rates move closely with those of other short-term instruments, the hedge vehicles available for these other instruments offer an attractive hedge for positions in repos. If the portfolio of repos is not maintained as a matched book by the institution, the dealer or bank could be subject to a level of residual market risk.

## RISKS

### Market Risk

Repos and reverse repos, if used to fund longer or more sensitive positions, expose the institution to changes in the future levels of interest rates.

### Credit Risk

The buyer is exposed to the risk that the seller will default on his or her obligation to repurchase the security when agreed. Of course, the buyer has access to the security as collateral and, in the event of default, the security could be sold to satisfy the debt. However, this could occur only through legal procedures and bankruptcy. Despite the conventional terminology, this type of transaction is a collateralized advance and not truly considered a sale and repurchase. If the value of the security has declined since the funds were disbursed, a loss may be incurred. Overcollateralization and margin arrangements are used to reduce this risk.

### Operational Risk

If the buyer is to rely on its ability to sell a security in the open market upon the seller's default, it must exercise effective control over the securities collateralizing the transactions. The Government Securities Act was passed in 1986 to address abuses that had resulted in customer losses when the security was held by the seller. Its requirements include (1) written repurchase agreements must be in place, (2) the risks of the transactions must be disclosed to the customer, (3) specific repurchase securities must be allocated to and segregated for the customer, and (4) confirmations must be made and provided to the customer by the end of the day on which a transaction is initiated and on any day on which a substitution of securities occurs. Participants in repo transactions now will often require securities to be delivered or held by a third-party custodian. (See section 2020.1 of the *Commercial Bank Examination Manual*.)

## ACCOUNTING TREATMENT

The accounting treatment for repurchase agreements is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

In general, assets collateralized by the current market value of securities issued or guaranteed by the U.S. government, its agencies, or government-sponsored agencies are given a 20 percent risk weight. If appropriate procedures to perfect a lien in the collateral are not taken, the asset should be assigned a 100 percent risk weight. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Repos on securities that are eligible for bank investment under 12 USC 24 (seventh) and 12 CFR 1 and that meet guidelines set forth by the Federal Reserve System may be held without limit. Repos that do not meet these guidelines should be treated as unsecured loans to the counterparty subject to 12 USC 84 and should be combined with other credit extensions to that counterparty. Repos with affiliates are subject to 12 USC 371c.

## REFERENCES

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### GENERAL DESCRIPTION

U.S. Treasury bills, notes, and bonds (collectively known as “Treasuries”) are issued by the Treasury Department and represent direct obligations of the U.S. government. Treasuries have very little credit risk and are backed by the full faith and credit of the U.S. government. Treasuries are issued in various maturities of up to 10 years.

### CHARACTERISTICS AND FEATURES

#### Treasury Bills

Treasury bills, or T-bills, are negotiable, non-interest-bearing securities with original maturities of three months, six months, and one year. T-bills are offered by the Treasury in minimum denominations of \$10,000, with multiples of \$5,000 thereafter, and are offered only in book-entry form. T-bills are issued at a discount from face value and are redeemed at par value. The difference between the discounted purchase price and the face value of the T-bill is the interest income that the purchaser receives. The yield on a T-bill is a function of this interest income and the maturity of the T-bill. The returns are treated as ordinary income for federal tax purposes and are exempt from state and local taxes.

#### Treasury Notes and Bonds

Treasury notes are currently issued in maturities of 2, 3, 5, and 10 years on a regular schedule. Treasury notes are not callable. Notes and bonds pay interest semiannually, when coupon rates are set at the time of issuance based on market interest rates and demand for the issue. Notes and bonds are issued monthly or quarterly, depending on the maturity of the issue. Notes and bonds settle regular-way, which is one day after the trade date (T+1). Interest is calculated using an actual/365-day-count convention.

### USES

Banks use Treasuries for investment, hedging, and speculative purposes. The lack of credit risk

and deep liquidity encourages the use of Treasuries as investment vehicles, and they are often held in a bank’s investment portfolio as a source of liquidity. Since it is the deepest and most efficient financial market available, many fixed-income and derivative instruments are priced relative to Treasuries. Speculators often use Treasuries to take positions on changes in the level and term structure of interest rates.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

T-bills are issued at regular intervals on a yield-auction basis. The three-month and six-month T-bills are auctioned every Monday. The one-year T-bills are auctioned in the third week of every month. The amount of T-bills to be auctioned is released on the preceding Tuesday, with settlement occurring on the Thursday following the auction. The auction of T-bills is done on a competitive-bid basis (the lowest-yield bids are chosen because they will cost the Treasury less money). Noncompetitive bids may also be placed on purchases of up to \$1 million. The price paid by these bids (if allocated a portion of the issue) is an average of the price resulting from the competitive bids.

Two-year and 5-year notes are issued once a month. The notes are generally announced near the middle of each month and auctioned one week later. They are usually issued on the last day of each month. Auctions for 3-year and 10-year notes are usually announced on the first Wednesday of February, May, August, and November. The notes are generally auctioned during the second week of those months and issued on the 15th day of the month.

#### Primary Market

Treasury notes and bonds are issued through yield auctions of new issues for cash. Bids are separated into competitive bids and noncompetitive bids. Competitive bids are made by primary government dealers, while noncompetitive bids are made by individual investors and small institutions. Competitive bidders bid yields to

three decimal places for specific quantities of the new issue. Two types of auctions are currently used to sell securities:

- *Multiple-price auction.* Competitive bids are ranked by the yield bid, from lowest to highest. The lowest price (highest yield) needed to place the allotted securities auction is determined. Treasuries are then allocated to non-competitive bidders at the average yield for the accepted competitive bids. After all Treasuries are allocated to noncompetitive bidders, the remaining securities are allocated to competitive bidders, with the bidder bidding the highest price (lowest yield) being awarded first. This procedure continues until the entire allocation of securities remaining to be sold is filled. Regional dealers who are not primary government dealers often get their allotment of Treasury notes and bonds through primary dealers, who may submit bids for the accounts of their customers as well as for their own accounts. This type of auction is used for 3-year and 10-year notes.
- *Single-price auction.* In this type of auction, each successful competitive bidder and each noncompetitive bidder is awarded securities at the price equivalent to the highest accepted rate or yield. This type of auction is used for 2-year and 5-year notes.

During the one- to two-week period between the time a new Treasury note or bond issue is auctioned and the time the securities sold are actually issued, securities that have been auctioned but not yet issued trade actively on a when-issued basis. They also trade when-issued during the announcement to the auction period.

### *Secondary Market*

Secondary trading in Treasuries occurs in the over-the-counter (OTC) market. In the secondary market, the most recently auctioned Treasury issue is considered “current,” or “on-the-run.” Issues auctioned before current issues are typically referred to as “off-the-run” securities. In general, current issues are much more actively traded and have much more liquidity than off-the-run securities. This often results in off-the-run securities trading at a higher yield than similar-maturity current issues.

## Market Participants

### *Sell Side*

All U.S. government securities are traded OTC, with the primary government securities dealers being the largest and most important market participants. A small group of interdealer brokers disseminates quotes and broker trades on a blind basis between primary dealers and users of the Government Securities Clearing Corporation (GSCC), the private clearinghouse created in 1986 to settle trades for the market.

### *Buy Side*

A wide range of investors use Treasuries for investing, hedging, and speculation. This includes commercial and investment banks, insurance companies, pension funds, and mutual fund and retail investors.

## Market Transparency

Price transparency is relatively high for Treasury securities since several information vendors disseminate prices to the investing public. Govpx, an industry-sponsored corporation, disseminates price and trading information over interdealer broker screens. Prices of Treasuries are active and visible.

## PRICING

### Treasury Bills

Treasury bills are traded on a discount basis. The yield on a discount basis is computed using the following formula:

$$\begin{aligned} \text{Annualized Yield} = & \\ & [( \text{Face Value} / \text{Price} ) / \text{Face Value}] \\ & \times ( 360 / \text{Days Remaining to Maturity} ) \end{aligned}$$

## Treasury Notes and Bonds

Treasury note and bond prices are quoted on a percentage basis in 32nds. For instance, a price of 98:16 means that the price of the note or bond will be 98.5 percent of par (that is, 98 16/32). Notes and bonds can be refined to 64ths through the use of a plus tick. A 98:16+ bid means that the bid is 98 and 16½ 32nds (that is, 98 16.5/32), which is equivalent to 98.515625 percent of par. When the note or bond is traded, the buyer pays the dollar price plus accrued interest as of the settlement date. Yields are also quoted on an actual/365-day-count convention.

## HEDGING

Treasuries are typically hedged in the futures or options markets or by taking a contra position in another Treasury security. Also, if a position in notes or bonds is hedged using an OTC option, the relative illiquidity of the option may diminish the effectiveness of the hedge.

## RISKS

### Market Risk

The risks of trading Treasury securities arise primarily from the interest-rate risk associated with holding positions and the type of trading conducted by the institution. Treasury securities are subject to price fluctuations because of changes in interest rates. Longer-term issues have more price volatility than shorter-term instruments. A large concentration of long-term maturities may subject a bank's investment portfolio to increased interest-rate risk. For instance, an institution that does arbitrage trading by buying an issue that is relatively cheap (that is, an off-the-run security) in comparison to historical relationships and selling one that is relatively expensive (that is, a current security) may expose itself to large losses if the spread between the two securities does not follow its historical alignments. In addition, dealers may take positions based on their expectations of interest-rate changes, which can be risky given the size of positions and the impact that small changes in rates have on the value of longer-duration instruments. If this type of trading is occurring, the institution's risk-management system should be sufficiently sophisticated to handle

the magnitude of risk to which the dealer is exposed.

## Liquidity Risk

Because of their lower liquidity, off-the-run securities generally have a higher yield than current securities. Many institutions attempt to arbitrage these pricing anomalies between current and off-the-run securities.

## ACCOUNTING TREATMENT

The accounting treatment for investments in Treasuries is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

U.S. Treasury bills, notes, and bonds have a zero percent risk weighting. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

U.S. Treasury bills, notes, and bonds are type I securities with no legal limitations on a bank's investment.

## REFERENCES

Fabozzi, Frank J., and T. Dessa Fabozzi, ed. *The Handbook of Fixed Income Securities*. 4th ed.

Chicago: Irwin Professional Publishing, 1995.  
Stigum, Marcia L. *The Money Market*. 3d ed.  
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U.S. Department of the Treasury. *Buying Treasury Securities*. Washington, D.C.: The Bureau of the Public Debt, 1995.



### GENERAL DESCRIPTION

STRIPS are zero-coupon securities (zeros) of the U.S. Treasury created by physically separating the principal and interest cash flows. This process of separating cash flows from standard fixed-rate Treasury securities is referred to as "coupon stripping." Similar trademark securities with such acronyms as CATS and TIGRs are created by investment banks.

### CHARACTERISTICS AND FEATURES

STRIPS is the U.S. Treasury's acronym for "Separate Trading of Registered Interest and Principal Securities," the Treasury program developed in 1985 to facilitate the stripping of designated Treasury securities. All new Treasury bonds and notes with maturities of 10 years and longer are eligible to be stripped under this program and are direct obligations of the U.S. government. Under the STRIPS program, the holder of any eligible security can request that the U.S. Treasury create separate book-entry instruments for all of the principal and interest cash flows. The principal and interest portions of these instruments are assigned separate identification (CUSIP) numbers and may be owned and traded separately.

### Trademark Products

Trademark products, which predate the STRIPS market, are stripped Treasury securities created by investment banks. In August 1982, Merrill Lynch marketed its Treasury Income Growth Receipts (TIGRs) and Salomon Brothers marketed its receipts as Certificates of Accrual on Treasury Securities (CATS). Other investment banks followed suit by issuing their own receipts. These products were created by purchasing Treasury securities and depositing them in a trust. The trusts then issued receipts representing ownership interests in the coupon and principal payments of the underlying Treasury securities.

Since the start of the STRIPS program in 1985, creation of trademark products such as

TIGRs and CATS has ceased, and STRIPS now dominate the market. Trademark products are, however, still traded in the secondary market.

### USES

STRIPS and other zero-coupon instruments can be tailored to meet a wide range of portfolio objectives because of their known cash-flow value at specific future dates. Specifically, they appeal to investors who want to lock in a terminal value without incurring the risk associated with reinvesting intervening cash flows. They also appeal to investors with definite opinions on interest rates, as prices of STRIPS are highly sensitive to changes in interest rates. Due to this high sensitivity to interest-rate changes, disproportionately large long-maturity holdings of Treasury derivatives such as STRIPS, CATS, or TIGRs in relation to the total investment portfolio or total capital of a depository institution would be considered an imprudent investment practice.

### DESCRIPTION OF MARKETPLACE

The STRIPS program provides that all stripped securities be maintained in a book-entry format. For maintenance and transfer purposes, each marketable Treasury security has a unique identification (CUSIP) number. Under STRIPS, each principal and interest component is assigned a separate CUSIP number. All STRIPS are traded over the counter (OTC), with the primary government securities dealers being the largest and most important market participants. A small group of interdealer brokers disseminates quotes and broker trades on a blind basis between market participants. Arbitrageurs continually monitor the prices of STRIPS and underlying coupon-bearing bonds, looking for profitable opportunities to strip or reconstitute. Price transparency is relatively high for STRIPS since several information vendors disseminate prices to the investment public.

## Market Participants

A wide range of investors use zeros for investing, hedging, and speculation. This includes commercial and investment banks, insurance companies, pension funds, and mutual fund and retail investors.

## PRICING

The prices of STRIPS, CATS, and TIGRs are quoted on a discount basis, as a percentage of par. Eligible securities can be stripped at any time. For a book-entry security to be separated into its component parts, the par value must be an amount which, based on the stated interest rate, will produce a semiannual interest payment of \$1,000 or a multiple of \$1,000. Quotes for STRIPS are quoted in yields to maturity.

## HEDGING

Zeros are typically hedged in the futures or options markets, or by taking a contra position in another Treasury security. The effectiveness of any hedge depends on yield-curve and basis risk. Also, if a position in zeros is hedged with an OTC option, the relative illiquidity of the derivative Treasury security and the option may diminish the effectiveness of the hedge.

## RISKS

Many factors affect the value of zeros. These include the current level of interest rates and the shape of their term structure (interest-rate risk), bond maturities (rate sensitivity or duration), and the relative demand for zero-coupon bonds (liquidity).

## Interest-Rate Risk

Increases in the level of interest rates increase the advantages of stripping. This is because the constant-yield method applied to premium bonds results in a lower price than linear amortization does. Zeros have higher sensitivity to changes in interest rates than bonds with the same maturity. Because they are zero-coupon bonds, their

duration equals their maturity. Duration measures the percentage change in price for a given change in rates. The higher the duration, the higher the potential volatility.

## Liquidity Risk

The STRIPS market is significantly less liquid than the U.S. Treasury bond market. Investors encounter wider bid/ask spreads and are subject to higher commissions. In addition, liquidity may fluctuate significantly in times of market instability. However, since a dealer can strip or reconstitute bonds in a fairly flexible manner, if zero-coupon prices diverge too far from their equilibrium levels, a new supply can be created or reduced through the stripping and reconstitution process.

Trademark products may have an uncertain marketability, as some may be eligible to be purchased only through the sponsoring dealer. CATS, however, are listed on the New York Stock Exchange, enhancing their liquidity. The market for zero-coupon Treasuries is more retail-oriented than the rest of the market. This often results in wider trading spreads, smaller transaction size, and less liquidity.

## Credit Risk

As an obligation of the U.S. Treasury, STRIPS are considered to be free from default (credit) risk. Trademark products such as CATS and TIGRs are collateralized by the underlying U.S. Treasury, but whether they are considered "obligations" of the U.S. Treasury is uncertain. Proprietary products should be reviewed individually to determine the extent of credit risk.

## ACCOUNTING TREATMENT

The accounting treatment for investments in U.S. Treasury STRIPS is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting

treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

U.S. Treasury STRIPS have a zero percent risk weighting. Trademark products have a 20 percent risk weighting. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

U.S. Treasury STRIPS are a type I security with no limitations on a bank's investment. Trademark products are proprietary products, so legal limits vary. Appropriate supervisory personnel should be consulted on specific issues.

## REFERENCES

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- Nagan, Peter S., and Kenneth A. Kaufman. "STRIPS—An Exciting New Market for Zero-Coupons." *ABA Banking Journal*.
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- Woelfel, Charles J. *Encyclopedia of Banking and Finance*. 10th ed. Cambridge, England: Probus Publishing Company.

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## GENERAL DESCRIPTION

Treasury inflation-indexed securities (TIIs) are issued by the Treasury Department and represent direct obligations of the U.S. government. The securities are designed to provide investors with a hedge against increases in inflation. The initial auction of these relatively new securities was held in January 1997, when a 10-year note was issued. Various longer-term maturities are planned for future auctions, which will be held quarterly. TIIs have very little credit risk, since they are backed by the full faith and credit of the U.S. government. Banks can be designated as primary dealers of Treasury securities, but they may sell them in the secondary markets and invest in TIIs for their own account.

## CHARACTERISTICS AND FEATURES

TIIs were created to meet the needs of longer-term investors wanting to insulate their investment principal from erosion due to inflation. The initial par amount of each TII issue is indexed to the nonseasonally adjusted Consumer Price Index for All Urban Consumers (CPI-U). The index ratio is determined by dividing the current CPI-U level by the CPI-U level that applied at the time the security was issued or last re-indexed. If there is a period of deflation, the principal value can be reduced below par at any time between the date of issuance and maturity. However, if at maturity the inflation-adjusted principal amount is below par, the Treasury will redeem the security at par. Every six months, interest is paid based on a fixed rate determined at the initial auction; this rate will remain fixed throughout the term of the security. Semiannual interest payments are determined by multiplying the inflation-adjusted principal amount by one-half the stated rate of interest on each payment date. TIIs are eligible for stripping into their principal and interest components under the Treasury STRIPS program.

Similar to zero-coupon bonds, TIIs are tax disadvantaged in that investors must pay tax on the accretion to the principal amount of the security, even though they do not currently receive the increase in principal in cash. Paying

tax on income not received reduces the effective yield on the security.

The following example illustrates how TIIs work: suppose an investor purchases a \$1,000 note at the beginning of the year, in which the interest rate set at the time of the auction is 3 percent. Also suppose that inflation for the first year of the note is 3 percent. At the end of the first year, the \$1,000 principal will be \$1,030, reflecting the increase in inflation, although the investor will not receive this increase in principal until maturity. The investor will receive, however, the 3 percent interest payment. At the end of the first year, the notes will be paying 3 percent interest on the increased principal balance of \$1,030. Principal will be adjusted each year, based on the increase or decrease in inflation.

## USES

At present, the primary strategy behind the purchase of a TII would be to hedge against erosion in value due to inflation. However, banks also use TIIs for investment, hedging, and speculative purposes. As TIIs are tax disadvantaged, they are most likely to appeal to investors who are not subject to tax.

An investor in TIIs is taking a view that *real* interest rates will fall. Real interest rates are defined as the nominal rate of interest less the rate of inflation. If nominal rates fall, but inflation does not (that is, a decline in real interest rates), TIIs will appreciate because their fixed coupon will now represent a more attractive rate relative to the market. If inflation rises, but nominal rates rise more (that is, an increase in real interest rates), the security will decrease in value because it will only partially adjust to the new rate climate.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

The auction process will use a single pricing method identical to the one used for two-year and five-year fixed-principal Treasury notes. In this type of auction, each successful competitive

bidder and each noncompetitive bidder is awarded securities at the price equivalent to the highest accepted rate or yield.

## Market Participants

### *Sell Side*

Like all U.S. government securities, TIIs are traded over the counter, with the primary government securities dealers being the largest and most important market participants. A small group of interdealer brokers disseminate quotes and broker trades on a blind basis between primary dealers and users of the Government Securities Clearing Corporation (GSCC), the private clearinghouse created in 1986 to settle trades for the market.

### *Buy Side*

A wide range of investors are expected to use TIIs for investing, hedging, and speculation, including commercial and investment banks, insurance companies, pension funds, mutual funds, and individual investors. As noted above, TIIs will most likely appeal to investors who are not subject to tax.

## Market Transparency

Price transparency is relatively high for Treasury securities since several information vendors disseminate prices to the investing public. Govpx, an industry-sponsored corporation, disseminates price and trading information via interdealer broker screens. Prices of TIIs are active and visible.

## RISKS

### Interest-Rate Risk

TIIs are subject to price fluctuations because of changes in real interest rates. TIIs will decline in value if real interest rates increase. For instance, if nominal interest rates rise by more than the increase in inflation, the value of a TII will decrease because the inflation component will not fully adjust to the higher level of nominal

rates in the market. As the coupon rate on TIIs is well below market for similar maturity instruments, the duration of TIIs will be higher, increasing the price sensitivity of the instrument for a given change in real interest rates. Also, the CPI-U index used in calculating the principal accretion on TIIs is lagged three months, which will hurt the investor when inflation is rising (and help the investor when inflation is falling).

Longer-term issues will have more price volatility than shorter-term instruments. A large concentration of long-term maturities may subject a bank's investment portfolio to unwarranted interest-rate risk.

## Liquidity Risk

The Treasury securities market is the largest and most liquid in the world. While an active secondary market for TIIs is expected, that market initially may not be as active or liquid as the secondary market for Treasury fixed-principal securities. In addition, as a new product, TIIs may not be as widely traded or well understood as Treasury fixed-principal securities. Lesser liquidity and fewer market participants may result in larger spreads between bid and asked prices for TIIs relative to the bid/ask spreads for fixed-principal securities of the same maturity. Larger bid/ask spreads normally result in higher transaction costs and/or lower overall returns. The liquidity of the TII market is expected to improve over time as additional amounts are issued and more entities enter the market.

## ACCOUNTING TREATMENT

The accounting treatment for investments in Treasury inflation-indexed securities is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for

Derivatives and Hedging Activities,” as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, “Accounting,” for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

TIIIs have a zero percent risk weighting. For specific risk weights for qualified trading accounts, see section 2110.1, “Capital Adequacy.”

## LEGAL LIMITATIONS FOR BANK INVESTMENT

TIIIs are a type I security so there are no legal limits on a bank’s investment in them.

## REFERENCES

U.S. Department of the Treasury. *Buying Treasury Inflation-Indexed Securities*. Washington, D.C.: The Bureau of the Public Debt, 1997.

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## GENERAL DESCRIPTION

Agency securities are debt obligations issued by federal agencies or federally sponsored agencies. Federal agencies are direct arms of the U.S. government; federally sponsored agencies are privately owned and publicly chartered organizations which were created by acts of Congress to support a specific public purpose (also referred to as government-sponsored entities or GSEs).

Federal agencies are arms of the federal government and generally do not issue securities directly in the marketplace. These agencies include the Government National Mortgage Association (GNMA or Ginnie Mae), Export-Import Bank, Farmers Home Administration (FmHA), General Services Administration (GSA), Maritime Administration, Small Business Administration (SBA), Tennessee Valley Authority, Commodity Credit Corporation, Rural Electrification Administration, Rural Telephone Bank, and Washington Metropolitan Area Transit Authority. All federally related institutions are exempt from registration with the Securities and Exchange Commission (SEC). Except for securities of the Private Export Funding Corporation and the Tennessee Valley Authority, the securities are backed by the full faith and credit of the U.S. government.

Government-sponsored entities include agencies in the following areas:

- housing (such as the Federal Home Loan Mortgage Corporation and Federal National Mortgage Association)
- farm credit (such as the Federal Farm Credit Bank System and Farm Credit System Financial Assistance Corporation)
- student loans (such as the Student Loan Marketing Association)
- small business (the Small Business Administration)
- export funding (the Export-Import Bank)

GSEs issue both discount and coupon notes and bonds. Discount notes are short-term obligations, with maturities ranging from overnight to 360 days. Coupon notes and bonds are sold with maturities greater than two years. The securities are not backed by the full faith and credit of the U.S. government. Consequently, investors purchasing GSEs are exposed to some potential

credit risk. The yield spread between these securities and Treasury securities of comparable maturity reflects differences in perceived credit risk and liquidity.

GSEs issue direct debt obligations and guarantee various types of asset-backed securities. This section discusses only securities that represent direct obligations of federal and federally sponsored agencies. For a discussion of securities issued or guaranteed by some of these agencies, see "Residential-Mortgage-Backed Securities," section 4110.1. Also, many GSEs are active in issuing structured notes. The role of the agency and particular risks involved in these securities are discussed in section 4040.1, "Structured Notes."

## CHARACTERISTICS AND FEATURES

Federal-agency securities such as those issued by the Government National Mortgage Association are backed by the full faith and credit of the U.S. government. However, government-sponsored agency securities are not guaranteed by the U.S. government, although market participants widely believe that the government would provide financial support to an agency if the need arose. This view has gained some credence as a result of the federal government's operations to bolster the Farm Credit System in the mid-1980s. U.S. agency securities are also exempt from SEC registration.

## USES

Agency securities are deemed suitable investments for banks. They are frequently purchased by banks and held in their investment portfolios.

## DESCRIPTION OF MARKETPLACE

In the primary market, government agencies and GSEs sell their securities to a select group of commercial banks, section 20 subsidiaries of commercial banks, and investment banks known as "selling groups." Members of a selling group advise the agencies on issuing debt, placing the

debt with end-users, and making markets in these securities.

Prices for the securities traded in the secondary market can be obtained from the "Money and Investing" section of *The Wall Street Journal* or the financial section of local newspapers. Other media, such as Internet financial sites and Bloomberg, provide over-the-counter quotes as well.

## Federal Agencies

Federal agencies do not issue securities directly in the marketplace. Since 1973, most have raised funds through the Federal Financing Bank, although many of these institutions have outstanding obligations from previous debt issues. Federal agencies include the following: the Export-Import Bank of the United States, Commodity Credit Corporation, Farmers Home Administration, General Services Administration, Government National Mortgage Association, Maritime Administration, Private Export Funding Corporation, Rural Electrification Administration, Rural Telephone Bank, Small Business Administration, Tennessee Valley Authority, and Washington Metropolitan Area Transit Authority (neither the Tennessee Valley Authority nor the Private Export Funding Corporation is backed by the full faith and credit of the U.S. government).

## Federally Sponsored Agencies

Following is a summary of the main federally sponsored agencies and the types of obligations that they typically issue to the public. The Federal Farm Credit Bank System issues discount notes; short-term bonds with maturities of three, six, and nine months; and long-term bonds with maturities of between one and 10 years. The Federal Farm Credit Bank also issues medium-term notes which have maturities of between one and 30 years. The Federal Farm Credit System Financial Assistance Corporation issues 15-year notes, guaranteed by the federal government, which were issued to support the Farm Credit System in the mid-1980s.

The Federal Home Loan Bank System issues discount notes that mature in one year or less and noncallable bonds with maturities ranging from one to 10 years. These debts are consoli-

dated obligations of the 12 regional Federal Home Loan Banks whose mandate is to provide funds to savings and other home-financing member organizations.

