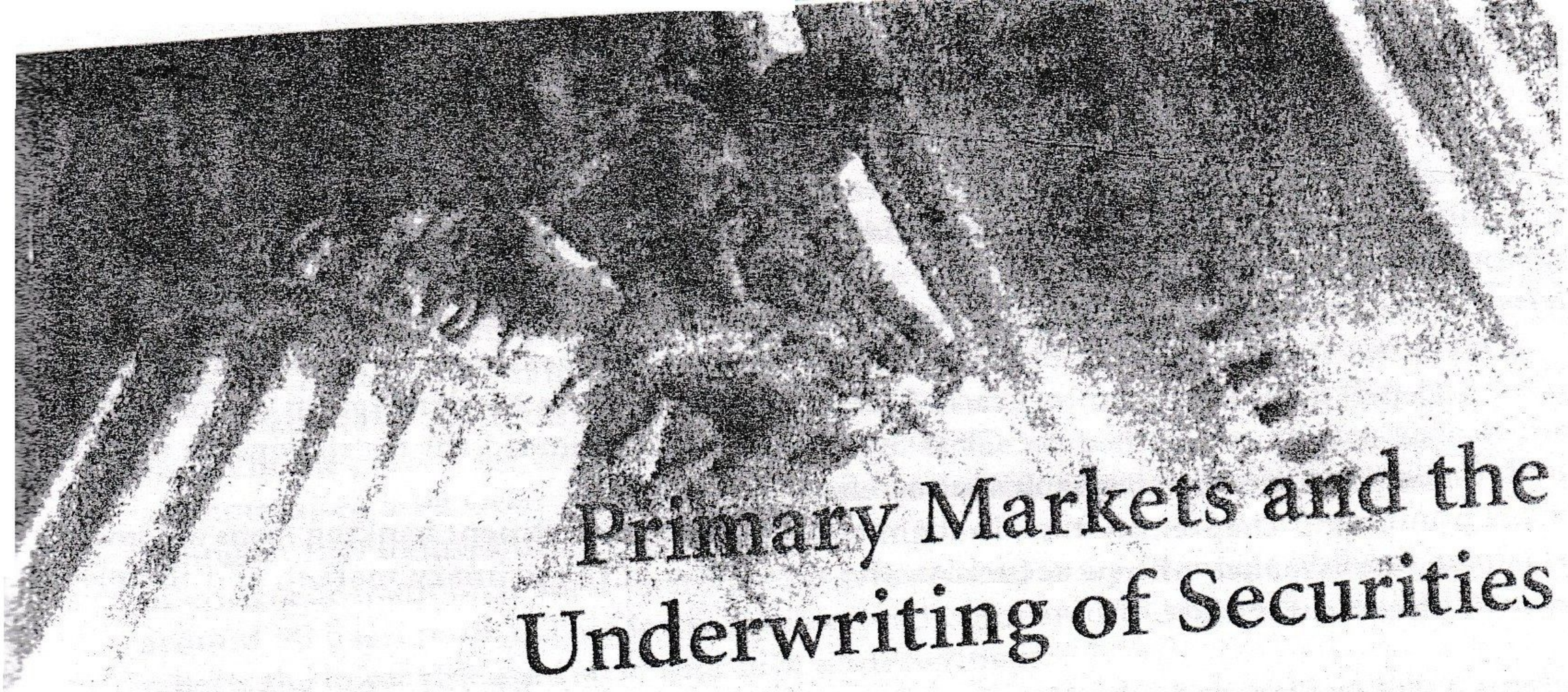


Primary Markets and the Underwriting of Securities

LEARNING OBJECTIVES

After reading this chapter, you will understand

- the role investment bankers play in the distribution of newly issued securities
- the risk associated with the underwriting of a security
- the different types of underwriting arrangements
- how the SEC regulates the distribution of newly issued securities
- what a registration statement is
- the impact of the SEC Rule 415 (shelf registration)
- what is a bought deal underwriting for a bond issue, and why it is used
- what a competitive bidding underwriting is
- what a rights offering for the sale of common stock is
- the advantages and disadvantages from an issuer's perspective of a private placement
- the reason for Rule 144A and its potential impact on the private placement market

Financial markets can be categorized as those dealing with financial claims that are newly issued, called the **primary market**, and those for exchanging financial claims previously issued, called the *secondary market*, or the market for seasoned securities. In this chapter, we focus on the primary market for securities; the next chapter covers the secondary market.