The Federal National Mortgage Association (Fannie Mae) issues short-term discount notes and long-term bonds with maturities of up to 30 years. Fannie Mae has also issued indexed sinking-fund debentures which are callable and contain features of both mortgage-backed securities and callable corporate bonds. The Federal Home Loan Mortgage Corporation (Freddie Mac) issues discount notes and a limited number of bonds. The Student Loan Marketing Association (Sallie Mae) issues unsecured debt obligations in the form of discount notes to provide funds to support higher education.

## PRICING

Agency notes and bonds are quoted in terms of 32nds (a percentage of par plus 32nds of a point). Thus, an investor will be willing to pay 101.5 percent of par for an agency security that is quoted at 101:16. Short-term discount notes are issued on a discount basis similar to the way that U.S. Treasury bills are priced.

Agency securities trade at yields offering a positive spread over Treasury security yields because of slightly greater credit risk (due to the lack of an explicit government guarantee for most obligations) and somewhat lower liquidity.

## HEDGING

The price risk of most agency securities is hedged in the cash market for Treasury securities or by using Treasury futures or options. As with all hedges, yield curve and basis risk must be monitored closely. In addition, dealers who are actively conducting arbitrage trades and other strategies should have the capability to monitor their positions effectively.

## RISKS

As with any security, much of the risk is a function of the type of trading strategy conducted by an institution.



## Interest-Rate Risk

Agency securities are subject to price fluctuations caused by changes in interest rates. As with other types of securities, the longer the term of the security, the greater the fluctuation and level of interest-rate risk. Moreover, some agency securities are subject to greater interest-rate risk than others. Agencies that issue structured notes that are direct obligations, such as step-up notes from a Federal Home Loan Bank, may have greater risk than other agency securities.

## Credit Risk

The credit risk of agency securities is slightly higher than that of Treasury securities because agency securities are not explicitly guaranteed by the U.S. government. However, their credit risk is still low due to the *implied* government guarantee.

## Liquidity Risk

Agency securities as a whole are not as liquid as U.S. Treasury securities, but liquidity varies widely within the agency market, depending on the issuer and the specific debt obligation. In general, agency securities have large trading volumes on the secondary market that help to keep the liquidity risk low. However, various debt provisions and structured notes of different agency securities contribute to differing levels of liquidity risk within the agency market.

## ACCOUNTING TREATMENT

The Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities," determines the accounting treatment for investments in government agency securities. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of

Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Federal-agency securities have a zero percent risk asset capital weight, as they are direct and unconditionally guaranteed obligations of federal agencies. Obligations of federally sponsored agencies (not explicitly guaranteed) have a 20 percent risk asset capital weight. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

General obligations of U.S. government agencies are type I securities, and are exempt from the limitations of 12 USC 24 (section 5136 of the U.S. Revised Statutes). Banks may purchase these securities for their own accounts without limitation, other than the exercise of prudent banking judgment. (One exception is an obligation of the Tennessee Valley Authority (TVA), which is a type II security. Investments in the TVA are limited to 10 percent of a bank's capital stock and unimpaired surplus.)

## REFERENCES

- Board of Governors of the Federal Reserve System. *Commercial Bank Examination Manual*.
- Fabozzi, Frank J., ed. *The Handbook of Fixed Income Securities*. 4th ed. Burr Ridge, Ill.: Irwin, 1991.
- First Boston Corporation, The. *Handbook of U.S. Government and Federal Agency Securities*. 34th ed. Chicago: Probus Publishing Company, 1990.
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## GENERAL DESCRIPTION

Structured notes are hybrid securities, possessing characteristics of straight debt instruments and derivative instruments. Rather than paying a straight fixed or floating coupon, the interest payments of these instruments are tailored to a myriad of possible indexes or rates. The Federal Home Loan Bank (FHLB), one of the largest issuers of such products in the United States, has more than 175 indexes or index combinations against which cash flows are calculated. In addition to the interest payments, the redemption value and final maturity of the securities can also be affected by the derivatives embedded in structured notes. Most structured notes contain embedded options, generally sold by the investor to the issuer. These options are primarily in the form of caps, floors, or call features. The identification, pricing, and analysis of these options give structured notes their complexity.

Structured notes are primarily issued by *government-sponsored enterprises (GSEs)*, such as the Federal Home Loan Bank (FHLB), Federal National Mortgage Association (FNMA), Student Loan Marketing Association (SLMA), and Federal Home Loan Mortgage Corporation (FHLMC). Although the credit risk of these securities is minimal, other risks such as interest-rate risk, market (price) risk, and liquidity risk can be material.

## CHARACTERISTICS AND FEATURES

There are many different types of structured notes; typically, a structure is created specifically to meet one investor's needs. Thus, an exhaustive description of all the types of structures in which an institution may invest is impossible. However, certain structures are fairly common and are briefly described below.

In many cases, very complex probability and pricing models are required to accurately evaluate and price structured notes. As mentioned earlier, most structures have embedded options, implicitly sold by the investor to the note's issuer. The proper valuation of these options poses unique challenges to investors considering structured notes. Many popular structures include

embedded, path-dependent options for which pricing involves complex models and systems.

## Inverse Floating-Rate Notes

An inverse floating-rate note (FRN) has a coupon that fluctuates inversely with changes in the reference rate. The coupon is structured as a base rate minus the reference rate, for example, a three-year note with a semiannual coupon that pays 13 percent minus six-month LIBOR, and an interest-rate floor of 0 percent, which ensures that rates can never be negative. The return on an inverse FRN increases in a decreasing-rate environment, and decreases in an increasing-rate environment. An investor in an inverse FRN is taking a view that rates will decrease. An inverse FRN has the risk characteristics of a leveraged fixed-rate instrument: inverse FRNs will outperform nonleveraged fixed-rate instruments when rates decrease and underperform when rates increase. If rates increase significantly, the investor may receive no coupon payments on the note.

The leverage inherent in an inverse FRN varies with each structure. The leverage amount of a particular structure will be equal to the underlying index plus one (that is, 13 percent minus 6-month LIBOR has a leverage factor of 2; 20 percent – (2 × 6-month LIBOR) has a leverage factor of 3). The degree of leverage incorporated in an FRN will increase the volatility and, hence, the interest-rate and price risk of the note.

## Step-Ups/Multi-Steps

Step-up notes or bonds are generally callable by the issuer; pay an initial yield higher than a comparable fixed-rate, fixed-maturity security; and have coupons which rise or “step up” at predetermined points in time if the issue is not called. If the coupon has more than one adjustment period, it is referred to as a multi-step. Step-up notes have final maturities ranging from one year to as long as 20 years. Typical *lock-out periods* (periods for which the note cannot be called) range from three months to five years.

An example of a step-up note is a five-year note which has an initial coupon of 6 percent; the coupon increases 50 basis points every six months. The note is callable by the issuer on any six-month interest-payment date.

Step-up notes contain embedded call options “sold” to the issuer by the investor. Any time an issue is callable, *the purchaser of the security has sold a call option to the issuer*. In the above example, the investor has sold a series of call options, called a *Bermuda option*, to the issuer. The note is callable on *any* interest-payment date after a specified lock-out period. Unlike callable issues which pay a *flat* rate until maturity or call, the step-up feature of these securities increases the value of the call options to the issuer and likewise increases the prospect of early redemption. Multi-steps can also be thought of as one-way floaters since the coupon can adjust higher, but never lower. As such, they can be viewed as securities in which the investor has bought a series of periodic floors and has sold a series of periodic caps in return for above-market initial yield.

As the investor has sold a series of call options to the issuer, a step-up note will outperform a straight bond issue when rates are relatively stable and underperform in a volatile rate environment. In a decreasing-rate environment, the note is likely to be called and the investor will be forced to invest the proceeds of the redemption in a low-interest-rate environment. Conversely, in a rising-rate environment, an investor will be in a below-market instrument when rates are high. Step-up notes with very long maturities (beyond 10 years) may have greater liquidity and price risk than other securities because of their long tenor.

## Index-Amortizing Notes

An index-amortizing note (IAN) is a form of structured note for which the outstanding principal or note amortizes according to a predetermined schedule. The predetermined amortization schedule is linked to the level of a designated index (such as LIBOR, CMT, or the prepayment rate of a specified pass-through pool). Thus, the timing of future cash flows and, hence, the average life and yield to maturity of the note become uncertain. The IAN does have a stated maximum maturity date, however, at which time all remaining principal balance is retired.

An embedded option feature, called a *path-dependent option*, is present in this type of security. The option is termed path-dependent because the payoff structure of the option will depend not only on the future path of the underlying index but on where that index has been in the past. The investor, in return for an above-market initial yield, effectively sells this option to the issuer. The issuer has the option to alter the principal amortization as the interest-rate environment changes. Caps and floors may also be present if the issue has a floating-rate coupon.

A typical IAN is structured so that as the designated index (for example, LIBOR) rises above a trigger level, the average life extends. Conversely, if the designated index is at or below the trigger level, the IAN’s principal will quickly amortize, leading to a shorter average life. The outstanding principal balance will vary according to the schedule at each redemption date. One may equate the amortization of the note to the retirement (call) of some portion of the principal. As the amortization quickens, more and more of the note is “called.”

IANs generally appeal to investors who want an investment with a CMO-like risk-return profile, but with reduced uncertainty as to the average life. As the amortization schedule of an IAN depends only on the level of the underlying index, an IAN eliminates the noneconomic prepayment factors of a CMO. However, like a CMO, an IAN will outperform a straight bond issue in a stable rate environment and underperform it in a volatile rate environment. In a decreasing-rate environment, the IAN is likely to be called, and the investor will be forced to invest the proceeds of the redemption in a low interest-rate environment. Conversely, in a rising-rate environment, the maturity of the IAN will extend, and an investor will be in a below-market instrument when rates are high.

## De-Leveraged and Leveraged Floaters

De-leveraged and leveraged floating-rate notes give investors the opportunity to receive an above-market initial yield and tie subsequent coupon adjustments to a specific point on the yield curve. A leveraged note’s coupon will adjust by a multiple of a change in the relevant interest rate, for example,  $1.25 \times \text{LIBOR} + 100$  basis points. Conversely, a de-leveraged securi-

ty's coupon adjusts by a fraction of the change in rates, for example,  $.60 \times 10\text{-year CMT} + 100$  basis points.

De-leveraged floaters are combinations of fixed- and floating-rate instruments. For example, a \$10 million de-leveraged floater with a coupon of 60 percent of the 10-year CMT + 100 basis points is equivalent to the investor holding a \$6 million note with a coupon equal to a 10-year CMT/LIBOR basis swap and a \$4 million fixed-rate instrument. If rates rise, an investor in a de-leveraged floater participates in the rise, but only by a fraction. The leverage factor (for example, 60 percent) causes the coupons to lag the actual market. Thus, de-leveraged floaters will outperform straight bond issuances in a declining or stable interest-rate environment.

Conversely, a leveraged floater such as the example above should be purchased by investors with an expectation of rising rates in which they would receive better than one one-to-one participation. The degree of leverage amplifies the risks as well as the rewards of this type of security. The greater the leverage, the greater the interest-rate and price risk of the security.

Other alternatives in this category include floaters which do not permit the coupon to decrease, so-called one-way de-leveraged floaters which can effectively lock in higher coupons in an environment where the index rises then falls.

## Ratchet Notes

Ratchet notes typically pay a floating-rate coupon that can never go down. The notes generally have periodic caps that limit the amount of the increases (ratchets) or that set a predetermined increase for each quarter. These periodic caps are akin to those found in adjustable-rate mortgage products.

An investor in a ratchet note has purchased from the issuer a series of periodic floors and has sold a series of periodic caps. As such, a ratchet note will outperform a straight floating-rate note in a stable or declining interest-rate environment, and it will underperform in a rapidly rising interest-rate environment. In a rapidly rising interest-rate environment, a ratchet note will perform similarly to a fixed-rate instrument with a low coupon which gradually steps up. The price volatility of the instrument will

therefore depend on the frequency of resets, the amount of coupon increase at each reset, and the final maturity of the note. Longer maturity notes, which have limited reset dates and limited coupon increases, will be more volatile in rising-rate environments and will therefore have a greater degree of interest-rate and price risk.

## Dual-Index Notes

A dual-index note (sometimes called a yield curve anticipation note (YCAN)) is a security whose coupon is tied to the spread between two market indexes. An example is a three-year security which pays a semiannual coupon equal to (prime + 250 basis points – 6-month LIBOR). Typical indexes used to structure payoffs to these notes are the prime rate, LIBOR, COFI, and CMT yields of different maturities. Yield-curve notes allow the investor to lock in a very specific view about forward rates. Such a play, while constructable in the cash market, is often difficult and costly to an investor. A purchaser of this type of security is typically making an assumption about the *future shape* of the yield curve. These notes can be structured to reward the investors in either steepening or flattening yield-curve environments. However, these notes can also be tied to indexes other than interest rates, such as foreign-exchange rates, stock indexes, or commodity prices.

An example of a note which would appeal to investors with expectations of a flattening yield curve (in a currently steep yield-curve environment) would be one with a coupon that floats at

$$[\text{the 5-year CMT} - \text{the 10-year CMT} + \text{a designated spread}].$$

Based on this formula, the coupon will increase if the yield curve flattens between the 5-year and the 10-year maturities. Alternatively, a yield-curve-steepening play would be an issue that floats at—

$$[\text{the 10-year CMT} - \text{the 5-year CMT} + \text{a designated spread}].$$

In this case, coupons would increase as the spread between the long- and medium-term indexes widens.

A dual-index note is equivalent to being a long basis swap (in the example above, the investor receives prime and pays LIBOR) and to being long a fixed-rate instrument. As such, the note has the risk-return elements of both a basis swap and a comparable fixed-rate instrument. The note will underperform comparable fixed-rate instruments in an environment when the basis relationship (between prime and LIBOR in the above example) narrows. These instruments are subject to incremental price risk in a rising-rate environment in which the basis spread is narrowing.

## Principal-Linked Notes

An example of a principal-linked note is a one-year security which pays a fixed semi-annual coupon of 8 percent, and the principal received at maturity is determined by the following formula using market yields two days before maturity:

$$P = 100 + 5 ( (2\text{-year swap rate} - 3\text{-month LIBOR}) - 1.40 )$$

The resulting principal-redemption amount under varying rate scenarios would be as follows in table 1.

Table 1—Examples of Possible Principal-Redemption Schemes

Par	Rate			Redemption Percentage
	2-Year Swap Rate - 3-Month LIBOR	Rate - 1.40	5*(Rate - 1.40)	
100	180	.4	2.00	102
100	160	.2	1.00	101
100	140	-.00	0.00	100
100	120	-0.20	-1.00	99
100	100	-0.40	-2.00	98

Under a principal-linked structured note, the maturity and the fixed coupon payments are unchanged from the terms established at issuance. The issuer's redemption obligation at maturity, however, is *not* the face value of the note. Redemption amounts are established by a formula whose components reflect historical or prevailing market levels. Principal-linked notes have been issued when the principal redemption is a function of underlying currency, commodity, equity, and interest-rate indexes. As the return of principal at maturity in many types of principal-linked notes is not ensured, these structures are subject to a great degree of price risk.

the index remains *within* a designated range, the lower rate is used during periods that the index falls outside the range. *This lower level may be zero.* Range notes have been issued which reference underlying indexes linked to interest rates, currencies, commodities, and equities. Most range notes reference the index daily such that interest may accrue at 7 percent on one day and at 2 percent on the following day, if the underlying index crosses in and out of the range. However, they can also reference the index monthly, quarterly, or only once over the note's life. If the note only references quarterly, then the index's relationship to the range matters only on the quarterly reset date. With the purchase of one of these notes, the investor has sold a series of digital (or binary) options:<sup>1</sup> a call

## Range Notes

Range notes (also called accrual notes) *accrue* interest daily at a set coupon which is tied to an index. Most range notes have two coupon levels; the higher accrual rate is for the period that

1. A digital option has a fixed, predetermined payoff if the underlying instrument or index is at or beyond the strike at expiration. The value of the payoff is not affected by the magnitude of the difference between the underlying and the strike price.

struck at the high end of the range and a put struck at the low end of the range. This means that the accrual rate is strictly defined, and the magnitude of movement outside the range is inconsequential. The narrower the range, the greater the coupon enhancement over a like instrument. In some cases, the range varies each year that the security is outstanding.

However, range notes also exist which require that the investor sell two barrier options:<sup>2</sup> a down-and-out put struck at the low level of the range and an up-and-out call struck at the high level of the range. For these range notes, the index must remain within the target band for the entire accrual period, and sometimes for the entire life of the instrument. If it crosses either barrier on even one day, the investor's coupon will drop to zero for the whole period.<sup>3</sup> This type of range note is quite rare, but investors should pay careful attention to the payment provisions attached to movements outside the range.

As the investor has sold leveraged call and put options to the issuer of these securities, a range note will outperform other floating-rate instruments in stable environments when the index remains within the specified range, and it will underperform in volatile environments in which the underlying index is outside of the specified range. Given the degree of leverage inherent in these types of structures, the securities can be very volatile and often exhibit a significant degree of price risk.

## USES

Structured notes are used for a variety of purposes by investors, issuers, and underwriters or traders. Banks are often involved in all three of these capacities.

### Uses by Investors

Structured notes are investment vehicles that allow investors to alter the risk profile of their

portfolios and/or to express a viewpoint about the course of interest rates or other financial variables. The basic appeal of structured notes lies in their attendant *customized* risk parameters. Attributes that typically are *not* available (or not *easily* available) to an investor are assembled in a prepackaged format. Additionally, investors find the notes attractive for other distinct reasons. In a sustained period of low interest rates (such as the United States experienced for the five years leading up to February 1994), receiving an "acceptable" return on an investment became increasingly difficult. Structured notes, whose cash flows and market values are linked to one or more benchmarks, offered the *potential* for greater returns than prevailing market rates. The desire for higher yield led investors to make a risk-return tradeoff which reflected their market view.

The fact that most structured notes are issued by government-sponsored enterprises (GSEs) means that credit risk—the risk that the issuer will default—is minimal. GSEs are not, however, backed by the full faith and credit of the U.S. government, though most have explicit lines of credit from the Treasury. As a result, investors were attracted by the potential returns of structured notes and by their high credit quality (implied government guarantee). As noted above, however, the credit risk of these notes may be minimal, but their price risk may be significant.

### Uses by Issuers

Issuers often issue structured notes to achieve all-in funding rates, which are more advantageous than what is achievable through a straight debt issue. To induce issuers to issue complex and often very specialized debt instruments, investors often will sacrifice some return, which lowers the issuer's all-in cost of funding. Generally, only highly rated (single-A or better) banks, corporations, agencies, and finance companies will be able to issue in the structured-note market. A detailed discussion of issuing practices is included in the "Description of Marketplace" subsection below.

### Uses by Underwriters or Traders

Investment banks and the section 20 subsidiaries of banks often act to underwrite structured-note

2. Path-dependent options with both their payoff pattern and their survival to the nominal expiration date are dependent not only on the final price of the underlying but on whether the underlying sells at or through a barrier (instrike, outstrike) price during the life of the option.

3. McNeil, Rod. "The Revival of the Structured Note Market." *International Bond Investor*. Summer 1994, pp. 34–37.

issuances. They are often actively involved in making a market in secondary structured notes. A detailed discussion of these activities is included in the “Description of Marketplace” subsection below.

## DESCRIPTION OF MARKETPLACE

### Background

In its heyday, the structured-note market was a by-product of a unique period in financial history. In 1992 and 1993, Wall Street firms engineered debt that allowed borrowers to attain highly attractive below-market funding and that rewarded investors (in large part) *as long as interest rates remained low*. The incredible and at times implausible array of structure types came into being in response to the investment community’s desire for higher returns during a sustained period of low interest rates. Issuers and investment dealer firms were more than willing to address this need, introducing investors to more attractive (and by definition riskier) securities whose cash flows were linked to, for example, the performance of the yen; the yen’s relationship to the lira; and a host of other indexes, currencies, or benchmarks.<sup>4</sup> Investors’ quest for enhanced yield caused them to adopt, in many cases, very tenuous risk-reward measures with respect to potential investment choices.

Structured notes received heightened attention from both regulators and investors in the spring and summer of 1994. Many of these structured securities, created to satisfy a perceived need at the time, deteriorated in value as a result of the rate increases of 1994. In many cases, the leverage inherent in the security worked against the investor, obliterating once attractive coupon payments. Market values of many of these instruments fell below par as their coupons became vastly inferior to comparable maturity investments and as maturities were extended beyond investors’ original expectations.

4. As more exotic structured-note issues came into being (and especially in light of the Orange County debacle), much of the bad press centered on the (quasi-government) agencies who issued the paper. As discussed later, the impetus for the vast majority of deals in fact emanated from Wall Street.

### Primary Market

Structured notes are primarily issued by GSEs such as the FHLB, FNMA, SLMA, and FHLMC, which carry an implicit government guarantee and are rated triple-A. Many large corporations, banks, and finance companies, generally rated single-A or better, also issue structured notes.

Most structured-note issuances originate with investors on a *reverse inquiry basis*, through the *medium-term note (MTN)* market. The process originates when an investor has a demand for a security with specific risk characteristics. Through a reverse inquiry, an investor will use MTN agents such as the underwriting desk of an investment bank or section 20 subsidiary of a bank to communicate its desires to the issuer. If the issuer agrees to the inquiry, the issuer will issue the security which is sold through the MTN agent to the investor.

Although structured notes in the MTN market often originate with the investor, investment banks and section 20 subsidiaries of banks also put together such transactions. Most investment banks and section 20 subsidiaries have derivative-product specialists who design structured notes to take advantage of specific market opportunities. When an opportunity is identified, the investment bank or section 20 subsidiary will inform investors and propose that they buy the structured note. If an investor tentatively agrees to purchase the security, the MTN agents in the investment bank or section 20 subsidiary will contact an issuer with the proposed transaction. If the structure meets the funding needs of the issuer, the structured note will be issued to the investors.

### Secondary Market

Structured notes are traded in the secondary market through market makers such as investment banks or section 20 subsidiaries of banks or through brokers. Market makers will buy or sell structured notes, at a predetermined bid and offer. Market makers will usually trade GSE structured notes through their secondary agency trader and trade corporate-issued structured notes through their corporate bond trader. Some market makers trade secondary structured notes through their structured-note desk, a specialized group who will buy and trade all types of structured notes.

Investors in secondary structured notes may buy the notes at a discount or premium to issuance and receive the performance characteristics of the note as shown in the prospectus. Investors may also purchase structured notes on an *asset-swap basis*, which strips the optionality out of a note and leaves the investor with a synthetically created “plain vanilla” return such as LIBOR. Asset-swap pricing is discussed in the “Pricing” subsection below.

Secondary structured notes are also used to create special-purpose vehicles such as Merrill Lynch’s STEERS program. In these types of programs, secondary structured notes are placed in a special-purpose vehicle, the receipts of which are then sold to investors. A series of swap transactions is then entered into between a swap counterparty and the special-purpose vehicle, which strips the optionality out of the structures. The investor therefore receives a trust receipt which pays a plain vanilla return such as LIBOR.

Structured notes often possess greater liquidity risk than many other types of securities. The most important factor affecting the liquidity of the note in the secondary market is the size of the secondary note being traded. Generally, the larger the size of the note, the more liquid the note will be in the secondary market. Most investors will not buy a structured note of limited size unless they receive a significant premium to cover the administrative costs of booking the note. Similarly, most market makers will not inventory small pieces of paper unless they charge a significant liquidity premium.

Another factor which may affect the liquidity of a structured note in the secondary market is the one-way “bullishness” or “bearishness” of a note. For example, in a rising-rate environment, leveraged bullish instruments such as inverse floaters may not be in demand by investors and may therefore have less liquidity in the secondary market. As many structured notes are sold on an asset-swap basis, the characteristics of the structured note can be “engineered” out of the note, leaving the investor with a plain vanilla return. The asset-swap market, therefore, helps to increase the liquidity of these types of notes.

## PRICING

The two primary methods by which structured notes are priced in the secondary market are

(1) on an asset-swap basis or (2) on a straight-pricing basis.

### Asset-Swap Pricing

Structured notes are typically constructed by embedding some form of optionality in the coupon, principal, or maturity component of a debt issue. Once these embedded derivatives are quantified, a swap or series of swaps can be undertaken to strip out those options and effectively create a synthetic instrument with either fixed or variable cash-flow streams. This process is known as asset-swap pricing.<sup>5</sup>

Asset-swap pricing initially involves decomposing and valuing the components of the note, including contingent cash flows. It conveys where those components can be cashed out in the market, often referred to as the *break-up value* of the note. After the note is decomposed, an alternate cash-flow stream is created through the asset-swap market.

When structured notes are priced on an asset-swap basis, the issue is analyzed based on its *salvage value*.<sup>6</sup> The salvage value on most agency structured issues varies based on the current market and the size, type, and maturity of the note.

Liquidity in the structured-notes market exists because every note has a salvage value. If demand for the note as a whole is weak, its cash flows can be reconstructed via the asset-swap market to create a synthetic security. In many cases, the re-engineered security has broader investor appeal, thereby generating needed liquidity for the holder of the original issue.

### Straight Pricing

Contrasted with an asset-swapped issue, a note trading on a straight-pricing basis is purchased and sold as is.<sup>7</sup> Traders who price structured notes on this basis compare the note with similar types of instruments trading in the market and derive a price accordingly.

5. See the Federal Reserve product summary *Asset Swaps—Creating Synthetic Instruments* by Joseph Cilia for a detailed treatment on the topic.

6. Goodman, Laurie. “Anatomy of the Secondary Structured Note Market.” *Derivatives Quarterly*, Fall 1995.

7. Peng, Scott Y., and Ravi E. Dattatreya. *The Structured Note Market*. Chicago: Probus, 1995.



## HEDGING

Structured notes are, from a cash-flow perspective, a combination of traditional debt instruments and derivative contracts. As a result, the value (or performance) of a structured note can be replicated by combining components consisting of appropriate zero-coupon debt plus appropriate futures or options positions that reflect the optionality embedded in the issue. Similar to the decomposition process employed in an asset-swap transaction, the fair value of this replicated portfolio should be equivalent to the fair value of the structured note.

Theoretically, one should be indifferent about investing in a structured note or in its equivalently constructed portfolio as long as the price of the note equals the present value of its replication components.<sup>8</sup> Price discrepancy should govern the selection process between these alternatives.

A hedge of a structured-note position involves engaging in the opposite of the replication trades noted above. To be fully protected in a hedge, the sum of the present values of each component of the hedge should be less than or equal to the market value of the note. If, for some reason, the note was priced *higher* than the cost of the worst-case replication components, the hedging firm stands to lock in a positive spread if that worst-case scenario fails to materialize.<sup>9</sup>

A structured-note position itself can serve to hedge unique risks faced by the investor. For example, a company which is long (owns) Japanese yen (¥) is exposed to the risk of yen depreciation. The FHLB issued a one-year structured range note which accrued interest daily at 7 percent if the ¥/U.S.\$ is greater than 108.50 or at 0 percent if the ¥/U.S.\$ is less than 108.50. If the yen depreciates, the note accrues interest at an above-market rate. Meanwhile, the company's yen holdings will decline in value. This note could serve as a perfectly tailored hedge for the company's business-risk profile. In fact, the design of many of the most complicated structured notes is driven not by the innovations of note issuers and underwriters, but rather by investors seeking to hedge their own unique risk profiles.

8. Kawaller, Ira G. "Understanding Structured Notes." *Derivatives Quarterly*, Spring 1995.

9. *Ibid.*, p. 32.

## RISKS

### Market Risk

The embedded options and other leverage factors inherent in structured notes result in a great deal of uncertainty about future cash flows. Thus, price volatility is generally high in these types of securities. An institution should have—or should have ready access to—a model which is able to quantify the risks. The model should be able to forecast the change in market price at various points in time (for example, one year later or the first call date) for a given shift in interest rates. For the many variants of these products which are tied to the shape of the yield curve, the ability to model price effects from nonparallel interest-rate shifts is also crucial. In most cases (except for some principal-linked notes), full principal will be returned at maturity. However, between issuance and redemption, changes in fundamental factors can give rise to significant reductions in the "market" price.

As with other types of instruments in which an investor has sold an option, structured notes will underperform similar straight debt issuances in a volatile rate environment. For notes such as callable step-ups and IANs, the investor may be exposed to reinvestment risk (investing the proceeds of the note in a low-interest-rate environment) when rates decrease and to extension risk (not being able to invest in a high-interest-rate environment) when rates increase.

### Liquidity Risk

Due to the complex nature of structured notes, the number of firms that are able and willing to competitively price and bid for these securities is quite small; however, an active secondary market has developed over the past few years. When the structure is complex, however, bidders may be few. Consequently, an institution hoping to liquidate a structured-note holding before maturity may find that their only option is to sell at a significant loss. In certain cases, the issue's original underwriter is the only source for a bid (and even that is not always guaranteed).

Some factors influencing the liquidity of the note include the type, size, and maturity of the note. In general, the more complex the structure or the more a note exhibits one-way bullishness or bearishness, the less liquidity a note will have. Although the asset-swap market allows

the derivative components to be engineered out of these complex structures, liquidity may be impaired because many institutions have investment guidelines that prohibit the purchase of certain types of complex notes. Thus, the size of the potential market is diminished, and liquidity decreases. Also, notes with a smaller size (generally under \$10 million) and a longer maturity (generally greater than five years) will tend to be less liquid.

## Volatility Risk

For each of these structures with embedded options, assumptions about the volatility of interest-rate moves are also inherent. For any of these options that are purchased by investors (for example, interest-rate floors), the risk that expectations for market-rate volatility will decrease over time exists. If that happens, market valuation of these securities will also decrease, and the investor will have “purchased” an overvalued option for which he or she will not be compensated if the instrument is sold before maturity. For options that are sold by investors (for example, interest-rate caps), the risk that volatility increases after the note is purchased exists. If that occurs, the market valuation of the structured note will decrease, and the investor will have “sold” an undervalued option for which he or she will have to pay a higher price if the instrument is sold before maturity.

## ACCOUNTING TREATMENT

The Financial Accounting Standards Board’s Statement of Financial Accounting Standards No. 115 (FAS 115), “Accounting for Certain Investments in Debt and Equity Securities,” as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), “Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities,” determines the accounting treatment for investments in structured notes. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), “Accounting for Derivatives and Hedging Activities,” as amended by Statement of Financial Accounting Standards Nos. 137 and 138

(FAS 137 and FAS 138). (See section 2120.1, “Accounting,” for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Structured notes issued by GSEs should be given a 20 percent risk weighting. Structured notes issued by investment-grade corporations should be given a 100 percent risk weighting. For specific risk weights for qualified trading accounts, see section 2110.1, “Capital Adequacy.”

## LEGAL LIMITATIONS FOR BANK INVESTMENT

The limitations of 12 CFR 1 apply to structured notes. Structured notes issued by GSEs are type I securities, and there is no limitation on the amount which a bank can purchase or sell. Structured notes issued by investment-graded corporations are type III securities. A bank’s purchases and sales of type III securities are limited to 10 percent of its capital and surplus.

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## GENERAL DESCRIPTION

Corporate bonds are debt obligations issued by corporations. Corporate bonds may be either secured or unsecured. Collateral used for secured debt includes but is not limited to real property, machinery, equipment, accounts receivable, stocks, bonds, or notes. If the debt is unsecured, the bonds are known as debentures. Bondholders, as creditors, have a prior legal claim over common and preferred stockholders as to both income and assets of the corporation for the principal and interest due them and may have a prior claim over other creditors if liens or mortgages are involved.

Corporate bonds contain elements of both interest-rate risk and credit risk. Corporate bonds usually yield more than government or agency bonds due to the presence of credit risk. Corporate bonds are issued as *registered bonds* and are usually sold in *book-entry form*. Interest may be fixed, floating, or the bonds may be zero coupons. Interest on corporate bonds is typically paid semiannually and is fully taxable to the bondholder.

## CHARACTERISTICS AND FEATURES

### Security for Bonds

Various types of security may be pledged to offer security beyond that of the general standing of the issuer. Secured bonds, such as first-mortgage bonds, collateral trust bonds, and equipment trust certificates, yield a lower rate of interest than comparable unsecured bonds because of the greater security they provide to the bondholder.

#### *First-Mortgage Bonds*

First-mortgage bonds normally grant the bondholder a first-mortgage lien on the property of the issuer. Often first-mortgage bonds are issued in series with bonds of each series secured equally by the same first mortgage.

#### *Collateral Trust Bonds*

Collateral trust bonds are secured by pledges of stocks, notes, bonds, or other collateral. Generally, the market or appraised value of the collateral must be maintained at some percentage of the amount of the bonds outstanding, and a provision for withdrawal of some collateral is often included, provided other acceptable collateral is provided. Collateral trust bonds may be issued in series.

#### *Equipment Trust Certificates*

Equipment trust certificates are usually issued by railroads or airlines. The issuer, such as a railroad company or airline, buys a piece of equipment from a manufacturer, who transfers the title to the equipment to a trustee. The trustee then leases the equipment to the issuer and at the same time sells equipment trust certificates (ETCs) to investors. The manufacturer is paid off through the sale of the certificates, and interest and principal are paid to the bondholders through the proceeds of lease payments from the issuer to the trustee. At the end of some specified period of time, the certificates are paid off, the trustee sells the equipment to the issuer for a nominal price, and the lease is terminated. As the issuer does not own the equipment, foreclosing a lien in event of default is facilitated. These bonds are often issued in serial form.

#### *Debenture Bonds*

Debenture bonds are not secured by a specific pledge of designated property. Debenture bondholders have the claim of general creditors on all assets of the issuer not pledged specifically to secure other debt. They also have a claim on pledged assets to the extent that these assets have value greater than necessary to satisfy secured creditors. Debentures often contain a variety of provisions designed to afford some degree of protection to bondholders, including limitation on the amount of additional debt issuance, minimum maintenance requirements on net working capital, and limits on the payment of cash dividends by the issuer. If an issuer

has no secured debt, it is customary to provide a *negative pledge clause*—a provision that debentures will be secured equally with any secured bonds that may be issued in the future.

### *Subordinated and Convertible Debentures*

Subordinated debenture bonds stand behind secured debt, debenture bonds, and often some general creditors in their claim on assets and earnings. Because these bonds are weaker in their claim on assets, they yield a higher rate of interest than comparable secured bonds. Often, subordinated debenture bonds offer conversion privileges to convert bonds into shares of an issuer's own common stock or the common stock of a corporation other than an issuer—referred to as *exchangeable bonds*.

### *Guaranteed Bonds*

Guaranteed bonds are guaranteed by a corporation other than the issuer. The safety of a guaranteed bond depends on the financial capability of the guarantor, as well as the financial capability of the issuer. The terms of the guarantee may call for the guarantor to guarantee the payment of interest and/or repayment of principal. A guaranteed bond may have more than one corporate guarantor, who may be responsible for not only its pro rata share but also the entire amount guaranteed by other guarantors.

### *Maturity*

Corporate bonds are issued in a broad maturity spectrum, ranging from less than one year to perpetual issues. Issues maturing within one year are usually viewed as the equivalent of cash items. Debt maturing between one and five years is generally thought of as short-term. Intermediate-term debt is usually considered to mature between 5 and 12 years, whereas long-term debt matures in more than 12 years.

### *Interest-Payment Characteristics*

#### *Fixed-Rate Bonds*

Most fixed-rate corporate bonds pay interest

semiannually and at maturity. Interest payments once a year are the norm for bonds sold overseas. Interest on corporate bonds is based on a 360-day year, made up of twelve 30-day months.

#### *Zero-Coupon Bonds*

Zero-coupon bonds are bonds without coupons or a stated interest rate. These securities are issued at discounts to par; the difference between the face amount and the offering price when first issued is called the *original-issue discount* (OID). The rate of return depends on the amount of the discount and the period over which it accretes. In bankruptcy, a zero-coupon bond creditor can claim the original offering price plus accrued and unpaid interest to the date of bankruptcy filing, but not the principal amount of \$1,000.

#### *Floating-Rate Notes*

The coupon rates for floating-rate notes are based on various benchmarks ranging from short-term rates, such as prime and 30-day commercial paper, to one-year and longer *constant maturity Treasury rates* (CMTs). Coupons are usually quoted as spread above or below the base rate (that is, three-month LIBOR + 15 bp). The interest rate paid on floating-rate notes adjusts based on changes in the base rate. For example, a note linked to three-month U.S. LIBOR would adjust every three months, based on the then-prevailing yield on three-month U.S. LIBOR. Floating-rate notes are often subject to a maximum (cap) or minimum (floor) rate of interest.

### *Features*

A significant portion of corporate notes and bonds has various features. These include call provisions, in which the issuer has the right to redeem the bond before maturity; put options, in which the holder has the right to redeem the bond before maturity; sinking funds, used to retire the bonds at maturity; and convertibility features that allow the holder to exchange debt for equity in the issuing company.

### *Callable Bonds*

Callable bonds are bonds in which the investor has sold a call option to the issuer. This increases the coupon rate paid by the issuer but exposes the investor to prepayment risk. If market interest rates fall below the coupon rate of the bond on the call date, the issuer will call the bond and the investor will be forced to invest the proceeds in a low-interest-rate environment. As a rule, corporate bonds are callable at a premium above par, which declines gradually as the bond approaches maturity.

### *Put Bonds*

Put bonds are bonds in which the investor has purchased a put option from the issuer. The cost of this put option decreases the coupon rate paid by the issuer, but decreases the risk to an investor in a rising interest-rate environment. If market rates are above the coupon rate of the bond at the put date, the investor can “put” the bond back to the issuer and reinvest the proceeds of the bond in a high-interest-rate environment.

### *Sinking-Fund Provisions*

Bonds with sinking-fund provisions require the issuer to retire a specified portion on a bond issue each year. This type of provision reduces the default risk on the bond because of the orderly retirement of the issue before maturity. The investor assumes the risk, however, that the bonds may be called at a special sinking-fund call price at a time when interest rates are lower than rates prevailing at the time the bond was issued. In that case, the bonds will be selling above par but may be retired by the issuer at the special call price that may be equal to par value.

### *Convertible Bonds*

Convertible securities are fixed income securities that permit the holder the right to acquire, at the investor's option, the common stock of the issuing corporation under terms set forth in the bond indenture. New convertible issues typically have a maturity of 25 to 30 years and carry a coupon rate below that of a nonconvertible

bond of comparable quality. An investor in a convertible security receives the upside potential of the common stock of the issuer, combined with the safety of principal in terms of a prior claim to assets over equity security holders. The investor, however, pays for this conversion privilege by accepting a significantly lower yield-to-maturity than that offered on comparable nonconvertible bonds. Also, if anticipated corporate growth is not realized, the investor sacrifices current yield and risks having the price of the bond fall below the price paid to acquire it. Commercial banks may purchase eligible convertible issues if the yield obtained is reasonably similar to nonconvertible issues of similar quality and maturity, and the issues are not selling at a significant conversion premium.

## USES

Corporate bonds can be used for hedging, investment, or speculative purposes. In some instances, the presence of credit risk and lack of liquidity in various issues may discourage their use. Speculators can use corporate bonds to take positions on the level and term structure of both interest rates and corporate spreads over government securities.

Banks often purchase corporate bonds for their investment portfolios. In return for increased credit risk, corporate bonds provide an enhanced spread relative to Treasury securities. Banks may purchase investment-grade corporate securities subject to a 10 percent limitation of its capital and surplus for one obligor. Banks are prohibited from underwriting or dealing in these securities. A bank's section 20 subsidiary may, however, be able to underwrite and deal in corporate bonds.

Banks often act as corporate trustees for bond issues. A corporate trustee is responsible for authenticating the bonds issued and ensuring that the issuer complies with all of the covenants specified in the indenture. Corporate trustees are subject to the Trust Indenture Act, which specifies that adequate requirements for the performance of the trustee's duties on behalf of the bondholders be developed. Furthermore, the trustee's interest as a trustee must not conflict with other interest it may have, and the trustee must provide reports to bondholders.

## DESCRIPTION OF MARKETPLACE

The size of the total corporate bond market was \$2.2 trillion dollars at the end of 1993. Nonfinancially corporate business comprised approximately 56 percent of total issuance in 1993.

### Market Participants

#### *Buy Side*

The largest holder of corporate debt in the United States is the insurance industry, accounting for more than 33 percent of ownership at the end of 1993. Private pension funds are the second-largest holders with 13.7 percent of ownership. Commercial banks account for approximately 4.5 percent of ownership of outstanding corporate bonds.

#### *Sell Side*

Corporate bonds are underwritten in the primary market by investment banks and section 20 subsidiaries of banks. In the secondary market, corporate bonds are traded in the listed and unlisted markets. Listed markets include the New York Stock Exchange and the American Stock Exchange. These markets primarily service retail investors who trade in small lots. The over-the-counter market is the primary market for professional investors. In the secondary market, investment banks and section 20 subsidiaries of banks may act as either a broker or dealer. Brokers execute orders for the accounts of customers; they are agents and get a commission for their services. Dealers buy and sell for their own accounts, thus taking the risk of reselling at a loss.

### Sources of Information

For a primary offering, the primary source of information is contained in a *prospectus* filed by the issuer with the Securities and Exchange Commission. For seasoned issues, major contractual provisions are provided in Moody's manuals or Standard & Poor's corporation records.

Bond ratings are published by several organizations that analyze bonds and express their conclusions by a ratings system. The four major nationally recognized statistical rating organizations (NRSROs) in the United States are Duff & Phelps Credit Rating Co. (D&P); Fitch Investor Service, Inc. (Fitch); Moody's Investor Service, Inc. (Moody's); and Standard & Poor's Corporation (S&P).

## PRICING

The major factors influencing the value of a corporate bond are—

- its coupon rate relative to prevailing market interest rates (typical of all bonds, bond prices will decline when market interest rates rise above the coupon rate, and prices will rise when interest rates decline below the coupon rate) and
- the issuer's credit standing (a change in an issuer's financial condition or ability to finance the debt can cause a change in the risk premium and price of the security).

Other factors that influence corporate bond prices are the existence of call options, put features, sinking funds, convertibility features, and guarantees or insurance. These factors can significantly alter the risk/return profile of a bond issue. (These factors and their effect on pricing are discussed in the "Characteristics and Features" subsection above.)

The majority of corporate bonds are traded on the over-the-counter market and are priced as a spread over U.S. Treasuries. Most often the benchmark U.S. Treasury is the on-the-run (current coupon) issue. However, pricing "abnormalities" can occur where the benchmark U.S. Treasury is different from the on-the-run security.

## HEDGING

Interest-rate risk for corporate debt can be hedged either with cash, exchange-traded, or over-the-counter instruments. Typically, long corporate bond or note positions are hedged by selling a U.S. Treasury issue of similar maturity or by shorting an exchange-traded futures contract. The effectiveness of the hedge depends, in part, on basis risk and the degree to which the hedge

has neutralized interest-rate risk. Hedging strategies may incorporate assumptions about the correlation between the credit spread and government rates. The effectiveness of these strategies may be affected if these assumptions prove inaccurate. Hedges can be constructed with securities from the identical issuer but with varying maturities. Alternatively, hedges can be constructed with issuers within an industry group. The relative illiquidity of various corporate instruments may diminish hedging effectiveness.

## RISKS

### Interest-Rate Risk

For fixed-income bonds, prices fluctuate with changes in interest rates. The degree of interest-rate sensitivity depends on the maturity and coupon of the bond. Floating-rate issues lessen the bank's interest-rate risk to the extent that the rate adjustments are responsive to market rate movements. For this reason, these issues generally have lower yields to compensate for their benefit to the holder.

### Prepayment or Reinvestment Risk

Call provisions will also affect a bank's interest-rate exposure. If the issuer has the right to redeem the bond before maturity, the action has the potential to adversely alter the investor's exposure. The issue is most likely to be called when market rates have moved in the issuer's favor, leaving the investor with funds to invest in a lower-interest-rate environment.

### Credit Risk

Credit risk is a function of the financial condition of the issuer or the degree of support provided by a credit enhancement. The bond rating may be a quick indicator of credit quality. However, changes in bond ratings may lag behind changes in financial condition. Banks holding corporate bonds should perform a periodic financial analysis to determine the credit quality of the issuer.

Some bonds will include a credit enhancement in the form of insurance or a guarantee by

another corporation. The safety of the bond may depend on the financial condition of the guarantor, since the guarantor will make principal and interest payments if the obligor cannot. Credit enhancements often are used to improve the credit rating of a bond issue, thereby reducing the rate of interest that the issuer must pay.

Zero-coupon bonds may pose greater credit-risk problems. When a zero-coupon bond has been sold at a deep discount, the issuer must have the funds to make a large payment at maturity. This potentially large balloon repayment may significantly increase the credit risk of the issue.

### Liquidity Risk

Major issues are actively traded in large amounts, and liquidity concerns may be small. Trading for many issues, however, may be inactive and significant liquidity problems may affect pricing. The trading volume of a security determines the size of the bid/ask spread of a bond. This provides an indication of the bond's marketability and, hence, its liquidity. A narrow spread of between one-quarter to one-half of 1 percent may indicate a liquid market, while a spread of 2 percent or 3 percent may indicate poor liquidity for a bond. Even for major issues, news of credit problems may cause temporary liquidity problems.

### Event Risk

Event risk can be large for corporate bonds. This is the risk of an unpredictable event that immediately affects the ability of an issuer to service the obligations of a bond. Examples of event risk include leveraged buyouts, corporate restructurings, or court rulings that affect the credit rating of a company. To mitigate event risk, some indentures include a maintenance of net worth clause, which requires the issuer to maintain its net worth above a stipulated level. If the requirement is not met, the issuer must begin to retire its debt at par.

## ACCOUNTING TREATMENT

The Financial Accounting Standards Board's Statement of Financial Accounting Standards



No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities," determines the accounting treatment for investments in corporate notes and bonds. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Corporate notes and bonds should be weighted at 100 percent. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Corporate notes and bonds are type III securities. A bank may purchase or sell for its own account corporate debt subject to the limitation that the corporate debt of a single obligor may not exceed 10 percent of the bank's capital and surplus. To be eligible for purchase, a corporate security must be investment grade (that is, rated BBB or higher) and must be marketable. Banks may not deal in or underwrite corporate bonds.

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### GENERAL DESCRIPTION

Municipal securities are interest-bearing obligations issued by local governments or their political subdivisions (such as cities, towns, villages, counties, or special districts) or by state governments, agencies, or political subdivisions. These governmental entities can borrow at favorable rates because the interest income from most municipal securities generally receives advantageous treatment under federal income tax rules. There are important restrictions on these tax advantages, however, and banks are subject to different tax treatment than other investors.

The two principal classifications of municipal securities are general obligation bonds and revenue bonds. *General obligation bonds* are secured by the full faith and credit of an issuer with taxing power. General obligation bonds issued by local governments are generally secured by a pledge of the issuer's specific taxing power, while general obligation bonds issued by states are generally based on appropriations made by the state's legislature. In the event of default, the holders of general obligation bonds have the right to compel a tax levy or legislative appropriation to satisfy the issuer's obligation on the defaulted bonds.

*Revenue bonds* are payable from a specific source of revenue, so that the full faith and credit of an issuer with taxing power is not pledged. Revenue bonds are payable only from specifically identified sources of revenue. Pledged revenues may be derived from operation of the financed project, grants, and excise or other taxes. *Industrial development bonds* are a common example of revenue bonds. These bonds are municipal debt obligations issued by a state or local government (or a development agency) to finance private projects that generate tax revenues. The debt service on these bonds is dependent on the lease income generated by the project or facility. In certain instances, industrial development bonds may be categorized as loans (see the instructions to the call report).

In addition to municipal and industrial development bonds, state and local governmental entities issue short-term obligations in the form of notes. These debt obligations are generally issued to bridge the gap between when expenses are paid and tax revenues are collected. The

types of notes issued include *tax anticipation notes (TANs)*, *revenue anticipation notes (RANs)*, *tax and revenue anticipation notes (TRANs)*, *grant anticipation notes (GANs)*, and *bond anticipation notes (BANs)*.

### CHARACTERISTICS AND FEATURES

Municipal bonds are typically issued in denominations of \$5,000, known as the par value or face value amount of the bond. Municipal bonds are generally issued in serial maturities. A typical offering is made up of different maturities which allow the issuer to spread out debt service and stay within financial requirements. In recent years, however, term bonds have become increasingly popular. Term bonds are bonds comprising a large part or all of a particular issue which comes due in a single maturity. The issuer usually agrees to make periodic payments into a sinking fund for mandatory redemption of term bonds before maturity or for payment at maturity. Most municipal bonds are issued with call provisions which give the issuer flexibility in controlling its borrowing costs through the early retirement of debt.

A prime feature of municipal securities had been the exemption of their interest from federal income taxation. However, two significant restrictions have been imposed on the tax benefits of owning municipal securities. First, beginning in 1986, all taxpayers became subject to the alternative minimum tax (AMT), which was intended to provide an upper limit on the degree to which individuals and corporations can protect their income from taxation. Interest income from private-activity securities issued since then is potentially subject to the AMT. Second, investors became unable to deduct interest expense incurred in funding tax-advantaged securities, a measure that was intended to remove the benefit of borrowing funds from others to invest in municipal securities. In this regard, special federal tax rules apply to bank holdings of municipal securities, including the manner in which the amount of nondeductible interest expense is calculated. Exceptions to these various limitations apply only to tax-exempt obligations issued after August 1986 that are issued by small entities and are not private-activity bonds.

The state and local income taxation treatment of municipal securities varies greatly from state to state. Many states and local governments exempt interest income only on those bonds and notes issued by government entities located within their own boundaries.

## USES

Municipal securities have traditionally been held primarily for investment purposes by investors who would benefit from income that is advantaged under federal income tax statutes and regulations. This group includes institutional investors such as insurance companies, mutual funds, commercial banks, and retail investors. The value of the tax advantage and, therefore, the attractiveness of the security increase when the income earned is also advantaged under state and local tax laws. Wealthy individuals and corporations face the highest marginal tax rates and, therefore, stand to receive the highest tax-equivalent yields on these securities. Private individuals are the largest holders of municipal securities, accounting for three-fourths of these securities outstanding.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

State and local government entities can market their new bond issues by offering them publicly or placing them privately with a small group of investors. When a public offering is selected, the issue is usually underwritten by investment bankers and municipal bond departments of banks. The underwriter may acquire the securities either by negotiation with the issuer or by award on the basis of competitive bidding. The underwriter is responsible for the distribution of the issue and accepts the risk that investors might fail to purchase the issues at the expected prices. For most sizable issues, underwriters join together in a syndicate to spread the risk of the sale and gain wider access to potential investors.

Standards and practices for the municipal securities activities of banks and other market participants are set by the Municipal Securities Rulemaking Board (MSRB), a congressionally chartered self-regulatory body that is overseen

by the SEC. Examination and enforcement of MSRB standards is delegated to the NASD for securities firms and to the appropriate federal banking agency (Federal Reserve, OCC, or FDIC) for banking organizations.

## Secondary Market

Municipal securities are not listed on or traded in exchanges; however, there are strong and active secondary markets for municipal securities that are supported by municipal bond dealers. These traders buy and sell to other dealers and investors and for their own inventories. The bond broker's broker also serves a significant role in the market for municipal bonds. These brokers are a small number of interdealer brokers who act as agents for registered dealers and dealer banks. In addition to using these brokers, many dealers advertise municipal offerings for the retail market through the *Blue List*. The *Blue List* is published by Standard & Poor's Corporation and lists securities and yields or prices of bonds and notes being offered by dealers.

## Market Participants

Market participants in the municipal securities industry include underwriters, broker-dealers, brokers' brokers, the rating agencies, bond insurers, and investors. Financial advisors, who advise state and local governments for both competitive and negotiated offerings, and bond counsel, who provide opinions on the legality of specific obligations, are also important participants in the industry. The underwriting business primarily consists of a small number of large broker-dealers, typically with retail branch systems, and a large number of regional underwriters and broker-dealers with ties to local governments and who specialize in placing debt in their individual regions.

## Market Transparency

Price transparency in the municipal securities industry varies depending on the type of security and the issuer. Prices for public issues are more readily available than prices for private placements. Two publications quote prices for municipal securities: *The Bond Buyer* and the *Blue List*.

## PRICING

Municipal securities are priced either on a yield or dollar basis depending on the issue. Securities that are priced on a dollar basis are quoted as a percentage of the par value. A bond that is traded and quoted as a percentage of its par value is called a “dollar bond.” Municipal securities, however, are generally traded and quoted in terms of yields because there are so many issues of different maturities. A bond quoted at 6.751-6.50 percent means that a dealer is willing to purchase the bond to yield 6.75 percent and will sell it to yield 6.50 percent.

To compare the yield of a municipal security with that of a taxable bond, the yield of the maturity must be adjusted to account for a number of factors that may be unique to the individual investor. For example, a fully taxable equivalent (FTE) yield would consider the relevant federal, state, and local marginal tax rates of the investor; specific characteristics of the security; the applicability of the alternative minimum tax (AMT); the ability to deduct interest expense associated with funding the acquisition; and other elements of the institution’s tax status. (These factors are discussed more fully in the “Characteristics and Features” subsection.)

## HEDGING

Generally, the special features and unique potential tax advantages of municipal securities make it difficult to construct an ideal hedge. The municipal bond futures contract from the Chicago Board of Trade (and corresponding options) is frequently used to hedge positions in municipal bonds. These contracts are cash settled to the value of the Bond Buyer Index, an index of actively traded municipal bonds, whose composition changes frequently. The market for these exchange contracts is not very liquid, however, and the possibility of basis risk may be large.

Municipal securities also can be hedged using more liquid Treasury securities, futures, and options. Treasury securities can be used to mitigate exposure to yield-curve risk; however, the significant basis risk present in the municipal/Treasury securities price relationship would remain unhedged. Some dealers use over-the-counter municipal swaps to hedge interest-rate risk. This would reduce basis risk to the relationship between the security being hedged and

the municipal index employed in the swap transaction. Municipal swaps are relatively new and are not widespread in the industry. As a result, their use as hedging vehicles is limited.