The primary market involves the distribution to investors of newly issued securities by central governments, their agencies, municipal governments, and corporations.[1] The participants in

[1] This also includes the offering of securities of government-owned companies to private investors. This process is referred to as *privatization*. An example in the United States is the initial public offering of the U.S. government-owned railroad company Conrail in March 1987. Non–U.S. examples include Great Britain's British Telecom, Chile's Pacifica, and France's Paribas.

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the marketplace that work with issuers to distribute newly issued securities are called **investment bankers**. Investment banking is performed by two groups: commercial banks and securities houses. Prior to 1999, the Glass-Steagall Act separated the activities of commercial banks and securities house, restricting the types of securities that commercial banks in the United States could underwrite. This act had been on the books since the Great Depression. The Gramm-Leach-Bliley Financial Services Modernization Act of 1999 (the "GLB Act") supplanted the Glass-Steagall Act and eliminated the restrictions on the activities conducted by companies in each financial sector.

In this chapter, we explain the various ways that investment banking firms are involved in the issuance of new securities, the regulation of the primary market, and the private placement market.

THE TRADITIONAL PROCESS FOR ISSUING NEW SECURITIES

The traditional process in the United States for issuing new securities involves investment bankers performing one or more of the following three functions: (1) advising the issuer on the terms and the timing of the offering, (2) buying the securities from the issuer, and (3) distributing the issue to the public.[2] The advisor role may require investment bankers to design a security structure that is more palatable to investors than a particular traditional instrument. For example, the high interest rates in the United States in the late 1970s and early 1980s increased the cost of borrowing for issuers of even the highest-quality rating. To reduce the cost of borrowing for their clients, investment bankers designed securities with characteristics that were more attractive to investors but not onerous to issuers. They also designed security structures for low-quality bond issues, so-called high-yield or junk bond structures. We will give several examples of these financial innovations in later chapters.

In the sale of new securities, investment bankers need not undertake the second function—buying the securities from the issuer. An investment banker may merely act as an advisor and/or distributor of the new security. The function of buying the securities from the issuer is called **underwriting**. When an investment banking firm buys the securities from the issuer and accepts the risk of selling the securities to investors at a lower price, it is referred to as an *underwriter*. When the investment banking firm agrees to buy the securities from the issuer at a set price, the underwriting arrangement is referred to as a firm commitment. In contrast, in a **best efforts** arrangement, the investment banking firm agrees only to use its expertise to sell the securities—it does not buy the entire issue from the issuer.

The fee earned from underwriting a security is the difference between the price paid to the issuer and the price at which the investment bank reoffers the security to the public. This difference is called the **gross spread**, or the **underwriter discount**. Numerous factors affect the size of the gross spread. Two important factors are the type of security and the size of the offering. The major types of offerings can be classified as initial public offering, secondary common stock offering, and bond offering.

An **initial public offering (IPO)** is a common stock offering issued by companies that had not previously issued common stock to the public. For example, on September 22, 2006,

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[2] When an investment banking firm commits its own funds on a long-term basis by either taking an equity interest or creditor position in companies, this activity is referred to as merchant banking.

DivX, Inc. conducted an IPO for 9,100,000 shares of common stock at a price to the public of $16.00 per share. The total amount raised was therefore $145,600,000. The underwriting discount (and commissions) was $1.12 per share or $10,192,000. As a percentage of proceeds raised, the underwriting discount was 7%. The range for a public offering is typically between 4.5% and 7.5% of the amount issued, with the lower end of the range being for large IPOs.

A **secondary common stock offering** is an offering of common stock that had been issued in the past by the corporation. The range for the gross spread as a percentage of the amount raised is between 3% and 6%. Because of the risk associated with pricing and then selling an IPO to investors, the gross spread is higher than for a secondary common stock offering. For traditional bond offerings, the gross spread as a percentage of the principal is around 50 basis points. This lower gross spread compared to common stock offerings reflects the lower risk associated with such underwritings.

The typical underwritten transaction involves so much risk of capital loss that a single investment banking firm undertaking it alone would be exposed to the danger of losing a significant portion of its capital. To share this risk, an investment banking firm forms a **syndicate** of firms to underwrite the issue. The gross spread is then divided among the lead underwriter(s) and the other firms in the underwriting syndicate. The lead underwriter manages the deal (or "runs the books" for the deal). In many cases, there may be more than one lead underwriter, so that the lead underwriters are said to colead or comanage the deal.