## RISKS

### Credit Risk

Municipal securities activities involve differing degrees of credit risk depending on the financial capacity of the issuer or economic obligor. Noteworthy cases in which municipal securities have been unable to perform as agreed range from New York City in the 1970s and WPPSS (a Washington state power utility) in the 1980s to more recent examples. For revenue bonds, the ability to perform depends primarily on the success of the project or venture funded by the bond. Trends in real estate values, fiscal management, and the size of the tax base bear directly on the issuer’s ability to service general obligation bonds.

An important starting point in performing a credit review of a potential issuer is to obtain a legal opinion that the issuing entity has the legal authority to undertake the obligation. The entity must also have the capacity to repay as well as the willingness to perform, both influenced not only by financial factors but by political factors. Since some issuers depend on legislatures or voters to approve bond issues or new funding, credit analysis can become problematic; issuers could default on their bond obligations despite having the funds to service debt. These political issues may reach beyond the direct jurisdiction of the issuing entity, including decisions made by state legislatures or Congress. Therefore, to fully evaluate market risk, market participants must monitor how political and legislative factors may affect a security’s default risk.

The lack of standardized financial statements and the large number of different issuers (as many as 50,000 entities issue municipal bonds) also make credit analysis of municipal securities more difficult. This heightens the importance of the role of the rating agencies and bond insurers in comparison to other markets. Larger issuers of municipal securities are rated by nationally recognized rating agencies. Other issuers achieve an investment-grade rating through the use of credit enhancements such as insurance from a municipal bond insurance company or a letter of credit issued by a financial institution. Credit

enhancements are often used to improve the credit rating of a security, thereby lowering the interest that the issuer must pay.

## Liquidity Risk

One of the problems in the municipal market is the lack of ready marketability for many municipal issues. Many municipal bonds are relatively small issues, and most general obligation issues are sold on a serial basis, which in effect breaks the issues up into smaller components. Furthermore, a large percentage of municipal securities are purchased by retail investors and small institutions that tend to hold securities to maturity. Overall, smaller issues and those with thin secondary markets often experience liquidity difficulties and are therefore subject to higher risk.

## Interest-Rate Risk and Market Risk

Like other fixed-income securities, fixed-income municipal securities are subject to price fluctuations based on changes in interest rates. The degree of fluctuation depends on the maturity and coupon of the security. Variable-rate issues are typically tied to a money market rate, so their interest-rate risk will be significantly less. Nonetheless, since bond prices and interest rates are inextricably linked, all municipal securities involve some degree of interest-rate risk.

Holders of municipal securities are also affected by changes in marginal tax rates. For instance, a reduction in marginal tax rates would lower the tax-equivalent yield on the security, causing the security to depreciate in price.

## Prepayment or Reinvestment Risk

Call provisions will affect a bank's interest-rate exposure. If the issuer has the right to redeem the bond before maturity, the risk of an adverse effect on the bank's exposure is greater. The security is most likely to be called when rates have moved in the issuer's favor, leaving the investor with funds to invest in a lower-interest-rate environment.

## ACCOUNTING TREATMENT

The accounting treatment for investments in municipal securities is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

General obligations, BANs, and TANs have a 20 percent risk weight. Municipal revenue bonds and RANs have a 50 percent risk weight. Industrial development bonds are rated at 100 percent. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

The limitations of 12 USC 24 (section 5136 of the Revised Statutes) apply to municipal securities. Municipal securities that are general obligations are type I securities and may be purchased by banks in unlimited amounts. Municipal revenue securities, however, are either type II or type III securities. The purchase of type II and type III securities is limited to 10 percent of equity capital and reserves for each obligor. That limitation is reduced to 5 percent of equity capital and reserves for all obligors in the aggregate when the judgment of the obligor's ability to perform is based predominantly on reliable estimates versus adequate evidence.

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### GENERAL DESCRIPTION

A Eurodollar certificate of deposit (Eurodollar CD) is a negotiable dollar-denominated time deposit issued by a U.S. bank located outside the United States or by a foreign bank located abroad. Dollars deposited in international banking facilities (IBFs) in the United States are also considered Eurodollars.

### CHARACTERISTICS AND FEATURES

Eurodollar CDs are not FDIC-insured. Eurodollar deposits are generally free from domestic (U.S.) regulation and reserve requirements, and these deposits are not subject to other fees imposed by the FDIC. Most Eurodollar CDs are issued in denominations over \$1 million. Although their maturities must be at least seven days and most CDs are issued for three to six months, there is no upward limit on the term. Issuing banks cannot purchase their own CDs.

### USES

The primary reason for issuing in the Eurodollar market (besides the basic reason to issue a CD—to provide a source of funds) is the lower cost of funds available as a result of the elimination of regulatory costs and reserve requirements. Buyers, on the other hand, can take advantage of the slightly higher yields while maintaining reasonable liquidity. Eurodollar CD issuers subsequently take the funds received from the issuance and redeposit them with other foreign banks, invest them, retain them to improve reserves or overall liquidity, or lend them to companies, individuals, or governments outside the United States.

### DESCRIPTION OF MARKETPLACE

The Eurodollar CD market is centered in London. Activity also takes place in offshore branches, including those in Nassau and the Cayman Islands. Issuers include the overseas

branches of money-center U.S. banks, large British banks, and branches of major Canadian and Japanese banks. Only the largest banks with strong international reputations usually sell Eurodollar CDs. Since the advent of the medium-term note market, the Eurodollar CD market has been on a decline and is now a relatively illiquid market.

Eurodollar CDs are sold by the issuing bank at face value either directly to investors or depositors or through CD dealers and brokers. Settlement is on a two-day basis and occurs at the New York correspondents of the issuers' and investors' banks.

### PRICING

Eurodollar CDs are priced off the London Interbank Offered Rate (LIBOR). Their yields are generally slightly higher than yields for domestic CDs to compensate the investor for the slightly higher risk.

Eurodollar CDs are quoted and sold on an interest-bearing basis on an actual/360-day basis. The bid/offer quotes are in 16ths (for example, 12 7/16). The quotes directly translate to rates on the given Eurodollar CD. Thus, bid/offer rates of 12 7/16 and 12 3/16 would roughly translate to a bid interest rate of 12.4375 percent and an offer rate of 12.1875 percent, respectively, giving the dealer a spread of .25 percent.

### HEDGING

Eurodollar futures may be used to hedge Eurodollar time deposits. Eurodollar futures are one of the most actively traded futures contracts in the world.

### RISKS

The risks associated with purchasing Eurodollar CDs include credit risk, sovereign risk, and liquidity risk. To reduce credit risk, a detailed analysis should be performed on all Eurodollar CD issuers in which the investor has invested. Although the instruments themselves are not rated, most issuers are rated by either Thompson

Bankwatch (for domestic banks) or IBCA, Ltd. (for foreign banks).

The secondary market for Eurodollar CDs is less developed than the domestic CD market. The current perception of the issuer's name, as well as the size and maturity of the issue, may affect marketability.

## ACCOUNTING TREATMENT

The Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities," determines the accounting treatment for investments in Eurodollar CDs. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

In general, a 20 percent risk weighting is appropriate for depository institutions based in OECD

countries. For specific risk weights for qualified trading accounts, see section 2110.1, "Capital Adequacy."

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Owning Eurodollar CDs is authorized under the "incidental powers" provisions of 12 USC 24 (seventh). Banks may legally hold these instruments without limit.

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### GENERAL DESCRIPTION

Asset-backed securities (ABS) are debt instruments that represent an interest in a pool of assets. Technically, mortgage-backed securities (MBS) can be viewed as a subset of ABS, but the term “ABS” is generally used to refer to securities in which underlying collateral consists of assets other than residential first mortgages such as credit card and home equity loans, leases, or commercial mortgage loans. Issuers are primarily banks and finance companies, captive finance subsidiaries of nonfinancial corporations (for example, GMAC), or specialized originators such as credit card lenders (for example, Discover). Credit risk is an important issue in asset-backed securities because of the significant credit risks inherent in the underlying collateral and because issuers are primarily private entities. Accordingly, asset-backed securities generally include one or more credit enhancements, which are designed to raise the overall credit quality of the security above that of the underlying loans.

Another important type of asset-backed security is commercial paper issued by special-purpose entities. Asset-backed commercial paper is usually backed by trade receivables, though such conduits may also fund commercial and industrial loans. Banks are typically more active as issuers of these instruments than as investors in them.

### CHARACTERISTICS AND FEATURES

An asset-backed security is created by the sale of assets or collateral to a conduit, which becomes the legal issuer of the ABS. The securitization conduit or issuer is generally a bankruptcy-remote vehicle such as a grantor trust or, in the case of an asset-backed commercial paper program, a special-purpose entity (SPE). The sponsor or originator of the collateral usually establishes the issuer. Interests in the trust, which embody the right to certain cash flows arising from the underlying assets, are then sold in the form of securities to investors through an investment bank or other securities underwriter. Each ABS has a servicer (often the originator of the collateral) that is responsible

for collecting the cash flows generated by the securitized assets—principal, interest, and fees net of losses and any servicing costs as well as other expenses—and for passing them along to the investors in accord with the terms of the securities. The servicer processes the payments and administers the borrower accounts in the pool.

The structure of an asset-backed security and the terms of the investors’ interest in the collateral can vary widely depending on the type of collateral, the desires of investors, and the use of credit enhancements. Often ABS are structured to reallocate the risks entailed in the underlying collateral (particularly credit risk) into security tranches that match the desires of investors. For example, senior subordinated security structures give holders of senior tranches greater credit risk protection (albeit at lower yields) than holders of subordinated tranches. Under this structure, at least two classes of asset-backed securities are issued, with the senior class having a priority claim on the cash flows from the underlying pool of assets. The subordinated class must absorb credit losses on the collateral before losses can be charged to the senior portion. Because the senior class has this priority claim, cash flows from the underlying pool of assets must first satisfy the requirements of the senior class. Only after these requirements have been met will the cash flows be directed to service the subordinated class.

ABS also use various forms of credit enhancements to transform the risk-return profile of underlying collateral, including third-party credit enhancements, recourse provisions, overcollateralization, and various covenants. Third-party credit enhancements include standby letters of credit, collateral or pool insurance, or surety bonds from third parties. Recourse provisions are guarantees that require the originator to cover any losses up to a contractually agreed-upon amount. One type of recourse provision, usually seen in securities backed by credit card receivables, is the “spread account.” This account is actually an escrow account whose funds are derived from a portion of the spread between the interest earned on the assets in the underlying pool of collateral and the lower interest paid on securities issued by the trust. The amounts that accumulate in this escrow account are used to cover credit losses in the

underlying asset pool, up to several multiples of historical losses on the particular asset collateralizing the securities.

Overcollateralization is another form of credit enhancement that covers a predetermined amount of potential credit losses. It occurs when the value of the underlying assets exceeds the face value of the securities. A similar form of credit enhancement is the cash-collateral account, which is established when a third party deposits cash into a pledged account. The use of cash-collateral accounts, which are considered by enhancers to be loans, grew as the number of highly rated banks and other credit enhancers declined in the early 1990s. Cash-collateral accounts provide credit protection to investors of a securitization by eliminating “event risk,” or the risk that the credit enhancer will have its credit rating downgraded or that it will not be able to fulfill its financial obligation to absorb losses.

An investment banking firm or other organization generally serves as an underwriter for ABS. In addition, for asset-backed issues that are publicly offered, a credit-rating agency will analyze the policies and operations of the originator and servicer, as well as the structure, underlying pool of assets, expected cash flows, and other attributes of the securities. Before assigning a rating to the issue, the rating agency will also assess the extent of loss protection provided to investors by the credit enhancements associated with the issue.

Although the basic elements of all asset-backed securities are similar, individual transactions can differ markedly in both structure and execution. Important determinants of the risk associated with issuing or holding the securities include the process by which principal and interest payments are allocated and down-streamed to investors, how credit losses affect the trust and the return to investors, whether collateral represents a fixed set of specific assets or accounts, whether the underlying loans are revolving or closed-end, under what terms (including maturity of the asset-backed instrument) any remaining balance in the accounts may revert to the issuing company, and the extent to which the issuing company (the actual source of the collateral assets) is obligated to provide support to the trust/conduit or to the investors. Further issues may arise based on discretionary behavior of the issuer within the terms of the securitization agreement, such as voluntary buybacks from, or contributions to,

the underlying pool of loans when credit losses rise.

A bank or other issuer may play more than one role in the securitization process. An issuer can simultaneously serve as originator of loans, servicer, administrator of the trust, underwriter, provider of liquidity, and credit enhancer. Issuers typically receive a fee for each element of the transaction.

Institutions acquiring ABS should recognize that the multiplicity of roles that may be played by a single firm—within a single securitization or across a number of them—means that credit and operational risk can accumulate into significant concentrations with respect to one or a small number of firms.

## TYPES OF SECURITIZED ASSETS

There are many different varieties of asset-backed securities, often customized to the terms and characteristics of the underlying collateral. The most common types are securities collateralized by revolving credit-card receivables, but instruments backed by home equity loans, other second mortgages, and automobile-finance receivables are also common.

### Installment Loans

Securities backed by closed-end installment loans are typically the least complex form of asset-backed instruments. Collateral for these ABS typically includes leases, automobile loans, and student loans. The loans that form the pool of collateral for the asset-backed security may have varying contractual maturities and may or may not represent a heterogeneous pool of borrowers. Unlike a mortgage pass-through instrument, the trustee does not need to take physical possession of any account documents to perfect security interest in the receivables under the Uniform Commercial Code. The repayment stream on installment loans is fairly predictable, since it is primarily determined by a contractual amortization schedule. Early repayment on these instruments can occur for a number of reasons, with most tied to the disposition of the underlying collateral (for example, in the case of an ABS backed by an automobile loan, the sale of the vehicle). Interest is typically passed through to bondholders at a fixed rate that is slightly

below the weighted average coupon of the loan pool, allowing for servicing and other expenses as well as credit losses.

## Revolving Credit

Unlike closed-end installment loans, revolving-credit receivables involve greater uncertainty about future cash flows. Therefore, ABS structures using this type of collateral must be more complex to afford investors more comfort in predicting their repayment. Accounts included in the securitization pool may have balances that grow or decline over the life of the ABS. Accordingly, at maturity of the ABS, any remaining balances revert to the originator. During the term of the ABS, the originator may be required to sell additional accounts to the pool to maintain a minimum dollar amount of collateral if accountholders pay down their balances in advance of predetermined rates.

Credit card securitizations are the most prevalent form of revolving-credit ABS, although home equity lines of credit are a growing source of ABS collateral. Credit card ABS are typically structured to incorporate two phases in the life cycle of the collateral: an initial phase during which the principal amount of the securities remains constant, and an amortization phase during which investors are paid off. A specific period of time is assigned to each phase. Typically, a specific pool of accounts is identified in the securitization documents, and these specifications may include not only the initial pool of loans but a portfolio from which new accounts may be contributed.

The dominant vehicle for issuing securities backed by credit cards is a master-trust structure with a “spread account,” which is funded up to a predetermined amount through “excess yield”—that is, interest and fee income less credit losses, servicing, and other fees. With credit card receivables, the income from the pool of loans—even after credit losses—is generally much higher than the return paid to investors. After the spread account accumulates to its predetermined level, the excess yield reverts to the issuer. Under GAAP, issuers are required to recognize on their balance sheet an excess-yield asset that is based on the fair value of the expected future excess yield; in principle, this value would be based on the net present value of the expected earnings stream from the

transaction. Issuers are further required to revalue the asset periodically to take account of changes in fair value that may occur due to interest rates, actual credit losses, and other factors relevant to the future stream of excess yield. The accounting and capital implications of these transactions are discussed further below.

## Asset-Backed Commercial Paper

A number of larger banks use “special-purpose entities” (SPEs) to acquire trade receivables and commercial loans from high-quality (often investment-grade) obligors and to fund those loans by issuing (asset-backed) commercial paper that is to be repaid from the cash flow of the receivables. Capital is contributed to the SPE by the originating bank; together with the high quality of the underlying borrowers, this capital is sufficient to allow the SPE to receive a high credit rating. The net result is that the SPE’s cost of funding can be at or below that of the originating bank itself. The SPE is “owned” by individuals who are not formally affiliated with the bank, although the degree of separation is typically minimal.

These types of securitization programs enable banks to arrange short-term financing support for their customers without having to extend credit directly. This structure provides borrowers with an alternative source of funding and allows banks to earn fee income for managing the programs. As the asset-backed commercial paper structure has developed, it has been used to finance a variety of underlying loans—in some cases, loans purchased from other firms rather than originated by the bank itself—and as a remote-origination vehicle from which loans can be made directly. Like other securitization techniques, this structure allows banks to meet their customers’ credit needs while incurring lower capital requirements and a smaller balance sheet than if it made the loans directly.

## USES

Issuers obtain a number of advantages from securitizing assets, including improving their capital ratios and return on assets, monetizing gains in loan value, generating fee income by providing services to the securitization conduit, closing a potential source of interest-rate risk,

and increasing institutional liquidity by providing access to a new source of funds. Investors are attracted by the high credit quality of ABS, as well as their attractive returns.

## DESCRIPTION OF MARKETPLACE

The primary buyers for ABS have been insurance companies and pension funds looking for attractive returns with superior credit quality. New issues often sell out very quickly. Banks typically are not active buyers of these securities. The secondary market is active, but new issues currently trade at a premium to more seasoned products.

Market transparency can be less than perfect, especially when banks and other issuers retain most of the economic risk despite the securitization transaction. This is particularly true when excess yield is a significant part of the transaction and when recourse (explicit or implicit) is a material consideration. The early-amortization features of some ABS also may not be fully understood by potential buyers.

## PRICING

ABS carry coupons that can be fixed (generally yielding between 50 and 300 basis points over the Treasury curve) or floating (for example, 15 basis points over one-month LIBOR). Pricing is typically designed to mirror the coupon characteristics of the loans being securitized. The spread will vary depending on the credit quality of the underlying collateral, the degree and nature of credit enhancement, and the degree of variability in the cash flows emanating from the securitized loans.

## HEDGING

Given the high degree of predictability in their cash flows, the hedging of installment loans and revolving-credit ABS holdings is relatively straightforward and can be accomplished either through cash-flow matching or duration hedging. Most market risk arises from the perceived credit quality of the collateral and from the nature and degree of credit enhancement, a risk

that may be difficult to hedge. One source of potential unpredictability, however, is the risk that acceleration or wind-down provisions would be triggered by poor credit quality in the asset pool—essentially, a complex credit-quality option that pays off bondholders early if credit losses exceed some threshold level.

For issuers, variability in excess yield (in terms of carrying value) or in the spread account (in terms of income) can represent a material interest-rate risk, particularly if the bonds pay interest on a variable-rate basis while the underlying loans are fixed-rate instruments. While the risk can be significant, the hedging solutions are not complex (that is, dollar-for-dollar in notional terms). Potential hedging strategies include the use of futures or forwards, forward rate agreements (FRAs), swaps, or more complex options or swaptions. In the case of home equity loans or other revolving credits for which the pool earnings rate is linked to prime while the ABS interest rate is not, prime LIBOR swaps or similar instruments could be used to mitigate basis risk. The presence of interest-rate risk may have credit-quality ramifications for the securities, as tighter excess yield and spread accounts would reduce the ability of the structure to absorb credit losses.

An asset-backed commercial paper (ABCP) program can lead to maturity mismatches for the issuer, depending on the pricing characteristics of the commercial loan assets. Similarly, the presence of embedded options—such as prepayment options, caps, or floors—can expose the ABCP entity to options risk. These risks can be hedged through the use of options, swaptions, or other derivative instruments. As with home equity ABS, prime-based commercial loans could lead to basis-risk exposure, which can be hedged using basis swaps.

## RISKS

### Credit Risk

Credit risk arises from (1) losses caused by defaults of borrowers in the underlying collateral and (2) the issuer's or servicer's failure to perform. These two elements can blur together, as in the case of a servicer who does not provide adequate credit-review scrutiny to the serviced portfolio, leading to a higher incidence

of defaults. ABS are rated by major rating agencies.

## Market Risk

Market risk arises from the cash-flow characteristics of the security, which for most ABS tend to be predictable. Rate-motivated prepayments are a relatively minor phenomenon because of the small principal amounts on each loan and the relatively short maturity. The greatest variability in cash flows comes from credit performance, including the presence of wind-down or acceleration features designed to protect the investor if credit losses in the portfolio rise well above expected levels.

## Interest-Rate Risk

Interest-rate risk arises for the issuer from the relationship between the pricing terms on the underlying loans and the terms of the rate paid to bondholders, as well as from the need to mark to market the excess servicing or spread-account proceeds carried on the balance sheet. For the holder of the security, interest-rate risk depends on the expected life or repricing of the ABS, with relatively minor risk arising from embedded options. The notable exception is valuation of the wind-down option.

## Liquidity Risk

Liquidity risk can arise from increased perceived credit risk. Liquidity can also become a major concern for asset-backed commercial paper programs if concerns about credit quality, for example, lead investors to avoid the commercial paper issued by the SPE. For these cases, the securitization transaction may include a “liquidity facility,” which requires the facility provider to advance funds to the SPE if liquidity problems arise. To the extent that the bank originating the loans is also the provider of the liquidity facility and that the bank is likely to experience similar market concerns if the loans it originates deteriorate, the ultimate practical value of the liquidity facility to the transaction may be questionable.

## Operations Risk

Operations risk arises from the potential misrepresentation of loan quality or terms by the originating institution, the misrepresentation of the nature and current value of the assets by the servicer, and inadequate controls over disbursements and receipts by the servicer.

## ACCOUNTING TREATMENT

The Financial Accounting Standards Board’s Statement of Financial Accounting Standards No. 115 (FAS 115), “Accounting for Certain Investments in Debt and Equity Securities,” as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), “Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities,” determines the accounting treatment for investments in government agency securities. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), “Accounting for Derivatives and Hedging Activities,” as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, “Accounting,” for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

For the holder of ABS, a 100 percent risk weighting is assigned for corporate issues and a 20 percent rating for state or municipal issues. Under risk-based capital regulations, a transfer of assets is a “true sale” as long as the banking organization (1) retains no risk of loss and (2) has no obligation to any party for the payment of principal or interest on the assets transferred. Unless these conditions are met, the banking organization is deemed to have sold the assets with recourse; thus, capital generally must be held against the entire risk-weighted amount of the assets sold unless (1) the transaction is subject to the low-level capital rule or (2) the loans securitized are small-business loans and receive preferential treatments. For assets sold in which an interest-only receivable is recognized under FAS 140, or in which the spread account is recognized on the balance sheet and provides credit enhance-

ment to the assets sold, those assets are deemed to have been sold with recourse. In the case of asset-backed commercial paper, capital generally must be held against the entire risk-weighted amount of any guarantee, other credit enhancement, or liquidity facility provided by the bank to the SPE.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Asset-backed securities can be either type IV or type V securities. Type IV securities were added as bank-eligible securities in 1996 primarily in response to provisions of the Riegle Community Development and Regulatory Improvement Act of 1994 (RCRDIA), which removed quantitative limits on a bank's ability to buy commercial mortgage and small-business loan securities. In summary, type IV securities include the following asset-backed securities that are fully secured by interests in a pool (or pools) of loans made to numerous obligors:

- investment-grade residential mortgage-related securities offered or sold pursuant to section 4(5) of the Securities Act of 1933 (15 USC 77d(5))
- residential mortgage-related securities, as described in section 3(a)(41) of the Securities Exchange Act of 1934 (15 USC 78c(a)(41)), that are rated in one of the two highest investment-grade rating categories
- investment-grade commercial mortgage securities offered or sold pursuant to section 4(5) of the Securities Act of 1933 (15 USC 77d(5))
- commercial mortgage securities, as described in section 3(a)(41) of the Securities Exchange Act of 1934 (15 USC 78c(a)(41)), that are rated in one of the two highest investment-grade rating categories
- investment-grade, small-business loan securities as described in section 3(a)(53)(A) of the Securities Exchange Act of 1934 (15 USC 78c(a)(53)(A))

For all type IV commercial and residential mortgage securities and for type IV small-business loan securities rated in the top two rating categories, there is no limitation on the amount a bank can purchase or sell for its own account. Type IV investment-grade small-business loan securities that are not rated in the top two rating categories are subject to a limit of

25 percent of a bank's capital and surplus for any one issuer. In addition to being able to purchase and sell type IV securities, subject to the above limitations, a bank may deal in those type IV securities that are fully secured by type I securities.

Type V securities consist of all ABS that are not type IV securities. Specifically, they are defined as marketable, investment grade-rated securities that are not type IV and are "fully secured by interests in a pool of loans to numerous obligors and in which a national bank could invest directly." They include securities backed by auto loans, credit card loans, home equity loans, and other assets. Also included are residential and commercial mortgage securities as described in section 3(a)(41) of the Securities Exchange Act of 1934 (15 USC 78c(a)(41)) that are not rated in one of the two highest investment-grade rating categories, but are still investment grade. A bank may purchase or sell type V securities for its own account provided the aggregate par value of type V securities issued by any one issuer held by the bank does not exceed 25 percent of the bank's capital and surplus.

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### GENERAL DESCRIPTION

A mortgage loan is a loan which is secured by the collateral of a specified real estate property. The real estate pledged with a mortgage can be divided into two categories: residential and non-residential. Residential properties include houses, condominiums, cooperatives, and apartments. Residential real estate can be further subdivided into single-family (one- to four-family) and multifamily (apartment buildings in which more than four families reside). Nonresidential property includes commercial and farm properties. Common types of mortgages which have been securitized include traditional fixed-rate level-payment mortgages, graduated-payment mortgages, adjustable-rate mortgages (ARMs), and balloon mortgages.

Mortgage-backed securities (MBS) are products that use pools of mortgages as collateral for the issuance of securities. Although these securities have been collateralized using many types of mortgages, most are collateralized by one- to four-family residential properties. MBS can be broadly classified into four basic categories:

1. mortgage-backed bonds
2. pass-through securities
3. collateralized mortgage obligations and real estate mortgage investment conduits
4. stripped mortgage-backed securities

### Mortgage-Backed Bonds

Mortgage-backed bonds are corporate bonds which are general obligations of the issuer. These bonds are credit enhanced through the pledging of specific mortgages as collateral. Mortgage-backed bonds involve no sale or conveyance of ownership of the mortgages acting as collateral.

### Pass-Through Securities

A mortgage-backed pass-through security provides its owner with a pro rata share in underlying mortgages. The mortgages are typically placed in a trust, and certificates of ownership are sold to investors. Issuers of pass-through instruments primarily act as a conduit for the

investors by collecting and proportionally distributing monthly cash flows generated by homeowners making payments on their home mortgage loans. The pass-through certificate represents a sale of assets to the investor, thus removing the assets from the balance sheet of the issuer.

### Collateralized Mortgage Obligations and Real Estate Mortgage Investment Conduits

Collateralized mortgage obligations (CMOs) and real estate mortgage investment conduit (REMICs) securities represent ownership interests in specified cash flows arising from underlying pools of mortgages or mortgage securities. CMOs and REMICs involve the creation, by the issuer, of a single-purpose entity designed to hold mortgage collateral and funnel payments of principal and interest from borrowers to investors. Unlike pass-through securities, however, which entail a pro rata share of ownership of all underlying mortgage cash flows, CMOs and REMICs convey ownership only of cash flows assigned to specific classes based on established principal distribution rules.

### Stripped Mortgage-Backed Securities

Stripped mortgage-backed securities (SMBS) entail the ownership of either the principal or interest cash flows arising from specified mortgages or mortgage pass-through securities. Rights to the principal are labeled POs (principal only), and rights to the interest cash flows are labeled IOs (interest only).

### CHARACTERISTICS AND FEATURES

#### Products Offered under Agency Programs

The Government National Mortgage Association (GNMA or Ginnie Mae), Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac), and the Federal National Mortgage Association (FNMA or Fannie Mae) are the three



main government-related institutions which securitize like groups of mortgages for sale to investors. Major mortgage-purchasing programs sponsored by these three agencies are listed below.

<i>Abbreviation</i>	<i>Description</i>
<i>GNMA</i>	
30-YR	30-year single-family programs
15-YR	15-year single-family programs
GPMs	Graduated-payment programs
PROJ Loans	Project-loan programs
ARMs	Single-family adjustable-rate programs
<i>FNMA</i>	
30-YR SF	30-year single-family programs
30-YR MF	30-year multifamily programs
30-YR FHA/ VA	FHA/VA 30-year single- and multifamily programs
15-YR	15-year single-family programs
SF ARMs	Single-family adjustable-rate programs
MF ARMs	Multifamily adjustable-rate programs
Balloons	Balloon-payment seven-year programs
Two-step	Five- and seven-year two-step programs
<i>FHLMC</i>	
30-YR	30-year single-family programs
15-YR	15-year single-family programs
TPMs	Tiered-payment single-family programs
ARMs	Single-family adjustable-rate programs
MF	Multifamily programs
5- & 7-year balloons	Balloon-payment, five- to seven-year programs

While the majority of outstanding mortgage loans are structured as 30-year fixed-rate loans, in recent years the size of the 15-year, fixed-rate sector has grown. Declining interest rates and a steep yield curve have led many borrowers to refinance or prepay existing 30-year, higher-coupon loans and replace them with a shorter maturity. This experience also has demonstrated the prepayment risk inherent in all mortgages.

## Public Securities Association Prepayment Rates

Mortgagors have the option to prepay the principal balance of their mortgages at any time. The value of the prepayment option to investors and mortgagors depends on the level of interest rates and the volatility of mortgage prepayments. Prepayment rates depend on many variables, and their response to these variables can be unpredictable. The single biggest influence on prepayment rates is the level of long-term mortgage rates; mortgage prepayments generally increase as long-term rates decrease. While future long-term rates are not known, higher volatility in long-term interest rates means lower rates are more likely, making the prepayment option more valuable to the mortgagor. This higher value of the prepayment option is reflected in lower mortgage security prices, as mortgage investors require higher yields to compensate for increased prepayment risk.

The importance of principal prepayment to the valuation of mortgage securities has resulted in several standardized forms of communicating the rate of prepayments of a mortgage security. One standard form is that developed by the Public Securities Association (PSA). The PSA standard is more accurately viewed as a benchmark or reference for communicating prepayment patterns. It may be helpful to think of the PSA measurement as a kind of speedometer, used only as a unit for measuring the speed of prepayments.

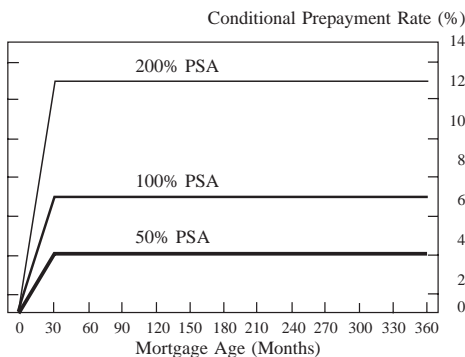
For a pool of mortgage loans, the PSA standard assumes that the mortgage prepayment rate increases at a linear rate over the first 30 months following origination, then levels off at a constant rate for the remaining life of the pool. Under the PSA convention, prepayments are assumed to occur at a 0.2 percent annual rate in the first month, 0.4 percent annual rate in the second month, escalating to a 6.0 percent annual rate by month 30. The PSA's annualized prepayment rate then remains at 6.0 percent over the remaining life of the mortgage pool (see chart 1). Using this convention, mortgage prepayment rates are often communicated in multiples of the PSA standard of 100 percent. For example, 200 percent PSA equals two times the PSA standard, whereas 50 percent PSA equals one-half of the PSA standard.

### *Mortgage Pass-Through Securities*

Mortgage pass-through securities are created when mortgages are pooled together and sold as undivided interests to investors. Usually, the mortgages in the pool have the same loan type and similar maturities and loan interest rates. The originator (for instance, a bank) may continue to service the mortgage and will “pass through” the principal and interest, less a servicing fee, to an agency or private issuer of mortgage-backed securities. Mortgages are then packaged by the agency or private issuer and sold to investors. The principal and interest, less guaranty and other fees are then “passed through” to the investor, who receives a pro rata share of the resulting cash flows.

Every agency pass-through pool is unique, distinguished by features such as size, prepayment characteristics, and geographic concentration or dispersion. Most agency pass-through securities, however, trade on a generic or to-be-announced (TBA) basis. In a TBA trade, the seller and buyer agree to the type of security, coupon, face value, price, and settlement date at the time of the trade, but do not specify the actual pools to be traded. Two days before settlement, the seller identifies the specific pools to be delivered to satisfy the commitment. Trading in agency pass-throughs may take place on any business day, but TBA securities usually settle on one specific date each month. The Public Securities Association releases a monthly schedule that divides all agency pass-throughs into six groups, each settling on a different day. Agency pass-throughs generally clear through electronic book-entry systems.

Chart 1—PSA Model



Nonagency pass-throughs are composed of specific pools and do not trade on a TBA basis. New issues settle on the date provided in the prospectus. In the secondary market, these securities trade on an issue-specific basis and generally settle on a corporate basis (three business days after the trade).

### *Collateralized Mortgage Obligations*

Since 1983, mortgage pass-through securities and mortgages have been securitized as collateralized mortgage obligations (CMOs).<sup>1</sup> While pass-through securities share prepayment risk on a pro rata basis among all bondholders, CMOs redistribute prepayment risk among different classes or tranches. The CMO securitization process recasts prepayment risk into classes or tranches. These tranches have risk profiles ranging from extremely low to significantly high risk. Some tranches can be relatively immune to prepayment risk, while others bear a disproportionate share of the risk associated with the underlying collateral.

CMO issuance has grown dramatically throughout the 1980s and currently dominates the market for FNMA and FHLMC pass-throughs or agency collateral. Given the dramatic growth of the CMO market and its complex risks, this subsection discusses the structures and risks associated with CMOs.

In 1984, the Treasury ruled that multiple-class pass-throughs required active management; this resulted in the pass-through entities' being considered corporations for tax purposes rather than trusts. Consequently, the issuer was no longer considered a grantor trust, and the income was taxed twice: once at the issuer level and again at the investor level. This ruling ultimately had complex and unintended ramifications for the CMO market.

The issue was ultimately addressed in the Tax Reform Act of 1986 through the creation of real estate mortgage investment conduits (REMICs). These instruments are essentially tax-free vehicles for issuing multiple-class mortgage-backed securities. REMIC is a tax designation; a REMIC may be originated as a trust, partnership, or other entity.

1. Today almost all CMOs are structured as real estate mortgage investment conduits (REMICs) to qualify for desirable tax treatment.

The Tax Reform Act of 1986 allowed for a five-year transition during which mortgage-backed securities could be issued pursuant to existing Treasury regulations. However, as of January 1, 1992, REMICs became the sole means of issuing multiple-class mortgage-backed securities exempt from double taxation. As a practical matter, the vast majority of CMOs carry the REMIC designation. Indeed, many market participants use the terms “CMO” and “REMIC” interchangeably.

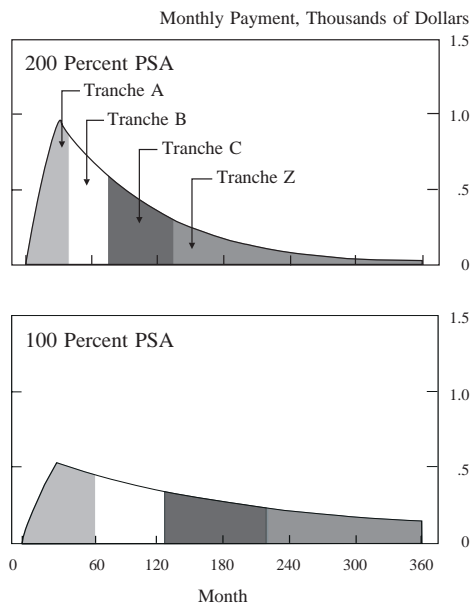
CMOs do not trade on a TBA basis. New-issue CMOs settle on the date provided in the prospectus and trade on a corporate basis (three business days after the trade) in the secondary market. Common CMO structures include sequential pay, PACs, TACs, and floaters and inverse floaters as described below.

*Sequential pay structure.* The initial form of CMO structure was designed to provide more precisely targeted maturities than the pass-through securities. Now considered a relatively simple design for CMOs, the sequential pay structure dominated CMO issuance from 1983 (when the first CMO was created) until the late 1980s. In the typical sequential pay deal of the 1980s (see chart 2), mortgage cash flows were

divided into four tranches, labeled A, B, C, and Z. Tranche A might receive the first 25 percent of principal payments and have an average maturity, or average life, of one to three years.<sup>2</sup> Tranche B, with an average life of between three and seven years, would receive the next 25 percent of principal. Tranche C, receiving the following 25 percent of principal, would have an average life of 5 to 10 years. The Z tranche, receiving the final 25 percent, would be an “accrual” bond with an average life of 15 to 20 years.<sup>3</sup>

The sequential pay structure was the first step in creating a mortgage yield curve, allowing mortgage investors to target short, intermediate, or long maturities. Nevertheless, sequential pay structure maturities remained highly sensitive to prepayment risks, as prepayments of the underlying collateral change the cash flows for each tranche, affecting the longer-dated tranches most, especially the Z tranche. If interest rates declined and prepayment speeds doubled (from 100 percent PSA to 200 percent PSA as shown on chart 2), the average life of the A tranche would change from 35 months to 25 months, but the average life of the Z bond would shift from 280 months to 180 months. Hence, the change in the value of the Z bond would be similarly greater than the price change of the A tranche.

Chart 2—Four-Tranche Sequential Pay CMO



*Planned amortization class (PAC) structure.* The PAC structure, which now dominates CMO issuance, creates tranches, called planned amortization classes, with cash flows that are protected from prepayment changes within certain limits. However, creating this “safer” set of tranches necessarily means that there must be other tranches, called “support” bonds, that are by definition more volatile than the underlying pass-throughs. While the PAC tranches are relatively easy to sell, finding investors for higher-yielding, less predictable support bonds has been crucial for the success of the expanding CMO market.

Chart 3 illustrates how PACs are created. In the example, the estimated prepayment rate for the mortgages is 145 percent of the PSA standard, and the desired PAC is structured to

2. Average life, or weighted average life (WAL), is defined as the weighted average number of years that each principal dollar of the mortgage security remains outstanding.

3. Unlike the Z tranche, the A, B, and C tranches receive regular interest payments in the early years before the principal is paid off.

be protected if prepayments slow to 80 percent PSA or rise to 250 percent PSA. The PACs therefore have some protection against both “extension risk” (slower than expected prepayments) and “call risk” (faster than expected prepayments). In order to create this 80 to 250 percent “PAC range,” principal payments are calculated for 80 percent PSA and 250 percent PSA.

The area underneath both curves indicates that amount of estimated principal that can be used to create the desired PAC tranche or tranches. That is, as long as the prepayment rates are greater than 80 percent PSA or less than 250 percent PSA, the four PACs will receive their scheduled cash flows (represented by the shaded areas).

This PAC analysis assumes a constant prepayment rate of between 80 and 250 percent of the PSA standard over the life of the underlying mortgages. Since PSA speeds can change every month, this assumption of a constant PSA speed for months 1 to 360 is never realized. If prepayment speeds are volatile, even within the PAC range, the PAC range itself may narrow over time. This phenomenon, termed “effective PAC band,” affects longer-dated PACs more than short-maturity PACs. Thus, PAC prepayment

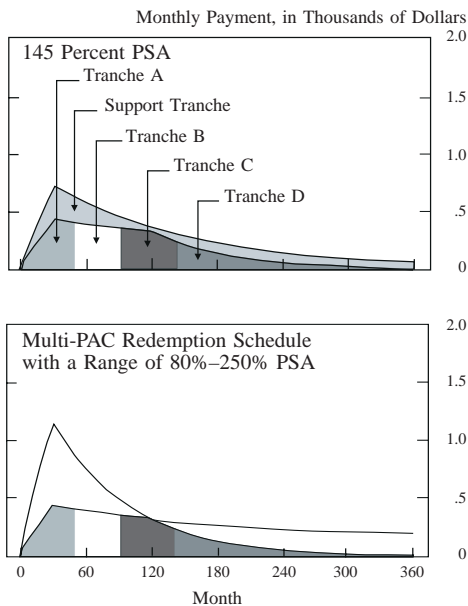
protection can break down from extremely high, extremely low, or extremely volatile prepayment rates.

A PAC bond classified as PAC 1 in a CMO structure has the highest cash-flow priority and the best protection from both extension and prepayment risk. In the past, deals have also included super PACs, another high-protection, lower-risk-type tranche distinguished by extremely wide bands. The mechanisms that protect a PAC tranche within a deal may diminish, and its status may shift more toward the support end of the spectrum. The extent of a support-type role that a PAC might play depends in part on its original cash-flow priority status and the principal balances of the other support tranches embedded within the deal. Indeed, as prepayments accelerated in 1993, support tranches were asked to bear the brunt, and many disappeared. A PAC III, for example, became a pure support tranche, foregoing any PAC-like characteristics in that case.

A variation on the PAC theme has emerged in the scheduled tranche (SCH). Like a PAC, an SCH has a predetermined cash-flow collar, but it is too narrow even to be called a PAC III. An SCH tranche is also prioritized within a deal using the above format, but understand that its initial priority status is usually below even that of a PAC III. These narrower band PAC-type bonds were designed to perform well in low-volatility environments and were popular in late 1992 and early 1993. At that time, many investors failed to realize what would happen to the tranche when prepayments violated the band.

In chart 3, the four grey shaded areas represent the PAC structure, which has been divided into four tranches to provide investors with an instrument more akin to the bullet maturity of Treasury and corporate bonds.<sup>4</sup> The two support tranches are structured to absorb the full amount of prepayment risk to the extent the prepayment rate for the PAC tranches is within the specified range of 80 to 250 percent PSA. The second panel of chart 3 shows principal cash flows at the original estimated speed of 145 percent PSA, which are divided between the PAC and support bonds throughout the life of the underlying mortgages.

Chart 3—Principal Payments

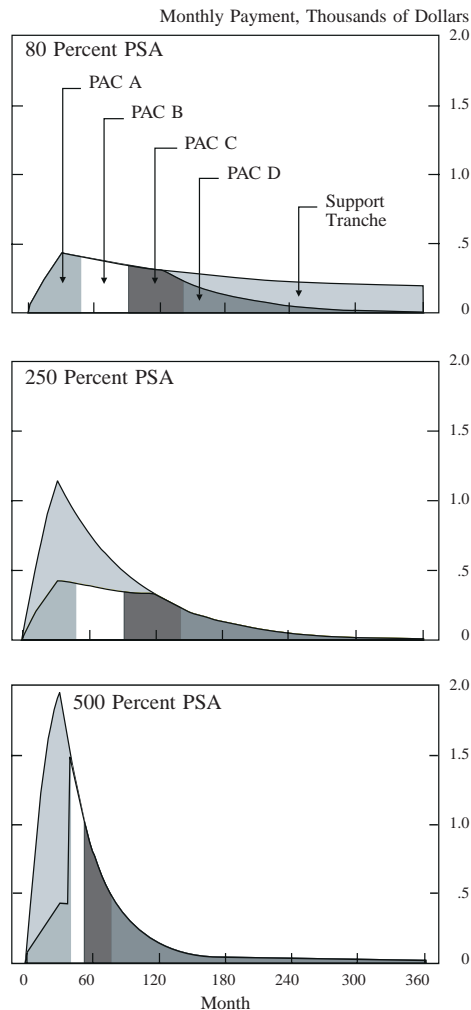


4. Treasury and corporate bonds usually return principal to investors at stated maturity; the PAC structure narrows the time interval over which principal is returned to the investors.

Chart 4 shows how both PACs and the support tranches react to different prepayment speeds. The average lives of the support bonds in this example could fluctuate from 1½ to 25 years depending on prepayment speeds. Simply put, support-bond returns are diminished whether prepayment rates increase or decrease (a lose-lose proposition). To compensate holders of support bonds for this characteristic (sometimes referred to as “negative convexity”), support bonds carry substantially higher yields

than PAC bonds.<sup>5</sup> Conversely, PAC bond investors are willing to give up yield in order to reduce their exposure to prepayment risk or negative convexity. Nevertheless, PAC bond holders are exposed to prepayment risk outside the protected range and correspondingly receive yields above those available on comparable Treasury securities. In extreme cases, even PAC tranches are subject to prepayment risk. For example, at 500 percent PSA (see the third panel of chart 4), the PAC range is broken. The support bonds fail to fully protect even the first PAC tranche; principal repayment accelerates sharply at the end of the scheduled maturity of PAC A.

Chart 4—Principal Payments



*Targeted amortization tranche structure.* A targeted amortization tranche (TAC) typically offers protection from prepayment risk but not extension risk. Similar to the cash-flow schedule of a PAC that is built around a collar, a TAC’s schedule is built around a single pricing speed, and the average life of the tranche is “targeted” to that speed. Any excess principal paid typically has little effect on the TAC; its targeted speed acts as a line of defense. Investors in TACs, however, pay the price for this defense with their lack of protection when rates increase, subjecting the tranche to potential extension risk.

*Floater and inverse floater.* CMOs and REMICs can include several floating-rate classes. Floating-rate tranches have coupon rates that float with movements in an underlying index. The most widely used indexes for floating-rate tranches are the London Interbank Offered Rate (LIBOR) and the Eleventh District Cost of Funds Index (COFI). While LIBOR correlates closely with interest-rate movements in the domestic federal funds market, COFI has a built-in lag feature and is slower to respond to changes in interest rates. Thus, the holders of COFI-indexed floaters generally experience a delay in the effects of changing interest-rate movements.

5. Price/yield curves for most fixed-income securities have a slightly convex shape, hence the securities are said to possess convexity. An important and desirable attribute of the convex shape of the price/yield curve for Treasury securities is that prices rise at a faster rate than they decline. Mortgage price/yield curves tend to be concave, especially in the range of premium prices, and are said to possess negative convexity. Securities with negative convexity rise in price at a slower rate than they fall in price.

Since most floating-rate tranches are backed by fixed-rate mortgages or pass-through securities, floating-rate tranches must be issued in combination with some kind of “support.” The designed support mechanism on floaters is an interest-rate cap, generally coupled with a support bond or inverse floater. If interest rates rise, where does the extra money come from to pay higher rates on the floating CMO tranches? The solution is in the form of an inverse floating-rate tranche. The coupon rate on the inverse tranche moves opposite of the accompanying floater tranche, thus allowing the floater to pay high interest rates. The floater and the inverse tranches “share” interest payments from a pool of fixed-rate mortgage securities. If rates rise, the coupon on the floater moves up; the floater takes more of the shared interest, leaving less for the inverse, whose coupon rate must fall. If rates fall, the rate on the floater falls, and more money is available to pay the inverse floater investor and the corresponding rate on the inverse rises.

Effectively, the interest-payment characteristics of the underlying home mortgages have not changed; another tranche is created where risk is shifted. This shifting of risk from the floater doubles up the interest-rate risk in the inverse floater, with enhanced yield and price ramifications as rates fluctuate. If rates fall, the inverse floater receives the benefit of a higher-rate-bearing security in a low-rate environment. Conversely, if rates rise, that same investor pays the price of holding a lower-rate security in a high-rate environment. As with other tranche types, prepayments determine the floating cash flows and the weighted average life of the instrument (WAL).

With respect to floaters, the two most important risks are the risk that the coupon rate will adjust to its maximum level (cap risk) and the risk that the index will not correlate tightly with the underlying mortgage product. Additionally, floaters that have “capped out” and that have WALs that extend as prepayments slow may experience considerable price depreciation.

### *Stripped Mortgage-Backed Securities: Interest-Only and Principal-Only*

Interest-only (IO) and principal-only (PO) securities are another modification of the mortgage pass-through product. This market is referred to as the stripped mortgage-backed securities (SMBS) market. Both IOs and POs are more

sensitive to prepayment rates than the underlying pass-throughs.<sup>6</sup> Despite the increased exposure to prepayment risk, these instruments have proved popular with several groups of investors. For example, mortgage servicers may purchase POs to offset the loss of servicing income from rising prepayments. IOs are often used as a hedging vehicle by fixed-income portfolio managers because the value of IOs rises when prepayments slow—usually in rising interest-rate environments when most fixed-income security prices decline.

Two techniques have been used to create IOs and POs. The first, which dominates outstandings in IOs and POs, strips pass-throughs into their interest and principal components, which are then sold as separate securities. As of October 1993, approximately \$65 billion of the supply of outstanding pass-throughs had been stripped into IOs and POs.<sup>7</sup> The second technique, which has become increasingly popular over the past few years, simply slices off an interest or principal portion of any CMO tranche to be sold independently. In practice, IO slices, called “IOettes,”<sup>8</sup> far outnumber PO slices.

Since IOs and IOettes produce cash flows in proportion to the mortgage principal outstanding, IO investors are hurt by fast prepayments and aided by slower prepayments. The value of POs rises when prepayments quicken and falls when prepayments slow because of the increases in principal cash flows coupled with the deep discount price of the PO.

IOs and IOettes are relatively high-yielding tranches that are generally subject to considerable prepayment volatility. For example, falling interest rates and rising prepayment speeds in late 1991 caused some IOs (such as those backed by FNMA 10 percent collateral) to fall up to 40 percent in value between July and December. IOs also declined sharply on several occasions in 1992 and 1993 as mortgage rates moved to 20- and 25-year lows, resulting in very high levels of prepayment. CMO dealers use IOettes to reduce coupons on numerous tranches, allowing these tranches to be sold at a discount

6. This counterintuitive result arises because IO and PO prices are negatively correlated.

7. Of this amount, FNMA has issued \$26 billion, FHLMC \$2.3 billion, and private issuers \$6.5 billion.

8. Securities and Exchange Commission regulations forbid pure IO slices within CMOs. IO slices therefore include nominal amounts of principal and are termed “IOettes.” As a practical matter, IOettes have the price performance characteristics of IOs.

(as preferred by investors). In effect, much of the call risk is transferred from these tranches to the IOette.

The fact that IO prices generally move inversely to most fixed-income securities makes them theoretically attractive hedging vehicles in a portfolio context. Nevertheless, IOs represent one of the riskiest fixed-income assets available and may be used in a highly leveraged way to speculate about either future interest rates or prepayment rates. Given that their value rises (falls) when interest rates increase (decrease), many financial institutions, including banks, thrifts, and insurance companies, have purchased IOs and IOettes as hedges for their fixed-income portfolios, but such hedges might prove problematic as they expose the hedger to considerable basis risk.

## USES

Both pass-through securities and CMOs are purchased by a broad array of institutional customers, including banks, thrifts, insurance companies, pension funds, mortgage “boutiques,”<sup>9</sup> and retail investors. CMO underwriters customize the majority of CMO tranches for specific end-users, and customization is especially common for low-risk tranches. Since this customization results from investors’ desire to either hedge an existing exposure or to assume a specific risk, many end-users perceive less need for hedging. For the most part, end-users generally adopt a buy-and-hold strategy, perhaps in part because the customization makes resale more difficult.

### Uses by Banks

Within the mortgage securities market, banks are predominately investors or end-users rather than underwriters or market makers. Furthermore, banks tend to invest in short to intermediate maturities. Indeed, banks aggressively purchase short-dated CMO tranches, such as planned amortization classes, floating-rate tranches, and adjustable-rate mortgage securities.

<sup>9</sup> Mortgage boutiques are highly specialized investment firms which typically invest in residuals and other high-risk tranches.

To the extent that banks do operate as market makers, the risks are more diverse and challenging. The key areas of focus for market makers are risk-management practices associated with trading, hedging, and funding their inventories. The operations and analytic support staff required for a bank’s underwriting operation are much greater than those needed for its more traditional role of investor.

Regulatory restrictions limit banks’ ownership of high-risk tranches. These tranches are so complex that the most common approaches and techniques for hedging interest-rate risks could be ineffective. High-risk tranches are so elaborately structured and highly volatile that it is unlikely that a reliable hedge offset exists. Hedging these instruments is largely subjective, and assessing hedge effectiveness becomes extremely difficult. Examiners must carefully assess whether owning such high-risk tranches reduces a bank’s overall interest-rate risk.

## DESCRIPTION OF MARKETPLACE

### Primary Market

The original lender is called the mortgage originator. Mortgage originators include commercial banks, thrifts, and mortgage bankers. Originators generate income in several ways. First, they typically charge an origination fee, which is expressed in terms of basis points of the loan amount. The second source of revenue is the profit that might be generated from selling a mortgage in the secondary market, and the profit is called secondary-marketing profit. The mortgage originator may also hold the mortgage in its investment portfolio.

### Secondary Market

The process of creating mortgage securities starts with mortgage originators which offer consumers many different types of mortgage loans. Mortgages that meet certain well-defined criteria are sold by mortgage originators to conduits, which link originators and investors. These conduits will pool like groups of mortgages and either securitize the mortgages and sell them to an investor or retain the mortgages as investments in their own portfolios. Both

government-related and private institutions act in this capacity. Ginnie Mae, Freddie Mac, and Fannie Mae are the three main government-related conduit institutions; all of them purchase *conforming* mortgages which meet the underwriting standards established by the agencies for being in a pool of mortgages underlying a security that they guarantee.

Ginnie Mae is a government agency, and the securities it guarantees carry the full faith and credit of the U.S. government. Fannie Mae and Freddie Mac are government-sponsored agencies; securities issued by these institutions are guaranteed by the agencies themselves and are generally assigned an AAA credit rating partly due to the implicit government guarantee.

Mortgage-backed securities have also been issued by private entities such as commercial banks, thrifts, homebuilders, and private conduits. These issues are often referred to as private label securities. These securities are not guaranteed by a government agency or GSE. Instead, their credit is usually enhanced by pool insurance, letters of credit, guarantees, or over-collateralization. These securities usually receive a rating of AA or better.

Private issuers of pass-throughs and CMOs provide a secondary market for conventional loans which do not qualify for Freddie Mac and Fannie Mae programs. There are several reasons why conventional loans may not qualify, but the major reason is that the principal balance exceeds the maximum allowed by the government (these are called “jumbo” loans in the market).