To realize the gross spread, the entire securities issue must be sold to the public at the planned reoffering price. This usually requires a great deal of marketing muscle. Investment banking firms have an investor client base (retail and institutional) to which they attempt to sell the securities. To increase the potential investor base, the lead underwriter will put together a **selling group**. This group includes the underwriting syndicate plus other firms that are not in the syndicate. Members of the selling group can buy the security at a concession price—a price less than the reoffering price. The gross spread is thereby divided among the lead underwriter, members of the underwriting syndicate, and members of the selling group.

A successful underwriting of a security requires that the underwriter have a strong sales force. The sales force provides feedback on advance interest in the security, and the traders (also called market makers) provide input in pricing the security as well. It would be a mistake to think that once the securities are all sold the investment banking firm's ties with the deal are ended. In the case of bonds, those who bought the securities will look to the investment banking firm to make a market in the issue. This means that the investment banking firm must be willing to take a principal position in secondary market transactions.

Key Points That You Should Understand Before Proceeding

1. There are three functions performed by investment bankers in the offering of new securities.
2. Depending on the type of underwriting agreement, the underwriting function may expose the investment banking firm to the risk of selling the securities to the public at a price less than the price paid to the issuer.
3. The gross spread earned by the underwriter depends on numerous factors.
4. Because of the risks associated with the underwriting of securities, an underwriting syndicate and a selling group are typically formed.

REGULATION OF THE PRIMARY MARKET

Underwriting activities are regulated by the Securities and Exchange Commission (SEC). The Securities Act of 1933 governs the issuance of securities. The act requires that a **registration statement** be filed with the SEC by the issuer of a security. The type of information contained in the registration statement is the nature of the business of the issuer, key provisions or features of the security, the nature of the investment risks associated with the security, and the background of management.[3] Financial statements must be included in the registration statement, and they must be certified by an independent public accountant.[4]

The registration is actually divided into two parts. Part I is the **prospectus**. It is this part that is typically distributed to the public as an offering of the securities. Part II contains supplemental information, which is not distributed to the public as part of the offering but is available from the SEC upon request.

The act provides for penalties in the form of fines and/or imprisonment if the information provided is inaccurate or material information is omitted. Moreover, investors who purchase the security are entitled to sue the issuer to recover damages if they incur a loss as a result of the misleading information. The underwri er may also be sued if it can be demonstrated that the underwriter did not conduct a reasonable investigation of the information reported by the issuer. One of the most important duties of an underwriter is to perform **due diligence**. The following quotation comes from a court decision that explains the obligation of an underwriter to perform due diligence:

> An underwriter by participating in an offering constructively represents that statements made in the registration materials are complete and accurate. The investing public properly relies upon the underwriter to check the accuracy of the statements and the soundness of the offer; when the underwriter does not speak out, the investor reasonably assumes that there are no undisclosed material deficiencies. The representations in the registration statement are those of the underwriter as much as they are those of the issuer.[5]

The filing of a registration statement with the SEC does not mean that the security can be offered to the public. The registration statement must be reviewed and approved by the SEC's Division of Corporate Finance before a public offering can be made. Typically, the staff of this division will find a problem with the registration statement. The staff then sends a "letter of comments" or "deficiency letter" to the issuer explaining the problem it has encountered. The issuer must remedy any problem by filing an amendment to the registration statement. If the staff is satisfied, the SEC will issue an order declaring that the registration statement is "effective," and the underwriter can solicit sales. The approval of the SEC, however, does not mean that the securities have investment merit or are properly priced or that the information is accurate. It merely means that the appropriate information appears to have been disclosed.

The time interval between the initial filing of the registration statement and the time the registration statement becomes effective is referred to as the **waiting period** (also called

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[3] SEC Regulation S-K and the Industry Guidelines (SEC Securities Act Release No. 6384, March 3, 1982) specify the information that must be included in the registration statement.

[4] SEC Regulation S-X specifies the financial statements that must be disclosed.

[5] *Chris-Craft Industries, Inc. v. Piper Aircraft Corp*, 1973.

the "cooling-off period"). During the waiting period, the SEC does allow the underwriters to distribute a preliminary prospectus. Because the prospectus has not become effective, its cover page states this in red ink and, as a result, the preliminary prospectus is commonly called a **red herring**. During the waiting period, the underwriter cannot sell the security, nor may it accept written offers from investors to buy the security.