Servicers of mortgages include banks, thrifts, and mortgage bankers. If a mortgage is sold to a conduit, it can be sold in total, or servicing rights may be maintained. The major source of income related to servicing is derived from the servicing fee. This fee is a fixed percentage of the outstanding mortgage balance. Consequently, if the mortgage is prepaid, the servicing fee will no longer accrue to the servicer. Other sources of revenue include interest on escrow, float earned on the monthly payment, and late fees. Also, servicers who are lenders often use their portfolios of borrowers as potential sources to cross-sell other bank products.

## PRICING

Mortgage valuations are highly subjective because of the unpredictable nature of mortgage

prepayment rates. Despite the application of highly sophisticated interest-rate simulation techniques, results from diverse proprietary prepayment models and assumptions about future interest-rate volatility still drive valuations. The subjective nature of mortgage valuations makes marking to market difficult due to the dynamic nature of prepayment rates, especially as one moves farther out along the price-risk continuum toward high-risk tranches. Historical price information for various CMO tranche types is not widely available and, moreover, might have limited value given the generally different methodologies used in deriving mortgage valuation.

## Decomposition of MBS

A popular approach to analyzing and valuing a callable bond involves breaking it down into its component parts—a long position in a noncallable bond and a short position in a call option written to the issuer by the investor. An MBS investor owns a callable bond, but decomposing it is not as easy as breaking down more traditional callables. The MBS investor has written a series of put and call options to each homeowner or mortgagor. The analytical challenge facing an examiner is to determine the value and risk profile of these options and their contribution to the overall risk profile of the portfolio. Compounding the problem is the fact that mortgagors do not exercise these prepayment options at the same time when presented with identical situations. Most prepayment options are exercised at the least opportune time from the standpoint of the MBS investor. In a falling-rate environment, a homeowner will have a greater propensity to refinance (or exercise the option) as prevailing mortgage rates fall below the homeowner's original note (as the option moves deeper into the money). Under this scenario, the MBS investor receives a cash windfall (principal payment) which must be reinvested in a lower-rate environment. Conversely, in a high- or rising-rate environment, when the prevailing mortgage rate is higher than the mortgagor's original term rate, the homeowner is less apt to exercise the option to refinance. Of course, the MBS investor would like nothing more than to receive his or her principal and be able to reinvest that principal at the prevailing higher rates. Under this scenario, the MBS investor holds an instrument



with a stated coupon that is below prevailing market rates and relatively unattractive to potential buyers.

Market prices of mortgages reflect an expected rate of prepayments. If prepayments are faster than the expected rate, the mortgage security is exposed to call risk. If prepayments are slower than expected, the mortgage securities are exposed to extension risk (similar to having written a put option). Thus, in practice, mortgage security ownership is comparable to owning a portfolio of cash bonds and writing a combination of put and call options on that portfolio of bonds. Call risk is manifested in a shortening of the bond's effective maturity or duration, and extension risk manifests itself in the lengthening of the bond's effective maturity or duration.

## Option-Adjusted Spread Analysis

For a further discussion of option-adjusted spread (OAS) analysis or optionality in general, see section 4330.1, "Options."

## HEDGING

Hedging mortgage-backed securities ultimately comes down to an assessment of one's expectation of forward rates (an implied forward curve). A forward-rate expectation can be thought of as a no-arbitrage perspective on the market, serving as a pricing mechanism for fixed-income securities and derivatives, including MBS. Investors who wish to hedge their forward-rate expectations can employ strategies which involve purchasing the underlying security and the use of swaps, options, futures, caps, or combinations thereof to hedge duration and convexity risk.<sup>10</sup>

With respect to intra-portfolio techniques, one can employ IOs and POs as hedge vehicles. Although exercise of the prepayment option generally takes value away from the IO class and adds value to the PO class, IOs and POs derived from the same pool of underlying mortgages *do not* have a correlation coefficient of

negative one.<sup>11</sup> If that were the case, the value of a pass-through security would *always* be hedged with respect to interest rates. However, IOs and POs do represent extremities in MBS theory and, properly applied, can be used as effective risk-reduction tools. Because the value of the prepayment option and the duration of an IO and PO are not constant, hedges must be continually managed and adjusted.

In general, a decline in prepayment speeds arises largely from rising mortgage rates, with fixed-rate mortgage securities losing value. At the same time, IO securities are rising in yield and price. Thus, within the context of an overall portfolio, the inclusion of IOs serves to increase yields and reduce losses in a rising-rate environment. More specifically, IOs can be used to hedge the interest-rate risk of Treasury strip securities. As rates increase, an IO's value increases. The duration of zero-coupon strips equals their maturity, while IOs have a negative duration.<sup>12</sup> Combining IOs with strips creates a portfolio with a lower duration than a position in strips alone.<sup>13</sup>

POs are a means to synthetically add discount (and positive convexity) to a portfolio, allowing it to more fully participate in bull markets. For example, a bank funding MBS with certificates of deposit (CDs) is exposed to prepayment risk. If rates fall faster than expected, mortgage holders (in general) will exercise their prepayment option while depositors will hold their higher-than-market CDs as long as possible. The bank could purchase POs as a hedge against its exposure to prepayment and interest-rate risk. As a hedging vehicle, POs offer preferable alternatives to traditional futures or options; the performance of a PO is directly tied to actual prepayments, thus the hedge should experience potentially less basis risk than other cross-market hedging instruments.

## RISKS

### Prepayment Risk

All investors in the mortgage sector share a common concern: the mortgage prepayment

10. Davidson, Andrew S., and Michael D. Herskovitz. *Mortgage Backed Securities—Investment Analysis and Advanced Valuation Techniques*. Chicago: Probus Publishing, 1994.

11. Zissu, Anne, and Charles Austin Stone. "The Risks of MBS and Their Derivatives." *Journal of Applied Corporate Finance*, Fall 1994.

12. *Ibid.*, p. 102.

13. *Ibid.*, p. 104.

option. This option is the homeowner's right to prepay a mortgage any time, at par. The prepayment option makes mortgage securities different from other fixed-income securities, as the timing of mortgage principal repayments is uncertain. The cash-flow uncertainty that derives from prepayment risk means that the maturity and duration of a mortgage security are uncertain. For investors, the prepayment option creates an exposure similar to that of having written a call option. That is, if mortgage rates move lower, causing mortgage bond prices to move higher, the mortgagor has the right to call the mortgage away from the investor at par.

While lower mortgage interest rates are the dominant economic incentive for prepayment, idiosyncratic, noneconomic factors to prepay a mortgage further complicate the forecasting of prepayment rates. These factors are sometimes summarized as the "five D's": death, divorce, destruction, default, and departure (relocation). Prepayments arising from these causes may lead to a mortgage's being called away from the investor at par when it is worth more or less than par (that is, trading at a premium or discount).

### Funding and Reinvestment Risk

The uncertainty of the maturities of underlying mortgages also presents both funding and reinvestment risks for investors. The uncertainty of a mortgage security's duration makes it difficult to obtain liabilities for matched funding of these assets. This asset/liability gap presents itself whether the mortgage asset's life shortens or lengthens, and it may vary dramatically.

Reinvestment risk is normally associated with duration shortening or call risk. Investors receive principal earlier than anticipated, usually as a result of declines in mortgage interest rates; the funds can then be reinvested only at the new lower rates. Reinvestment risk is also the opportunity cost associated with lengthening durations. Mortgage asset durations typically extend as rates rise. This results in lower investor returns as they are unable to reinvest at the now higher rates.

### Credit Risk

While prepayments expose pass-throughs and CMOs to considerable price risk, most MBS

pass-throughs have little credit risk.<sup>14</sup> Approximately 90 percent of all outstanding pass-through securities have been guaranteed by Ginnie Mae, Fannie Mae, and Freddie Mac.<sup>15</sup> This credit guarantee gives "agency" pass-through securities and CMOs a decisive advantage over nonagency pass-throughs and CMOs, which comprise less than 10 percent of the market.

In general, nonagency pass-through securities and CMOs use mortgages that are ineligible for agency guarantees. Issuers can also obtain credit enhancements, such as senior subordinated structures, insurance, corporate guarantees, or letters of credit from insurance companies or banks. The rating of the nonagency issue then partially depends upon the rating of the insurer and its credit enhancement.

### Settlement and Operational Risk

The most noteworthy risk issues associated with the trading of pass-through securities is the forward settlement and operational risk associated with the allocation of pass-through trades. Most pass-through trading occurs on a forward basis of two to three months, often referred to as "TBA" or "to be announced" trading.<sup>16</sup> During this interval, participants are exposed to counterparty credit risk.

Operating risk grows out of the pass-through seller's allocation option that occurs at settlement. Sellers in the TBA market are allowed a 2.0 percent delivery option variance when meeting their forward commitments. That is, between 98 and 102 percent of the committed par amount may be delivered. This variance is provided to ease the operational burden of recombining various pool sizes into round trading lots.<sup>17</sup> This delivery convention requires significant operational expertise and, if mismanaged, can be a

14. Credit risk in a pass-through stems from the possibility that the homeowner will default on the mortgage *and* that the foreclosure proceeds from the resale of the property will fall short of the balance of the mortgage.

15. For a full explanation of the minor differences between these agencies, see chapter 5 in Fabozzi, *The Handbook of Mortgage-Backed Securities*, 1995.

16. In the forward mortgage pass-through trading, or TBA trading, the seller announces the exact pool mix to be delivered the second business day before settlement day.

17. "Good delivery" guidelines are promulgated by the Public Securities Association in its *Uniform Practices* publication.

source of significant risk in the form of failed settlements and unforeseen carrying costs.

## Price Volatility in High-Risk CMOs

When the cash flow from pass-through securities is allocated among CMO tranches, prepayment risk is concentrated within a few volatile classes, most notably residuals, inverse floaters, IOs and POs, Z bonds, and long-term support bonds. These tranches are subject to sharp price fluctuations in response to changes in short- and long-term interest rates, interest-rate volatility, prepayment rates, and other macroeconomic conditions. Some of these tranches—especially residuals and inverse floaters—are frequently placed with a targeted set of investors willing to accept the extra risk. These classes are also among the most illiquid bonds traded in the CMO market.

These high-risk tranches, whether held by dealers or investors, have the potential to incur sizable losses (and sometimes gains) within a short period of time.<sup>18</sup> Compounding this price risk is the difficulty of finding effective hedging strategies for these instruments. Using different CMOs to hedge each other can present problems. Although pass-through securities from different pools tend to move in the same direction based on the same event, the magnitude of these moves can vary considerably, especially if the underlying mortgage pools have different average coupons.<sup>19</sup>

## Risks in “Safe” Tranches

Investors may also be underestimating risks in some “safe” tranches, such as long-maturity PACs, PAC 2s, and 3s, and floaters, because these tranches can experience abrupt changes in their average lives once their prepayment ranges

are exceeded. Even floating-rate tranches face risks, especially when short-term rates rise significantly and floaters reach their interest-rate caps. At the same time, long rates may rise and prepayments slow, causing the floaters’ maturities to extend significantly since the floater is usually based on a support bond. Under such circumstances, floater investors could face significant losses.

In addition to possible loss of market value, these safe tranches may lose significant liquidity under extreme interest-rate movements. These tranches are currently among the most liquid CMOs. Investors who rely on this liquidity when interest-rate volatility is low may find it difficult to sell these instruments to raise cash in times of financial stress. Nevertheless, investors in these tranches face lower prepayment risk than investors in either mortgage pass-throughs or the underlying mortgages themselves.

## Cap Risk

The caps in many floating-rate CMOs and ARMs are an embedded option. The value of floating-rate CMOs or ARMs is equal to the value of an uncapped floating-rate security less the value of the cap. As the coupon rate of the security approaches the cap rate, the value of the option increases and the value of the security falls. The rate of change is non-linear and increases as the coupon approaches the cap. As the coupon rate equals or exceeds the cap rate, the security will exhibit characteristics similar to those of a fixed-rate security, and price volatility will increase. All else being equal, securities with coupon rates close to their cap rates will tend to exhibit greater price volatility than securities with coupon rates farther away from their cap rates. Also, the tighter the “band” of caps and floors on the periodic caps embedded in ARMs, the greater the price sensitivity of the security will be. The value of embedded caps also increases with an increase in volatility. Thus, all else being equal, higher levels of interest-rate volatility will reduce the value of the floating-rate CMO or ARM.

## FFIEC Regulations Concerning Unsuitable Investments

The Federal Financial Institutions Examination Council (FFIEC) issued a revised policy state-

18. Examples of single-firm losses include a \$300 million to \$400 million loss by one firm on POs in the spring of 1987; more recently, several firms have lost between \$50 million and \$200 million on IO positions in 1992 and 1993.

19. For a discussion of the idiosyncratic prepayment behavior of pass-throughs, see Sean Beckett and Charles S. Morris, *The Prepayment Experience of FNMA Mortgage-Backed Securities*. New York University Salomon Center, 1990, pp. 24–41.

ment concerning securities activities for member banks. These rules became effective February 10, 1992, for member banks and bank holding companies under the Board's jurisdiction. A bank's CMO investments are deemed unsuitable if—

- the present weighted average life (WAL) is greater than ten years,
- the WAL extends more than four years or shortens more than six years for a parallel interest-rate shift of up and down 300 basis points, or
- the price changes by more than 17 percent from the asking price for a parallel interest-rate shift of up and down 300 basis points.

An affirmation of any of these three parameters means that the bond in question (1) may be considered high risk and (2) may not be a suitable investment for banks or bank holding companies. An institution holding high-risk securities must demonstrate that these securities reduce overall interest-rate risk for the bank.

Floating-rate CMOs with coupons tied to indexes other than LIBOR (sometimes called "mismatched floaters") are generally exempt from the average-life and average-life-sensitivity tests. Given the degree of price sensitivity associated with these securities, however, institutions that purchase non-LIBOR-indexed floaters must maintain documentation showing that they understand and are able to monitor the risks of these instruments. The documentation should include a prepurchase analysis and at least an annual analysis of the price sensitivity of the security under both parallel and nonparallel shifts of the yield curve. See the *Commercial Bank Examination Manual* for more information on the FFIEC testing parameters detailed above.

## ACCOUNTING TREATMENT

The accounting treatment for investments in mortgage-backed securities is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and

Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Pass-through securities are assigned the following weights:

GNMA (Ginnie Mae)	zero percent
FNMA (Fannie Mae)	20 percent
FHLMC (Freddie Mac)	20 percent
Private label	50 percent–100 percent

Collateralized mortgage obligations are assigned the following weights:

Backed by Ginnie Mae, Fannie Mae, or Freddie Mac securities	20 percent–100 percent
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Backed by whole loans or private-label pass-throughs	50 percent–100 percent
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Stripped MBS are assigned a 100 percent risk weighting.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

### Pass-Through Securities

Ginnie Mae, Fannie Mae, and Freddie Mac pass-through securities are type I securities. Banks can deal in, underwrite, purchase, and sell these securities for their own accounts without limitation.

### CMOs and Stripped MBS

CMOs and stripped MBS securitized by small

business-related securities and certain residential- and commercial-related securities rated Aaa and Aa are type IV securities. As such, a bank may purchase and sell these securities for its own account without limitation. CMOs and stripped MBS securitized by small business-related securities rated A or Baa are also type IV securities and are subject to an investment limitation of 25 percent of a bank's capital and surplus. Banks may deal in type IV securities that are fully secured by type I transactions without limitations.

CMOs and stripped MBS securitized by certain residential- and commercial-mortgage-related securities rated A or Baa are type V securities. For type V securities, the aggregate par value of a bank's purchase and sales of the securities of any one obligor may not exceed 25 percent of its capital and surplus.

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### GENERAL DESCRIPTION

The Australian Treasury issues Australian Commonwealth Government Bonds (CGBs) to finance the government's budget deficit and to refinance maturing debt. Since 1982, bonds have been issued in registered form only, although some outstanding issues may be in bearer form. The principal and interest on CGBs are guaranteed by the Commonwealth Government of Australia.

### CHARACTERISTICS AND FEATURES

CGBs, with maturities ranging from one to 20 years, are issued every six to eight weeks in an average tender size totaling A\$800 million. Most CGBs are noncallable, fixed-coupon securities with bullet maturities. The Australian Treasury has issued some indexed-linked bonds with either interest payments or capital linked to the Australian consumer price index. However, there are few of these issues and they tend to be very illiquid. CGBs can be issued with current market coupons, but in many cases the Australian Treasury will reopen existing issues.

Interest for government bonds is paid semi-annually on the 15th day of the month, and it is calculated on an actual/365 day-count basis. Coupon payments that fall on weekends or public holidays are paid on the next business day. Semiannual coupon payments are precisely half the coupon rate. Bonds that have more than six months left to maturity settle three business days after the trade date (T+3). Bonds with less than six months left to maturity may settle on the same day, provided they are dealt before noon; otherwise, they settle the next day.

### USES

Australian banks are the largest single group of investors in outstanding CGB issues. They use these securities to meet regulatory capital requirements. The Australian pension industry holds CGBs mainly as investment vehicles. In addition, CGBs are viewed as attractive investment vehicles by many foreign investors

because (1) they offer high yields relative to those available on other sovereign debt instruments and (2) the Australian bond market is regarded as stable. Although the bond market has a substantial foreign participation, due to its attractive yield and a much shorter period of time required for the bonds to mature, the majority of CGB investors are domestic. U.S. banks purchase CGBs to diversify their portfolios, speculate on currency and Australian interest rates, and to hedge Australian-denominated currency positions and positions along the Australian yield curve.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

CGBs are issued periodically on an as-needed basis, typically every six to eight weeks. Generally, issuance is through a competitive tender whereby subscribers are invited to submit bids as they would in an auction. Issue size is announced one day before the tender day. Bids, which are sent to the Reserve Bank of Australia through the Reserve Bank Information Transfer System (RBITS), are submitted to the Reserve Bank of Australia on a semiannual, yield-to-maturity basis. Specific information on the issue is announced later on the tender day, such as the amounts tendered and issued, the average and range of accepted bids, and the percentage of bids allotted at the highest yield.

#### Secondary Market

While CGBs are listed on the Australian Stock Exchange, nearly all trading takes place over the counter (OTC), by screen or direct trading. The primary participants in the secondary market are authorized dealers and share brokers. OTC transactions must be in amounts of A\$250,000 or more. Stock-exchange transactions are essentially limited to retail transactions under A\$1 million. Usually, authorized dealers trade bonds which are within five years of maturing.

## Market Participants

### *Sell Side*

Authorized dealers are the primary participants in the sell side of the CGB market.

### *Buy Side*

Australian banks and other financial institutions are the largest single group of investors in CGBs. These entities usually hold large quantities of shorter-term government bonds for regulatory purposes, as these securities may be included in the prime asset ratios of banks. In addition, a variety of other domestic investors participate in the CGB market.

The Australian bond market has been known to attract substantial foreign participation over the years, primarily because it is regarded as a stable market which offers relatively high yields. In general, foreign market participants are institutional investors, such as securities firms, life insurance companies, banks, and fund managers.

## Market Transparency

Prices tend to be active and liquid. Price transparency is enhanced by the dissemination of prices by several information vendors including Reuters and Telerate.

## PRICING

CGBs are quoted in terms of yield and rounded to three decimal places to determine gross price for settlement purposes. While tick size is equivalent to one basis point, yields are often quoted to the half basis point.

## HEDGING

Interest-rate risk may be hedged by taking an offsetting position in other government bonds or by using interest-rate forward, futures, options, or swap contracts. Foreign-exchange risk may be hedged by using foreign-currency derivatives and swaps.

## RISKS

### Liquidity Risk

The CGB market is considered fairly active and liquid. Trading volume among the benchmark bonds is about equal, although the three-year and 10-year benchmark issues tend to have the most turnover.

### Interest-Rate Risk

CGBs are subject to price fluctuation resulting from interest-rate volatility. Generally, longer-term bonds have more price volatility than shorter-term instruments. If an institution has a large concentration of long-term maturities, it may be subject to unwarranted interest-rate risk.

### Foreign-Exchange Risk

Currency fluctuations may affect the bond's yield as well as the value of coupons and principal paid in U.S. dollars. A number of factors may influence a country's foreign-exchange rate, including its balance of payments and prospective changes in that balance; inflation and interest-rate differentials between that country and the United States; the social and political environment, particularly with regard to the impact on foreign investment; and central bank intervention in the currency markets.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in

Debt and Equity Securities,” as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), “Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities.” Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), “Accounting for Derivatives and Hedging Activities,” as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, “Accounting,” for further discussion.)

### RISK-BASED CAPITAL WEIGHTING

Australian CGBs are assigned to the zero percent risk-weight category.

### LEGAL LIMITATIONS FOR BANK INVESTMENT

Australian CGBs are a type III security. As such, a bank’s investment is limited to 10 percent of its equity capital and reserves.

### REFERENCES

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- J.P. Morgan Securities. *Government Bond Outlines*. 9th ed. April 1996.



### GENERAL DESCRIPTION

The federal government of Canada issues bonds, known as “Canadas,” to finance its public debt. The Canadian government bond market is structurally similar to the U.S. bond market, particularly with regard to the types of securities issued. Canadas come in a wide variety of maturities ranging from two to thirty years. Recently, the longer-maturity bonds have increased in popularity.

### CHARACTERISTICS AND FEATURES

Canadas are issued at a price close to par value and are denominated in C\$1,000, C\$25,000, C\$100,000, and C\$1 million allotments. Canadas are available in bearer form with coupons attached or in registered form. All new Canadian bonds are issued with bullet maturities and generally are not callable. All Canadas have fixed coupons. Principal and coupon payments for these bonds are linked to the Canadian consumer price index.

Interest on Canadas is paid semiannually and is accrued from the previous coupon date (exclusive) to the settlement date (inclusive) up to a maximum value of 181.5 days. As a result, the value date is always the same as the settlement date. New issues may offer short first coupons but not long first coupons. Interest on short first coupons is accrued from the dated date to the first coupon date. Any “reopened” bonds include the accrued interest in the issue price to ensure that the new tranches carry the same coupons as the existing bond and that they trade indistinguishably. Canadas with remaining maturities of less than three years settle two market days after the trade date (T+2), while Canadas with maturities over three years settle three market days after the trade date (T+3).

### USES

Canadas are held for investment, hedging, and speculative purposes by both domestic and foreign investors. U.S. banks purchase Canadas to

diversify their portfolios, speculate on currency and Canadian interest rates, and hedge Canadian-denominated currency positions and positions along the Canadian yield curve.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

Canadas are issued by two methods: allotment and auction. In the allotment system, the amount, coupon, and issue price for each of the maturity tranches is announced after consultation with the primary distributors. The Bank of Canada pays a commission to all primary distributors who are responsible for placing the issue.

The auction system is very similar to the U.S. system. On the Thursday before the regular Wednesday auction, the Bank of Canada announces details, including the size, maturity, and delivery date for the upcoming auction, and active open market trading begins on a yield basis. The coupon for new issues is not known until auction results are released, and it is set at the nearest  $\frac{1}{4}$  percent increment below the auction average. The Bank of Canada accepts both competitive and noncompetitive bids from primary distributors. However, it will only accept one noncompetitive bid, which may have a maximum value of C\$2 million.

On the auction date, bids are submitted to the Bank of Canada, and primary distributors receive bonds of up to 20 percent of the total amount issued based on the competitiveness of their bids. The delivery date and dated date are usually ten days to two weeks after the auction. Issues typically range from C\$100 million to C\$8.8 billion, and any issue may be reopened by the Department of Finance on the basis of market conditions.

#### Secondary Market

Canadas are not listed on any stock exchanges but trade in over-the-counter (OTC) markets 24 hours a day. Settlement occurs through a book-entry system between market participants and the Canadian Depository for Securities

(CDS). Therefore, Canadas may trade when-issued without an exchange of cash.

## Market Participants

### *Sell Side*

Primary distributors include investment dealers and Canadian chartered banks.

### *Buy Side*

A wide range of investors use Canadas for investing, hedging, and speculation, including domestic banks, trust and insurance companies, and pension funds. The largest Canadian holders of Canadas are trust pension funds, insurance companies, chartered banks, and the Bank of Canada.

Foreign investors are also active participants in the Canadian government bond market. In general, foreign market participants are institutional investors such as banks, securities firms, life insurance companies, and fund managers.

## Market Transparency

Price transparency is relatively high for Canadas; several information vendors disseminate prices to the investing public. Trading of Canadas, both domestically and internationally, is active and prices are visible.

## PRICING

Bonds trade on a clean-price basis (net of accrued interest) and are quoted in terms of a percentage of par value, with the fraction of a percent expressed in decimals. Canadas typically trade with a  $\frac{1}{8}$ - to  $\frac{1}{4}$ -point spread between bid and offer prices. Canadas do not trade ex-dividend. If a settlement date occurs in the two weeks preceding a coupon payment date, the seller retains the upcoming coupon but must compensate the buyer by postdating a check payable to the buyer for the amount of the coupon payment.

## HEDGING

Interest-rate risk on Canadas may be hedged

using interest-rate swaps, forwards, futures (such as futures on 10-year and 5-year Canadas, which are traded on the Montreal Stock Exchange (MSE)), and options (such as options on all Canadas issues, which are traded on the MSE). Hedging may also be effected by taking a contra position in another Canadian government bond. Foreign-exchange risk may be hedged through the use of currency forwards, futures, swaps, and options. The effectiveness of a particular hedge depends on the yield curve and basis risk. For example, hedging a position in a 10-year Canadas future with an overhedged position in a 5-year bond may expose the dealer to yield-curve risk. Hedging a 30-year bond with a Canadas future exposes the dealer to basis risk if the historical price relationships between futures and cash markets are not stable. Also, if a position in notes or bonds is hedged using an OTC option, the relative illiquidity of the option may diminish the effectiveness of the hedge.

## RISKS

### Liquidity Risk

The Canadian bond market is considered to be one of the most liquid bond markets in the world, and Canadas are traded actively in both domestic and international capital markets. Most investment dealers in Canadas will make markets on all outstanding issues. The most liquid issues are the short-term issues of less than 10 years, but several 15-year and 30-year Canadas are actively traded and very liquid. All government bond issues are reasonably liquid when their outstanding size, net of stripping, is over C\$1 billion. "Orphaned" issues, small issues that are not reopened, are the only Canadas that are very illiquid because they are not actively traded.

### Interest-Rate Risk

Canadas are subject to price fluctuations caused by changes in interest rates. Longer-term issues tend to have more price volatility than shorter-term issues; therefore, a large concentration of longer-term maturities in a bank's portfolio may subject the bank to a high degree of interest-rate risk.

## Foreign-Exchange Risk

Because of the low volatility of the Canadian dollar exchange rate, there has been a low level of foreign-exchange risk associated with Canadian bonds. To the extent that this risk exists, it can be easily reduced by using foreign-currency derivatives instruments as described above.

## Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS

133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Canadas are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Canadas are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

## REFERENCES

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## GENERAL DESCRIPTION

The French Treasury is an active issuer of three types of government debt securities, which cover all maturities. *Obligation Assimilable du Tresor* (OATs), issued since 1985, are the French government's long-term debt instruments of up to thirty years. *Bons du Tresor a Taux Fixe et Interest Annuel* (BTANs) are medium-term, fixed-rate notes of up to five years. The French Treasury also issues discount Treasury bills, *Bons du Tresor a Taux Fixe et Interest Pre-comptes* (BTFs), that have maturities of up to one year. In addition, an active market for stripped OATs has developed. Stripping involves separating a bond's interest and principal payments into several zero-coupon bonds.

## CHARACTERISTICS AND FEATURES

The French Treasury issues OATs that have maturities of up to thirty years. Most OATs carry a fixed interest rate and have bullet maturities. However, some OATs are issued with floating rates that are referenced to various short-term or long-term indexes. OATs generally pay interest annually. OATs are settled three days after the trade date (T+3), both domestically and internationally. Domestically, OATs are cleared through the SICOVAM Relit system (a French securities settlement system), while OATs that settle internationally are cleared through Euroclear or Cedel (international clearing organizations).

BTANs are fixed-rate, bullet-maturity notes that have maturities of up to five years. Interest on BTANs is paid annually on the 12th of the month. Domestic settlement for BTANs and BTFs usually occurs one day after the trade date (T+1) through the Bank of France's Saturne system. Internationally, BTANs and BTFs settle three days after the trade date. Like OATS, BTANs and BTFs may also be cleared through Euroclear or Cedel. Interest on all government bonds and notes is calculated using a 30/360-day-count convention in which each month is assumed to have thirty days.

Since May 1991, French government securities primary dealers, *Specialistes en Valeurs du Tresor* (SVTs), have been allowed to strip most long-term OATs. Primary dealers may strip

OATs and subsequently reconstitute them. All stripped coupons carry a uniform face value to ensure the fungibility of receipts that have the same maturities but that are derived from OATs of different maturities.

## USES

French government securities are used for investment, hedging, and speculative purposes. They are considered attractive for investment purposes by foreign and domestic investors because of the market's liquidity, lack of credit risk, and wide range of maturities and structures (for example, fixed versus floating rates). Foreign investors often choose to invest internationally to enhance the diversification of their investment portfolios or derive higher returns. Stripped OATs can be used as tools for hedging or asset-liability management purposes, for example, to immunize a portfolio in terms of interest-rate risk. Speculators also use OATs, BTANs, and stripped OATs to take positions on the direction of interest-rate changes and yield-curve shifts. Finally, there is an active market for futures and options on French government securities traded on the *Marche a Terme International de France* (Matif), the Paris financial futures exchange.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

The French Treasury issues OATs, BTANs, and BTFs through Dutch auction. The Treasury usually issues tranches of securities that are part of a single borrowing line. The auction schedule is generally announced several months in advance. Securities are supplied at the price or effective rate tendered by the bidder rather than the marginal price or rate. The highest bids are filled first, followed by lower bids. Although bidding is open to any institution that has an account with the SICOVAM, Saturne, or Bank of France, SVTs account for 90 percent of the securities bought in the primary market. SVTs also quote two-way prices on a when-issued basis several business days before an auction.

## Secondary Market

There is an active secondary market for most issues of French government securities. OATs, BTANs, and BTFs are listed on the Paris Stock Exchange. In 2000, HTS France, an electronic trading system for the secondary market in French government bonds, was launched. Liquidity is ensured by the SVTs, who serve as market makers. The repo market allows investors to finance short-term positions.

## Market Participants

### *Sell Side*

Since 1987, SVTs have managed the market for French government securities. The SVTs work closely with the French Treasury in determining issuance policy, market conditions, and prices. SVTs are required to quote prices for clients and other primary dealers in tradable securities and are responsible for the maintenance of liquid primary and secondary markets. In exchange, the French Treasury permits SVTs to strip and reconstitute OATs and participate in noncompetitive bidding.

### *Buy Side*

French government securities are used for investment, hedging, and speculative purposes by a wide range of institutional investors, both international and domestic. These investors include insurance companies, pension funds, mutual funds, and commercial and investment banks.

## Market Transparency

The market for French government bonds is active, and market transparency is relatively high for most issues. The French Treasury regularly publishes the debt-issuance schedule and other information on the management of its debt. Auction results, trading information, and prices for most issues are available on inter-dealer broker screens such as Reuters, Telerate, and Bloomberg.

## PRICING

OATs are quoted as a percentage of par to two

decimal places. For example, the price quote of 106.85 refers to an OAT that is trading at 106.85 percent of its par value. Strips are quoted on the basis of their yield. BTANs and BTFs are quoted on an annual-yield basis to two decimal places.

## HEDGING

The interest-rate risk of French government securities can be hedged in the futures or options market at the Matif or by taking a contra position in another French government security. Swaps and options can also be used to hedge interest-rate risk. The effectiveness of a particular hedge is dependent on yield-curve and basis risk. For example, hedging a position in a five-year note with an overhedged position in a three-year note may expose the dealer to yield-curve risk. Hedging a thirty-year bond with a Treasury bond future exposes the dealer to basis risk if historical price relationships between futures and cash markets are not stable. Also, if a position in notes or bonds is hedged using an OTC option, the relative illiquidity of the option may diminish the effectiveness of the hedge.

Non-euro zone investors are also exposed to foreign-exchange risk. Foreign-exchange risk can be hedged using currency forwards, futures, swaps, or options. An international investor can use a series of forward foreign-exchange contracts that correspond to each of the coupon payments and the final principal payment to hedge this risk. Swaps, futures contracts, or currency options, traded either on the Matif or OTC, can also be used to hedge currency risk.

## RISKS

### Liquidity Risk

French bonds are among the most liquid in Europe. Because the French Treasury issues OATs and BTANs as tranches of existing bonds, most bond issues have sizable reserves and liquidity. SVTs make a market in French government bonds, a practice that enhances liquidity of the market. The most recently issued ten-year OAT generally serves as the benchmark and is thus the most liquid of these issues. For the medium-term market, the most recent issues of two- and five-year BTANs serve as the

benchmark. Next to the U.S. Treasury strip market, French strips are the most liquid in the world. As stated above, the face value of all stripped OATs is uniform, ensuring the fungibility of coupons of different maturities. Because primary dealers may reconstitute strips at any time, their liquidity is comparable to the reference OAT.

### Interest-Rate Risk

From the perspective of an international investor, the market risk of French government bonds consists primarily of interest-rate risk and foreign-exchange risk. The interest-rate risk of a French government bond depends on its duration and the volatility of French interest rates. Bonds with longer durations are more price sensitive to changes in interest rates than bonds with shorter durations. Because they are zero-coupon instruments, French strips have longer durations than OATs of comparable maturity, and they are more volatile.

### Foreign-Exchange Risk

From the perspective of an international investor, the total return from investing in French government securities is partly dependent on the exchange rate between the U.S. dollar and the euro.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations

governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

French government bonds and notes are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

French government bonds and notes are type III securities. A bank's investment in them is limited to 10 percent of its equity capital and reserves.

## GENERAL DESCRIPTION

The federal government of Germany issues several types of securities: bonds (*Bunds*), notes (*Bobls* and *Schätze*), and Treasury discount paper (*U-Schätze*). Government agencies such as the Federal Post Office and the Federal Railway have also issued bonds (*Posts* and *Bahns*) and notes (*Schätze*). In addition, after the unification of West and East Germany in October 1990, the German Unity Fund began to issue Unity Fund bonds (*Unities*) and notes (*Schätze*). The outstanding debt issues of the post office, railway, and Unity Fund have since been folded into the so-called Debt Inheritance Fund, which has led to an explicit debt service of these issues through the federal government. Hence, these issues are guaranteed by the full faith and credit of the federal government. All government-guaranteed securities are available in book-entry form only.

The government also issues U-Schätze, zero-coupon Treasury notes that have maturities of one to two years and that may not be purchased by foreigners, and short-term Treasury bills that have half-a-year to one-year maturities and that may be purchased by foreigners. However, the secondary market for these instruments is small and does not attract substantial foreign investment. Therefore, the following discussion will focus on bonds and notes.

## CHARACTERISTICS AND FEATURES

Bunds are issued regularly, usually in deutsche marks (DM) 20 billion to DM 30 billion blocks, and have maturities ranging from eight to thirty years. Bunds are typically issued with a maturity of ten or thirty years. Bunds are redeemable in a lump sum at maturity at their face value (bullet structure) with interest paid annually. Until 1990, all bonds issued by the federal government and other public authorities were noncallable and bore a fixed coupon. However, since February 1990, some callable floating-rate bonds have been issued.

Special five-year federal notes (Bobls) have been issued by the federal government since 1979, but foreign investment in these securities has been permitted only since 1988. Federal

Treasury notes (*Schätze*) are one-off issues that have a two-year maturity. Only credit institutions that are members of the Bund Issues Auction Group may bid directly in auctions.

On the short end of the maturity range are Federal Treasury financing paper that has maturities of twelve to twenty-four months and Treasury discount paper (*Bubills*) that has maturities of six months. Tap issues of Federal Treasury financing paper are sold in the open market unlike most sales of German government bonds, which occur through auctions.

Stock-exchange settlement takes place two market days after trade date (T+2). International settlement takes place three business days after trade date (T+3). As of January 1, 1994, German federal government notes and bonds no longer trade ex-coupon. They trade on a cum-coupon basis; the purchaser of the bond pays the seller accrued interest from the last coupon date to settlement. Interest is accrued on an actual/365-day-count basis, except for Federal Treasury financing paper, for which a 30/360-day-count basis is used.

## USES

German government bonds and notes are used for investment, hedging, and speculative purposes. Foreign investors, including U.S. banks, often purchase German government securities as a means of diversifying their securities portfolios. German government securities may also be used to hedge German interest-rate risk. Speculators may use German government bonds to take positions on changes in the level and term structure of German interest rates or on changes in the foreign-exchange rates between the euro zone and the United States. Because the German government bond market is deep and efficient, some German futures contracts and options are priced relative to Bund issues.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

Bunds are issued using a combination of syndication and bidding procedures. Part of the

issue is offered at fixed terms to the members of the Federal Bond Consortium, which consists of German banks, foreign banks in Germany, and the Deutsche Bundesbank (German Central Bank). The Bundesbank is the lead bank in the syndicate and determines the allocation of the offerings among the syndicate members. These allocations are changed infrequently. During the syndicate meeting, the coupon rate, maturity, and issue price are determined by the government and syndicate, although the total size of the issue is unknown. Syndicate members receive a fee from the government for selling bonds received through syndicate negotiations.

A further tranche is issued to the syndicate by means of an American-style auction. The terms—coupon rate, maturity, and settlement date—are the same as those determined in the syndicate meeting, although the overall size of the issue is not specified. The Deutsche Bundesbank accepts bids starting with the highest price and accepts lower bids until the supply of securities it wishes to sell is depleted. Noncompetitive bids may also be submitted, which are filled at the average accepted price of the auction. The size of the issue is announced after the auction. The difference between the issue size and the amount that has been issued through the underwriting syndicate plus the auction is retained by the Bundesbank for its bond market operations.

Five-year federal notes, Bobls, are issued on a standing-issue basis (similar to a tap form in which a fixed amount of securities at a fixed price is issued when market conditions are considered favorable) with stated coupon and price. During the initial selling period, which may last a few months, the price is periodically adjusted by the Ministry of Finance to reflect changes in market conditions. The sales of a given series are terminated when either the issuing volume has been exhausted or the nominal interest rate has moved too far away from the going market rate. The new series is launched within a short period of time. Only domestic private individuals and domestic nonprofit institutions are permitted to purchase the issues in the primary market. German banks (which cannot purchase these securities for their own account) receive a commission for selling the bonds to qualified investors. After the selling period is over and an issue is officially listed on the German stock exchange, the securities may be purchased by any investor.

## Secondary Market

German bonds are listed and traded on all eight German stock exchanges seven days after they are issued. Bobl issues are officially listed on the stock exchanges after the initial selling period of one to three months. In addition to the stock-exchange transactions, substantial over-the-counter (OTC) trading occurs. In Germany, the secondary market for both stocks and bonds is primarily an interbank market.

For some issues, prices are fixed once during stock-exchange hours (stock-exchange fixing takes place from 11:00 a.m. to 1:30 p.m. Greenwich mean time +1). However as of October 3, 1988, variable trading was introduced at the German stock exchanges for larger issuances of Bunds, Bobls, Bahns, and Posts issued after January 2, 1987. The Unity Fund issues also participate. After the fixing of the prices on the stock exchanges, the securities are traded on the OTC market (OTC hours are from 8:30 a.m. to 5:30 p.m.).

Seventy percent to 80 percent of the secondary-market trading of Bunds, Bahns, and Posts takes place in the OTC market. About 75 percent of Bobl trading takes place in the OTC market, as does most Schätze trading. However, the stock markets are important because the prices determined there provide standard, publicly available benchmarks.

## Market Participants

### *Sell Side*

The underwriting of public authority bonds is done by the Federal Bond Syndicate, which consists of German banks, foreign banks in Germany, and the Deutsche Bundesbank. German banks are responsible for placing Bobls with qualified investors.

### *Buy Side*

Domestic banks, private German individuals, German insurance companies, and German investment funds are major holders of German bonds. Foreign investors, such as U.S. commercial and investment banks, insurance companies, and money managers, also hold German government securities.



## Market Transparency

The market for German government bonds and notes is active and liquid, and price transparency is considered to be relatively high for these securities. Several vendors, including Reuters and Telerate, disseminate price information to the investing public.

## PRICING

Bonds and notes are quoted as a percentage of par to two decimal places. For example, a price of 98.25 means that the price of the bond or note is 98.25 percent of par. Bonds are traded on a price basis, net of accrued interest (clean).

## HEDGING

Interest-rate risk can be hedged using swaps, forwards, futures, or options or by taking a contra position in another German government security. The effectiveness of a particular hedge is dependent on yield-curve and basis risk. For example, hedging a position in a five-year note with an overhedged position in a three-year note may expose the dealer to yield-curve risk. Hedging a thirty-year bond with a bond future exposes the dealer to basis risk if the historical price relationships between futures and cash markets are not stable. Also, if a position in notes and bonds is hedged using an OTC option, the relative illiquidity of the option may diminish the effectiveness of the hedge.

## RISKS

### Liquidity Risk

Bunds are the most liquid and actively traded bond issues in Germany. Unities issued by the German Unity Fund are generally as liquid as Bunds, but Bahn and Post issues of government agencies are fairly limited compared with the federal government's bonds. Therefore, these agency securities tend to be less liquid and generally trade at a higher yield than Bunds.

The on-the-run (most recent) Bund issue is the most liquid of its category and serves as the benchmark. The most liquid area of the Bund yield curve is in the eight- to ten-year maturity range, as most Bund issues carry a ten-year

maturity. Similar to Bunds, on-the-run Bobls are the most liquid type of note. Off-the-run prices are not as transparent as current coupon securities, which makes these issues less liquid and trading more uncertain. Of course, larger issues of bonds and notes are generally more liquid than smaller ones.

At the stock exchange, the German Central Bank makes a market in Bunds, Bobls, Unities, and Post issues. The Deutsche Bundesbank is responsible for maintaining an orderly secondary market in these securities and regularly intervenes to support or regulate their prices. This tends to increase the liquidity in the market for these issues. However, the Bundesbank is not responsible for stabilizing Schätze prices. For this reason, these securities tend to be much less liquid than Bunds or Bobls; their issue sizes are also normally much smaller. The Railway Bank makes a market in Bahn issues, which enhances the liquidity of these issues.

### Interest-Rate Risk

German bonds and notes are subject to price fluctuations caused by changes in German interest rates. The variation in the term structure of interest rates accounts for the greatest amount of local market risk related to foreign bonds. Longer-term issues have more price volatility because of interest-rate fluctuations than do shorter-term instruments. Therefore, a large concentration of long-term maturities may subject a bank's investment portfolio to unwarranted interest-rate risk.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS

115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## **RISK-BASED CAPITAL WEIGHTING**

German government bonds and notes are assigned to the zero percent risk-weight category.

## **LEGAL LIMITATIONS FOR BANK INVESTMENT**

German government bonds and notes are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

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## GENERAL DESCRIPTION

Irish government bonds (IGBs) are issued by the National Treasury Management Agency (NTMA), which is responsible for the management of Ireland's national debt.<sup>1</sup> Bonds are issued to fund the government's borrowing requirements and to fund maturing bond issues.

## CHARACTERISTICS AND FEATURES

Bond issuance is confined to a limited number of designated fixed-rate benchmark bonds in key maturities of four, ten, and thirteen years. The amounts in issue in the benchmark bonds range from euro 4.4 billion to euro 7.5 billion. Issues are transferable in any amount and are listed and traded on the Irish stock exchange. Coupons are paid annually or semiannually, depending on the type of bond. Interest is accrued from the coupon payment date to the settlement date. Interest is computed using the actual/365-day-count convention for semiannual coupon bonds and the 30/365-day-count convention for annual coupon bonds. Settlement takes place three days after the trade date (T+3). The interest on annual coupon bonds that have an accrued ex-dividend date is negative if the settlement date falls between the ex-dividend date (exclusive) and the coupon date (inclusive). The benchmark bonds carry no ex-dividend period. IGBs are available in registered form and are cleared through Euroclear, an international clearing organization.

## USES

Irish government bonds and notes are used for investment, hedging, and speculative purposes, by both domestic and foreign investors and traders. U.S. banks purchase Irish government bonds to diversify their portfolios, speculate on Irish interest rates, and hedge euro zone currency positions and positions along the Irish yield curve.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

About 80 percent of issuance is by the tap system, and the rest of the bonds are issued by regular auctions. Taps are sales of a fixed amount of securities at a fixed price when market conditions are considered favorable. The type of bond and size of the tap issue are communicated to the market, but the price is only communicated to the primary dealers who bid by telephone. The auction system has both a competitive and noncompetitive element. The competitive auction is open to all investors who may bid directly or through a primary dealer or stockbroker. Following the auction, noncompetitive bids are filled at the average auction price. Only primary dealers may submit noncompetitive bids.

### Secondary Market

IGBs are listed on the Dublin, Cork, and London stock exchanges. They are also traded in the over-the-counter (OTC) market.

### Market Participants

#### *Sell Side*

Seven primary dealers quote firm bid and offer prices in each of a specified list of four bonds. In return for their market-making services, the NTMA provides these dealers with exclusive access to the supply of bonds issued in tap form. The designated brokers are ABN AMRO, AIB Capital Markets, Credit Agricole Indosuez, Davy, Deutsche Bank, NCB, and Schroder Salomon Smith Barney.

#### *Buy Side*

The principal holders of IGBs are domestic and foreign institutional investors, such as banks, securities firms, insurance companies, pension funds, and money managers.

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1. For more information, see [www.ntma.ie/govtbonds](http://www.ntma.ie/govtbonds).

## Market Transparency

Price transparency for Irish government securities is relatively high as a result of the structure of the primary dealer system, which enhances liquidity. Several information vendors disseminate prices to the investing public.

## PRICING

Bonds are quoted as a percent of par to two decimal places. The price paid by the buyer does not include accrued interest. The bid/offer spread for maturities up to ten years ranges from euro .05 to euro .07. For longer-term maturities, the bid/offer spread is euro .15.

## HEDGING

Interest-rate risk may be hedged by taking contra positions in government securities or by using swaps or futures. Foreign-exchange risk can be hedged using currency swaps, futures, or forward rate agreements.

## RISKS

### Liquidity Risk

Active portfolio management, the wide range of coupons and maturities available, and the development of a trading rather than a purely investment outlook among Irish investors have increased the liquidity of the Irish government bond market. The large issues tend to be very liquid throughout the yield curve; the four bonds for which the primary dealers are obliged to make markets are particularly liquid.

### Interest-Rate Risk

IGBs are exposed to interest-rate risk as a result of the inverse relationship between bond prices and interest rates. Longer-term issues have more price volatility than short-term instruments.

## Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Irish government bonds are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Irish government bonds are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

### GENERAL DESCRIPTION

The Italian Treasury issues bonds, notes, and bills, which are guaranteed by the Italian government. These securities are issued with maturities ranging from three months to thirty years in a wide variety of structures. These structures include Treasury bonds, Treasury floating-rate notes, Treasury notes with a put option, and short-term Treasury bills. Government securities are issued in book-entry form but may be converted to bearer form following their issuance.

### CHARACTERISTICS AND FEATURES

Treasury bonds, or *Buoni del Tesoro Poliennali* (BTPs), are fixed-coupon medium- to long-term government bonds with semiannual dividend payments. These bonds have played an important role in financing the Treasury, especially after the establishment of the telematic market for government bonds, which provides the liquidity necessary for these instruments. These bonds are issued with five-, ten-, and thirty-year maturities. Interest on the bonds is paid through deferred semiannual coupons.

Treasury floating-rate notes, or *Certificati di Credito del Tesoro* (CCTs), are floating-rate notes indexed to T-bill rates. CCTs are generally issued with seven-year maturities, although five- and ten-year notes have also become popular. Interest on these bonds is paid through deferred semiannual or annual dividend coupons, with rates indexed to Italian Treasury Bill (BOT) yields. The coupon is calculated by adding a spread of 30 basis points to the six-month T-bill recorded in the last auction.

Domestic and international settlement of Italian government bonds takes place three business dates after the trade date (T+3). The only exception is BOTs, which settle two business dates after the trade date (T+2). Italian government bonds with a coupon can be settled through Euroclear or Cedel (international clearing organizations). Settlement through Euroclear and Cedel takes five days. Interest is calculated using a 30/360-day count in which each month is assumed to have 30 days.

### USES

Italian government securities are used for investment, hedging, and speculative purposes. Investors may buy Italian bonds as a way to diversify their investment portfolios, but the bonds may also be used to hedge positions that are sensitive to movements in interest rates. Speculators, on the other hand, may use long-term bonds to take positions on changes in the level and term structure of interest rates.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

Italian government bonds are issued through a marginal auction, in which there is no base price. Each allotment is made at the marginal accepted bid, which represents the stop-out price. No bids are considered below the stop-out price. Partial allotments may be given at the stop-out price if the amount bid at that price exceeds the amount not covered by the higher-priced bids. Each participant is limited to three bids. The exclusion price, or the price below which no bids will be accepted, is calculated by listing the bids in decreasing order and proceeding as follows:

- If the amount of competitive bids is greater than or equal to the amount offered—
  - take the amount of bids (in a decreasing price order) needed to cover half the offered amount,
  - calculate the weighted average of the above set of bids, and
  - subtract 200 basis points from the weighted average to obtain the exclusion price.
- If the amount of competitive bids is less than the amount offered—
  - take half of the bids in a decreasing price order,
  - calculate the weighted average of the above set of bids, and
  - subtract 200 basis points from the weighted average to obtain the exclusion price.

Once the exclusion yield is calculated, bids are accepted in decreasing order of price. Bids

are accepted to the point that covers the amount to be offered up to the stop-out price. Noncompetitive bids may also be accepted and awarded at the average of accepted competitive bids plus a Treasury spread.

The Treasury makes an announcement of auction dates annually and also makes a quarterly announcement of the types of bonds and minimum issue sizes to be offered in the following three months. The auctions are held at the beginning and middle of the month. Generally, three- and five-year bills are sold on the same day, ten- and thirty-year bonds are sold together, and CCTs are sold on the third day of the auctions.

The Bank of Italy may reopen issues, that is, sell new tranches of existing bonds, until the level outstanding reaches a certain volume. After that threshold volume is reached, a new bond must be issued. If an issue is reopened, the Bank of Italy issues new tranches of securities with the same maturities, coupons, and repayment characteristics as existing debt. The ability to reopen issues improves liquidity and avoids the potential poor pricing of securities that often occurs when a market is flooded with one very large issue.

## Secondary Market

Italian government bonds can be traded on any of the following: the Milan Stock Exchange, the telematic government bond spot market (*Mercato Telematico dei Titoli di Stato* or MTS), and the over-the-counter (OTC) market. Bonds may be traded on the Milan Stock Exchange if they are transformed into bearer bonds (at least six months after being issued). The stock exchange is the reference market for the small saver; only small dealings are transacted there. At the end of the day, the exchange publishes an official list of the prices and volumes of trading. The MTS is the reference market for professional dealers.

## MARKET PARTICIPANTS

### Sell Side

Only banks authorized by the government of Italy may act as primary dealers of Italian government bonds. Branches of foreign banks and nonfinancial institutions can also act as

dealers, provided they are residents of the European Union and subject to comparable financial regulations.

### Buy Side

A wide range of investors use Italian government bonds for investing, hedging, and speculation. These investors include domestic banks, nonfinancial corporate and quasi-corporate public and private enterprises, insurance companies, and private investors. Foreign investors, including U.S. commercial banks, securities firms, insurance companies, and money managers, are also active in the Italian government bond market.

### Market Transparency

The Italian government bond market is an active one. Price transparency is relatively high for Italian government securities because several information vendors, including Reuters, disseminate prices to the investing public.

## PRICING

Prices and yields of Italian government securities are stated as a percentage of par to two decimal places. For instance, a price of 97.50 means that the price of the bond is 97.50 percent of par. The price spread is generally narrow due to the efficiency of the market.

Bonds trade on a clean-price basis, quoted net of accrued interest. Italian government bonds do not trade ex dividend. Interest on Italian bonds is accrued from the previous coupon date to the settlement date (inclusive). In this regard, Italian bonds pay an extra day of interest compared with other bond markets.

## HEDGING

Italian government bonds can be hedged for interest-rate risk in the Italian futures market (*Mercato Italiano Futures* or MIF) as well as the London International Financial Futures Exchange (LIFFE). The MIF and LIFFE offer futures on ten-year Italian government securities, and the MIF offers futures on five-year Italian govern-

ment securities. The LIFFE also offers OTC options on individual bonds as well as options on futures contracts. OTC forwards and swaps can also be used to hedge interest-rate risk.

The effectiveness of a hedge depends on the yield-curve and basis risk. For example, hedging a position in a five-year note with an overhedged position in a two-year note may expose the dealer to yield-curve risk. Hedging a thirty-year bond with an Italian bond future exposes the dealer to basis risk if the historical price relationships between futures and cash markets are not stable. Additionally, if a position in notes or bonds is hedged using an OTC option, the relative illiquidity of the option may diminish the effectiveness of the hedge.

## RISKS

### Liquidity Risk

The Italian bond market is one of the most liquid markets in the world. Liquidity is maintained by 40 market makers, which include 16 specialists, top-tier market makers (Morgan Guaranty, Milan), and 24 other market makers who are obligated to quote two-way prices. Ten market makers have privileged access to the Bank of Italy on the afternoon of an auction to buy extra bonds at the auction price. The purchases are subject to a limit set by the Bank. For instance, if a particular issue were oversubscribed and prices were likely to shoot up, the selected market makers would be able to buy more of the same bond and maintain or increase market liquidity.

Before selling a new bond, the Bank of Italy may reopen issues until they reach a certain volume. Liquidity is also maintained by limiting the number of government entities that issue debt. In the case of Italy, only the central government may issue debt securities.

### Interest-Rate Risk

Italian government bonds are subject to price fluctuations due to changes in interest rates. Longer-term issues have more price volatility than shorter-term instruments. Therefore, a large concentration of longer-term maturities in an

investment portfolio may increase interest-rate risk.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Italian government bonds and notes are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Italian government notes and bonds are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

## GENERAL DESCRIPTION

Japanese government bonds (JGBs) are issued by the Japanese national government. The Ministry of Finance (MOF) authorizes the issuance of coupon and non-coupon-bearing JGBs in a variety of maturities: super-long-term (twenty and thirty years), long-term (ten years), and medium-term (two through six years). The MOF also issues short-term Treasury bills, which are issued at a discount with maturities of three months, six months, or one year.

## CHARACTERISTICS AND FEATURES

JGB revenue bond issues are categorized as construction bonds, deficit-financing bonds, or refunding bonds, although there is no difference in these bonds from an investment perspective. Super-long-term coupon-bearing bonds are issued quarterly (with a twenty-year maturity) or semi-annually (with a thirty-year maturity) in units of yen 50,000 and have a fixed semiannual coupon. Long-term coupon-bearing bonds are issued monthly in units of yen 50,000 and have a fixed semiannual coupon. Medium-term coupon-bearing bonds are issued monthly (with a two-year maturity) or bimonthly (with four- and six-year maturities) in units of yen 50,000 and have a semiannual coupon.

## USES

Domestic and foreign investors use JGBs for investment, hedging, and speculative purposes. U.S. investors, including commercial banks, may purchase JGBs to speculate on interest rates or foreign-exchange rates, diversify portfolios, profit from spreads between U.S. and Japanese interest rates, and hedge various positions.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

Super-long-term coupon-bearing bonds are

issued through a syndicate underwriting system, in which 90 percent of the issue is distributed to syndicate members through a competitive price auction. The remaining 10 percent is executed at the average price paid in the competitive price auction. For long-term coupon-bearing bonds, 60 percent of the issue is distributed by syndicate members through an auction; the remaining 40 percent is distributed by syndicate members on the basis of a preset share at a price set at the average of the price paid in the auction. For medium-term coupon-bearing bonds, 90 percent of the issue is distributed to syndicate members through a competitive price auction, and the remaining 10 percent is executed at the average price paid in the competitive price auction.

### Secondary Market

Most JGBs are listed on the Japanese stock exchanges, although the majority of JGB trading occurs in the over-the-counter (OTC) market. While the OTC market is characterized by very large trading volume, stock-exchange trading is important because it enhances transparency in pricing—the Tokyo Stock Exchange closing prices serve as a public pricing source for JGBs. Long-term government bonds account for the largest share of secondary-market trading of government securities, partly because they have higher credit ratings and greater marketability than shorter-maturity JGBs. In the secondary market, the broker and investor negotiate the “invoice price,” which includes commissions for the agent.

The secondary market for JGBs has some unusual features. The first relates to the benchmark or bellwether bond issue. In the U.S. Treasury market, the on-the-run issue (the most recently auctioned issue for a given maturity) is the benchmark issue for each maturity. However, the Japanese benchmark issue is determined through an informal process that occurs over a few weeks. The characteristics of benchmark issues are (1) a coupon that is near the prevailing rate, (2) a large outstanding amount (approximately yen 1.5 trillion or more), (3) a wide distribution or placement after the benchmark’s issue, and (4) a remaining maturity that is very close to ten years.



Another unusual feature of the JGB market is the so-called reverse coupon effect. In most bond markets, high-coupon bonds trade at a higher yield than low-coupon bonds of the same duration. This “coupon effect,” which varies with the duration of the bond as well as over time, is often attributed to such institutional factors as different taxation of capital gains and ordinary income. In Japan, however, there is a strong preference for high-coupon bonds. As a result, high-coupon bonds trade at lower yields than low-coupon bonds for the same duration (the “reverse coupon effect”). This effect occurs in spite of the Japanese tax code that requires income tax to be paid on coupon income but generally not on capital gains on Japanese government bonds. Banks prefer coupon interest because banks’ current income ratios are closely monitored by Japanese bank regulators.

## Market Participants

### *Sell Side*

JGBs are issued through a syndicate consisting of domestic banks, life insurance companies, other domestic financial institutions, and some foreign securities firms.

### *Buy Side*

A wide range of domestic and foreign investors use JGBs for investing, hedging, and speculation. Japanese financial institutions, particularly city banks, long-term credit banks, regional banks, and insurance companies, tend to be the largest investors in yen-denominated bonds, although corporate and individual investors are very active investors in the medium-term government bond market. Foreign investors, such as U.S. commercial banks, securities firms, insurance companies, and money managers, are also active in the Japanese government bond market.

## MARKET TRANSPARENCY

Price transparency is relatively high for JGBs. JGBs are actively traded and pricing information is available from a variety of price information services, including Reuters and Telerate.

## PRICING

JGB prices are quoted in yield, specifically on the basis of simple yield, in basis points. Market price is calculated from simple yield. The following formulas are used to calculate price and yield:

$$Y_s = [C + (100 - P / T)] / P \text{ or} \\ P = [(C * T) + 100] / [1 + (T * Y_s)],$$

where

$Y_s$  = simple yield

$C$  = coupon stated in decimal form

$P$  = price

$T$  = time to maturity = number of days to maturity/365

## Discount Bonds

Discount bonds are quoted on a simple-yield basis, which is different from the simple yield used on coupon bonds. Simple yield is used for discount bonds with a maturity of less than one year, but the formula is adjusted to reflect the fact that discount bonds do not pay interest. Annually compounded yield is used for discount bonds with a maturity greater than one year.

The yield on a discount bond with less than one year remaining to maturity is the value of  $Y_s$  that solves—

$$P = 100 / (1 + T + Y_s).$$

The yield on a discount bond with more than one year remaining to maturity is the value of  $Y_m$  that solves—

$$P = 100 / (1 + Y_m)T,$$

where  $T$  is the number of days to maturity (excluding leap days) divided by 365.

## HEDGING

Because of the multiple risks associated with positions in foreign government bonds, investors may need to hedge one position in several markets using various instruments. Interest-rate risk related to JGBs is typically hedged by taking contra positions in other government bonds or by investing in interest-rate forwards,

futures, options, or swaps. Similarly, foreign-exchange risk can be reduced by using currency forwards, futures, options, or swaps.

## RISKS

### Liquidity Risk

The market for longer-term JGBs tends to be more liquid than that for the shorter-term issues, although liquidity has improved for the shorter-term issues in the past few years. The benchmark ten-year JGB still accounts for the majority of trading volume in the secondary market and therefore enjoys the best liquidity. JGBs issued more recently also tend to be more liquid than older issues. The market for medium-term bonds is less liquid because such bonds are typically purchased by individuals and investment trust funds, which tend to be buy-and-hold investors. The existence of a large and active JGB futures market enhances the liquidity of these issues.

### Interest-Rate Risk

Like all bonds, the price of JGBs will change in the opposite direction from a change in interest rates. If an investor has to sell a bond before the maturity date, an increase in interest rates will mean the realization of a capital loss (selling the bond below the purchase price). This risk is by far the major risk faced by an investor in the bond market. Interest-rate risk tends to be greater for longer-term issues than for shorter-term issues. Therefore, a large concentration of long-term maturities may subject a bank's investment portfolio to unwarranted interest-rate risk.

### Foreign-Exchange Risk

A non-dollar-denominated bond (a bond whose payments are made in a foreign currency) has unknown U.S. dollar cash flows. The dollar-equivalent cash flows depend on the exchange rate at the time the payments are received. For example, a U.S. bank that purchases a ten-year JGB receives interest payments in Japanese yen. If the yen depreciates relative to the U.S. dollar, fewer dollars will be received than would have been received if there had been no depreciation. Alternatively, if the yen appreciates relative to

the U.S. dollar, the investor will benefit by receiving more dollars than otherwise. Over the last few years, volatility in the U.S.-Japanese exchange rate has been particularly high, primarily because of the Japanese banking crisis.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Japanese government bonds and yields are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Japanese government bonds and notes are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

## GENERAL DESCRIPTION

The Spanish Treasury issues medium- and long-term bonds, *Bonos del Estado* (Bonos) and *Obligaciones del Estado* (Obligaciones), which are guaranteed by the Spanish government. Since 1987, these bonds have been issued in book-entry form only.

## CHARACTERISTICS AND FEATURES

Bonos are issued with maturities of three or five years, while Obligaciones are issued with maturities of ten or fifteen years. Bonos and Obligaciones are noncallable, have bullet maturities, and can be issued with either annual or semiannual coupons. All Spanish government bonds bear a fixed coupon. Domestic settlement takes place the market date after the trade date (T+1), while international settlement takes place seven calendar days following the trade date (T+7). Settlement is done on a delivery-against-payment basis for all transactions between interbank market participants. Bonos and Obligaciones are also eligible for settlement through Euroclear and Cedel (international clearing organizations). Interest is calculated using an actual/365-day count.

## USES

Historically, Bonos and Obligaciones have been used as medium- and long-term investments. However, in the early 1990s, the trading volume of these bonds doubled as banks and corporations began to use Bonos and Obligaciones for cash-management purposes. These securities can also be used for hedging and speculative purposes.

## DESCRIPTION OF MARKETPLACE

### Issuing Practices

Currently, all Bonos and Obligaciones are issued through monthly competitive auctions. The Span-

ish Treasury publishes the auction calendar at the beginning of the year. On the first Tuesday of the month, the three- and ten-year bonds are issued. The five- and fifteen-year bonds are issued on the following Wednesday. Each issue is sold in at least three competitive tenders. Bids are submitted before 10:30 a.m. on the auction date. Auction results are announced at 11:30 a.m. on the same day on Reuters. Payments generally occur on the 15th of the same month.

At the beginning of each issue, the Treasury fixes the coupon to be paid for at least the next three auctions. After all bids are made, the Treasury fixes the total issue amount and allocates bids from the highest price to a cut-off price. The total issue amount is not disclosed. The lowest bid submitted is referred to as the marginal price of the issue. Bids between the average and the marginal price are filled at the price the bidders submitted. Bids above the average are filled at the average price bid.

If the Treasury announces a target issuance level and the volume awarded during the initial bidding stage is equal to or higher than 70 percent of the target level—but does not reach the target issuance level—the Treasury has the right, but not the obligation, to hold a second auction exclusively with the primary dealers. In this case, every primary dealer must submit bids for an amount at least equal to—

$$\frac{(\text{target issuance level} - \text{volume awarded})}{\text{number of primary dealers}}$$

If the target issuance level is met with the first bidding stage or if the Treasury does not announce a target issuance level, primary dealers may submit up to three additional bids. These bids cannot have yields higher than the average yield during the first bidding stage. In this scenario, the Treasury must accept bids equal to at least 10 percent of the volume awarded during the first bidding stage if it had accepted more than 50 percent of the bids. If it had accepted less than 50 percent of the bids, the Treasury must accept bids equal to at least 20 percent of the volume awarded during the first bidding stage.

Interest begins to accrue from a date nominated by the Treasury. Historically, the date has been set so that the first coupon period will be exactly one year. Thus, tranches issued before

the nominated date have an irregular period during which they trade at a discount without accrued interest.

## Secondary Market

About 40 percent of all bond transactions are executed through a system of interdealer brokers (blind brokers) instituted by the Bank of Spain. In the secondary market, only entities designated as “primary dealers” can deal directly with the Bank of Spain. For example, if a customer wants to buy a bond that a dealer does not have in inventory, a primary dealer can go to the Bank of Spain to obtain the bond. Nonprimary dealers would have to obtain the bonds through interdealer trading. Interdealer trading is executed through information screens. Amounts and prices are quoted but counterparties are not disclosed.

## Market Participants

### *Sell Side*

The dealers of government securities are classified as either primary dealers or nonprimary dealers. The Bank of Spain designates primary dealers with whom they will conduct business. Other dealers obtain government securities through interdealer trading.

### *Buy Side*

The primary holders of Bonos and Obligaciones are private and savings banks. The Bank of Spain, corporations, and foreign investors, including U.S. commercial banks, securities firms, insurance companies, and money managers, also hold outstanding bonds.

## MARKET TRANSPARENCY

Several information vendors disseminate price information on Spanish government bonds. Reuters and Telerate provide pricing information for Bonos and Obligaciones. A Telerate service called 38494 provides the latest auction information. Reuters carries bond prices, dealer prices, the latest auction results, and Spanish Treasury pages.

## PRICING

Bonos and Obligaciones are quoted in eighths on a percentage-of-par basis. Bid/offer spreads are typically five to ten basis points for actively traded issues and about twenty basis points for illiquid issues. Bonos and Obligaciones do not trade ex dividend, but they do trade before the Treasury nominates a date to begin coupon accruals. The period before the nomination date is referred to as the irregular period. Because there is no accrued interest until a coupon payment date is nominated by the Treasury, issues outstanding before the nomination are priced at a discount and adjustments to yield must be made accordingly. The following price/yield relationship holds during the irregular period:

$$PV_0 = PV_1 / (1 + y)^{(n/365)},$$

where

$PV_1$  = standard price/yield on the nominated date

$y$  = annual internal rate of return

$n$  = the number of days until the end of the irregular period

## HEDGING

Foreign-currency and interest-rate risk may be hedged by using derivative instruments such as forwards, futures, swaps, or options. Interest-rate risk may also be hedged by taking an offsetting position in another Spanish fixed-income security.

## RISKS

### Liquidity Risk

Liquidity risk is increased when market volumes of a security are low. In the case of Bonos and Obligaciones, market volumes have been volatile as investor objectives and strategies have changed, such as when banks and corporations began to use Bonos and Obligaciones as cash-management instruments rather than as medium-term investments. These bonds may experience varying levels of liquidity. Liquidity may also be a function of how close to maturity a bond issue is. In other words, more recently issued

bonds tend to be more liquid than bonds that have been traded in the market for a longer period of time.

### Interest-Rate Risk

Interest-rate risk is derived from price fluctuations caused by changes in interest rates. Longer-term issues have more price volatility than shorter-term issues. A large concentration of long-term maturities may subject a bank's investment portfolio to greater interest-rate risk.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

### ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of

Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

### RISK-BASED CAPITAL WEIGHTING

Spanish government bonds are assigned to the zero percent risk-weight category.

### LEGAL LIMITATIONS FOR BANK INVESTMENT

Spanish government bonds are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

### GENERAL DESCRIPTION

Swiss government notes (SGNs) and bonds (SGBs), also known as confederation notes and bonds, are fully guaranteed debt obligations of the Swiss government. The Swiss government debt market has historically been relatively small as a result of the country's low level of debt and its balanced-budget policy. The Swiss government does not engage in open market operations because of the high degree of liquidity in the banking system. However, budget deficits in recent years have resulted in an increase in the volume of activity. Bonds and notes are issued through the Swiss National Bank in bearer form only.

### CHARACTERISTICS AND FEATURES

Bonds have average maturity ranges of seven to twenty years and are issued in denominations of Swiss franc (SFr) 1,000, SFr 5,000, and SFr 100,000. Notes have average maturities of three to seven years and are issued in denominations of SFr 50,000 and SFr 100,000. Both bonds and notes are fixed-coupon securities redeemable at par (bullets). Interest is paid annually and there are no odd first coupons. Most issues are callable, but many recent issues do not have a call feature. Settlement is based on Euroclear (an international clearing organization) conventions, three days after the trade date (T+3). Interest is calculated using the 30E+/360-day-count convention. If a starting date is the 31st, it is changed to the 30th, and an end date that falls on the 31st is changed to the 1st.

### USES

Swiss government bonds and notes are used for investment, hedging, and speculative purposes. Foreign investors, including U.S. banks, often purchase Swiss government securities as a means of diversifying their securities portfolios. The low credit risk and liquidity of Swiss government bonds encourage their use. Swiss government securities may also be used to hedge an investor's exposure to Swiss interest rates or

currency risk that is related to its positions in Swiss francs. Speculators may use Swiss government bonds to take positions on changes in the level and term structure of Swiss interest rates or on changes in the foreign-exchange rates between Switzerland and the United States.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

The Swiss Treasury issues debt through a Dutch auction, and allocations are made to the highest bidders in descending order until the supply of securities the Treasury wishes to sell is depleted. The lowest accepted tender price is considered the clearing price. The debt-issuance calendar is announced at the beginning of each year. Currently, issuance takes place on the fourth Thursday of every second month.

#### Secondary Market

SGBs are listed on the Swiss stock exchanges in Zurich, Geneva, and Basel, as well as on the over-the-counter (OTC) market. SGNs are traded OTC only.

#### Market Participants

##### *Sell Side*

The main dealers of SGBs are the Union Bank of Switzerland, Credit Suisse, and the Swiss Bank Corporation. The Swiss National Bank does not allow non-Swiss banks to underwrite or manage issues.

##### *Buy Side*

Many investors, foreign and domestic, are attracted to the Swiss bond market because of the strength of the Swiss economy, the country's low inflation rates, and the stability of its political environment and currency, all of which contribute to a stable and low-risk

government bond market. Investors include banks, securities firms, insurance companies, and money managers.

## Market Transparency

The market of SGBs and SGNs is fairly active. Price transparency is relatively high for Swiss government securities since several information vendors, including Reuters and Telerate, disseminate prices to the investing public.

## PRICING

Notes and bonds are quoted as a percentage of par to two decimals. For example, a quote of 98.16 would mean a price that is 98.16 percent of par value. The price quoted does not include accrued interest. Notes and bonds do not trade ex dividend.

## HEDGING

Interest-rate risk may be hedged by taking contra positions in other government securities or by using interest-rate swaps, forwards, options, or futures. Foreign-exchange risk can be hedged by using currency swaps, forwards, futures, or options.

## RISKS

### Liquidity Risk

The market for SGBs is more liquid than the market for SGNs due to a lower number of SGN issues. Bonds typically trade in a liquid market for the first few months after they are issued. However, after a few months on the secondary market, liquidity tends to decrease as a result of the fact that issue size is relatively small. In addition, liquidity is hampered by buy-and-hold investment practices and by federal and cantonal taxes levied on secondary transactions.

### Interest-Rate Risk

SGBs and SGNs are subject to interest-rate risk as a result of the inverse relationship between bond prices and interest rates. Longer-term issues

have more price volatility than short-term instruments. However, the Swiss capital market is characterized by relatively low and stable interest rates.

## Foreign-Exchange Risk

Currency fluctuations may affect the bond's yield as well as the value of coupons and principal paid in U.S. dollars. The Swiss franc is one of the strongest currencies in the world as a result of the strength of the Swiss economy and the excess liquidity in the banking system. Volatility of Swiss foreign-exchange rates has historically been low.

## Political Risk

A change in the political environment, withholding tax laws, or market regulations can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations governing foreign bond issuance, trading, transactions, and authorized counterparties.

## ACCOUNTING TREATMENT

The accounting treatment for investments in foreign debt is determined by the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities." Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

## RISK-BASED CAPITAL WEIGHTING

Swiss government notes and bonds are assigned to the zero percent risk-weight category.

## LEGAL LIMITATIONS FOR BANK INVESTMENT

Swiss government notes and bonds are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.

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### GENERAL DESCRIPTION

United Kingdom government bonds, known as “gilts” or “gilt-edged stocks,” are sterling-denominated bonds issued by the Bank of England (BOE) on behalf of the Treasury. Effective April 1, 1998, the Debt Management Office assumed responsibility for gilt-market oversight. The bonds are unconditionally guaranteed by the U.K. government and, therefore, are considered to have very low credit risk. Shorts are those gilts having zero to five years remaining to maturity; mediums, five to fifteen years; and longs, over fifteen years. The securities are generally held in registered form in the domestic settlement system. The securities can also be held through Euroclear and Cedel (international clearing organizations).

### CHARACTERISTICS AND FEATURES

Gilts come in a variety of structures. Conventional gilts, or “straights,” are noncallable bullet issues that pay interest semiannually. These bonds comprise around 80 percent of the outstanding gilt-edged securities. The government also issues callable gilts, so-called double-dated gilts, which may be called at the government’s discretion anytime after the designated call date. In addition to these bonds, a number of nonconventional gilt issues are considered to be of minor importance because of their insignificant issue sizes and lack of liquidity. Such nonconventional issues include convertible gilts (in which short-dated bonds may be converted to longer-dated bonds), index-linked gilts, and irredeemable gilts (consols). Most gilt issues pay a fixed coupon. Floating-rate gilts, first issued in March 1994, have coupon payments linked to the London Interbank Bid Rate (LIBID). Unlike fixed-rate gilts, interest on floating-rate gilts is paid quarterly to investors.

Settlement in the gilt market is usually done on the market date following the trade date (T+1), although two-day and seven-day settlements are also fairly common. Deals are normally cleared through the Bank of England’s Central Gilt Office (CGO). The CGO is linked to Euroclear and Cedel. Interest is calculated using an actual/actual day count.

### USES

Gilts are used for investment, hedging, and speculative purposes by domestic and foreign entities. Foreign investors may buy gilts as a means of diversifying their investment portfolios; however, gilts may also be used to hedge positions that are sensitive to movements in U.K. interest rates or foreign-exchange rates. Speculators, on the other hand, may use long-term bonds to take positions on changes in the level and term structure of interest rates.

### DESCRIPTION OF MARKETPLACE

#### Issuing Practices

Gilt-edged market makers (GEMMs) quote prices on a when-issued basis. Deals cannot be settled until the business day after the auction when trading in the newly issued bonds officially begins. The existence of a shadow market, however, ensures that the market can trade to a level in which new bonds will be easily absorbed, thus limiting the chances of a surplus inventory of bonds. (See “Sell Side” below.)

During the auction process, bids are accepted on a competitive and noncompetitive basis. Competitive bids are for a minimum of £500,000 and can be made at any price. Bids are accepted going from the highest price to the lowest price until the bank exhausts the amount of securities it wants to sell. If the issue size is not large enough to satisfy demand at the lowest accepted price, bidders get a proportion of their requests. In such a bid, the BOE cannot give more than 25 percent of the amount offered to any one bidder. Noncompetitive bids vary between £1,000 and £500,000 per bidder. Bonds are allocated to noncompetitive bidders at a price equal to that of the weighted average of bids filled in the competitive auction.

The BOE also sells a fixed amount of securities at a fixed price (tap form). This form of issuance allows the BOE to respond to market demand and add liquidity to the market. More specifically, tap issues are normally done from the supply of bonds that have not been sold at an auction. Typically, bonds are held back with the intent to sell them when demand has improved

or when there is an increased need for funds. In a tap issuance, stock is issued to GEMMs in the form of “tranches,” typically up to £500 million.

Payment for gilts may be made in full or in part. In a partly paid auction, competitive bidders are required to deposit a portion of the amount bid, and the rest is due after issue as specified in the prospectus. In a partly paid auction, the first coupon payment and the market price reflect the partly paid status of the gilt. After the installments are cleared as specified in the prospectus, the partly paid distinction disappears.

## Secondary Market

U.K. gilts are traded on the London Stock Exchange, International Stock Exchange, and London International Financial Futures Exchange (LIFFE). Gilts can be traded 24 hours a day. Generally, gilts are traded on the International Stock Exchange between 9 a.m. and 5 p.m. and on the LIFFE between 8:30 a.m. and 4:15 p.m. and between 4:30 p.m. and 6:00 p.m. The typical transaction size in the secondary market varies between £5 to £100 million.

## Market Participants

### *Sell Side*

The primary dealers of U.K. government bonds are the GEMMs. GEMMs quote the exact size, amount, and terms of the issuance beginning eight days before an auction, thereby creating a “shadow market.” At this time, they quote prices on a when-issued basis.

### *Buy Side*

A wide range of investors use U.K. government bonds for investing, hedging, and speculation. These investors include banks, nonfinancial corporate and quasi-corporate public and private enterprises, pension funds, charities, the pension divisions of life insurance companies, and private investors. The largest holders of gilts are domestic entities, but foreign investors, including U.S. banks, are also active participants in the market.

## Market Transparency

The gilt market is active and price transparency is relatively high for these securities. Several information vendors, including Reuters, disseminate prices to the investing public.

## PRICING

Prices are quoted in decimals, rounded to two decimal places.

## HEDGING

U.K. gilts may be hedged for foreign-exchange risk using foreign-exchange options, forwards, and futures. Gilts can be hedged for interest-rate risk by taking a contra position in another gilt or by using derivative instruments such as forwards, swaps, futures, or options. Currently, the LIFFE gilt futures contract is the most heavily traded hedging instrument. The effectiveness of a particular hedge depends on the yield curve and basis risk. For example, hedging a position in a six-year note with an overhedged position in a two-year bill may expose the dealer to yield-curve risk. Hedging a thirty-year bond with a bond future exposes the dealer to basis risk if the historical price relationships between futures and cash markets are not stable.

## RISKS

### Liquidity Risk

Gilts trade in an active and liquid market. Liquidity in the market is ensured by the BOE, which is responsible for maintaining the liquidity and efficiency of the market and, in turn, supervises the primary dealers of gilts. GEMMs, who act as primary dealers, are required to quote two-way prices at all times. An increase in foreign investment activity in the gilt market has led to a substantial increase in competition and enhanced liquidity.

Liquidity is also enhanced through the BOE’s ability to reopen auctions and tap issues. The ability to reopen issues improves liquidity and avoids the unfavorable pricing that may occur when the market is flooded with one very large issue. A tap issue allows the BOE to relieve a

market shortage for a particular bond. An active repo market allows market makers (GEMMs) to fund their short positions, and it improves turnover in the cash market and attracts international players who are familiar with the instrument, which further improves liquidity.

### Foreign-Exchange Risk

Currency movements have the potential to affect the returns of fixed-income investments whose interest and principal are paid in foreign currencies. The devaluation of a foreign currency relative to the U.S. dollar would not only affect a bond's yield, but would also affect bond payoffs in U.S. dollar terms. Some factors that may affect the U.K. foreign-exchange rate include—

- wider exchange-rate mechanism bands, which increase the risk of holding high-yielding currencies;
- central bank intervention in the currency markets;
- speculation about the European economic and monetary union and its potential membership, which puts European currencies under pressure vis-à-vis the deutsche mark; and
- endemic inflation in the United Kingdom.

### Political Risk

A change in the political environment, withholding tax laws, or market regulation can have an adverse impact on the value and liquidity of an investment in foreign bonds. Investors should be familiar with the local laws and regulations

governing foreign bond issuance, trading, transactions, and authorized counterparties.

### ACCOUNTING TREATMENT

The Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 115 (FAS 115), "Accounting for Certain Investments in Debt and Equity Securities," as amended by Statement of Financial Accounting Standards No. 140 (FAS 140), "Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities," determines the accounting treatment for investments in foreign debt. Accounting treatment for derivatives used as investments or for hedging purposes is determined by Statement of Financial Accounting Standards No. 133 (FAS 133), "Accounting for Derivatives and Hedging Activities," as amended by Statement of Financial Accounting Standards Nos. 137 and 138 (FAS 137 and FAS 138). (See section 2120.1, "Accounting," for further discussion.)

### RISK-BASED CAPITAL WEIGHTING

United Kingdom government bonds are assigned to the zero percent risk-weight category.

### LEGAL LIMITATIONS FOR BANK INVESTMENT

United Kingdom government bonds are type III securities. As such, a bank's investment in them is limited to 10 percent of its equity capital and reserves.