In 1982, the SEC approved Rule 415, which permits certain issuers to file a single registration document indicating that they intend to sell a certain amount of a certain class of securities at one or more times within the next two years.[6] Rule 415 is popularly referred to as the **shelf registration rule** because the securities can be viewed as sitting on a "shelf," and can be taken off that shelf and sold to the public without obtaining additional SEC approval. In essence, the filing of a single registration document allows the issuer to come to market quickly because the sale of the security has been preapproved by the SEC. Prior to establishment of Rule 415, there was a lengthy period required before a security could be sold to the public. As a result, in a fast-moving market, issuers could not come to market quickly with an offering to take advantage of what they perceived to be attractive financing opportunities. For example, if a corporation felt that interest rates were low and wanted to issue a bond, it had to file a registration statement and could not issue the bond until the registration statement became effective. The corporation was then taking the chance that during the waiting period interest rates would rise, making the bond offering more costly.

Key Points That You Should Understand Before Proceeding

1. The SEC regulates underwriting activities.
2. An issuer must file a registration statement, one part of which is the prospectus.
3. The underwriter must exercise due diligence to assure that there are no misstatements or omissions of fact in the registration statement or prospectus.
4. SEC Rule 415 (the shelf registration rule) gives greater flexibility to certain issuers by permitting them to file a single registration document for the offering of certain securities at one or more times within the next two years.

VARIATIONS IN THE UNDERWRITING PROCESS

Not all deals are underwritten using the traditional syndicate process we have described. Variations in the United States, the Euromarkets, and foreign markets include the bought deal for the underwriting of bonds, the auction process for both stocks and bonds, and a rights offering for underwriting common stock.

Bought Deal

The bought deal was introduced in the Eurobond market in 1981 when Credit Suisse First Boston purchased from General Motors Acceptance Corporation a $100 million issue without lining up an underwriting syndicate prior to the purchase. Thus, Credit Suisse

[6] The issuer qualifies for Rule 415 registration if the securities are investment-grade securities and/or the securities of companies that have historically filed registration statements and whose securities comply with minimum flotation requirements.

First Boston did not use the traditional syndication process to diversify the capital risk exposure associated with an underwriting that we described earlier.

The mechanics of a bought deal are as follows. The lead manager or a group of managers offers a potential issuer of debt securities a firm bid to purchase a specified amount of the securities with a certain interest (coupon) rate and maturity. The issuer is given a day or so (maybe even only a few hours) to accept or reject the bid. If the bid is accepted, the underwriting firm has bought the deal. It can, in turn, sell the securities to other investment banking firms for distribution to their clients and/or distribute the securities to its clients. Typically, the underwriting firm that buys the deal will have presold most of the issue to its institutional clients.

The bought deal found its way into the United States in mid-1985 when Merrill Lynch underwrote a bond issue for which it was the only underwriter. The gross spread on the bond, a $50 million issue of Norwest Financial, was 0.268%. This is far less than the gross spread typical of that time. Merrill Lynch offered a portion of the securities to investors and the balance to other investment banking firms.

There are several reasons why some underwriting firms find the bought deal attractive. While Rule 415 gives certain issuers timing flexibility to take advantage of windows of opportunities in the global marketplace, it requires that underwriting firms be prepared to respond on short notice to commit funds to a deal. This fact favors the bought deal because it gives the underwriting firm very little time to line up a syndicate. A consequence of accepting bought deals, however, is that underwriting firms need to expand their capital so that they can commit greater amounts of funds to such deals.

The risk of capital loss in a bought deal may not be as great as it first appears. Some deals are so straightforward that a large underwriting firm may have enough institutional investor interest to keep the risks of distributing the issue at the reoffering price quite small. Moreover, in the case of bonds, hedging strategies using the interest rate risk control tools that we discuss later in this book can reduce or eliminate the risk of realizing a loss of selling the bonds at a price below the reoffering price.

Auction Process

Another variation for underwriting securities is the auction process. In this method, the issuer announces the terms of the issue, and interested parties submit bids for the entire issue. The auction form is mandated for certain securities of regulated public utilities and many municipal debt obligations. It is more commonly referred to as a **competitive bidding underwriting**. For example, suppose that a public utility wishes to issue $100 million of bonds. Various underwriters will form syndicates and bid on the issue. The syndicate that bids the lowest yield (i.e., the lowest cost to the issuer) wins the entire $100 million bond issue and then reoffers it to the public.

In a variant of the process, the bidders indicate the price they are willing to pay and the amount they are willing to buy. The security is then allocated to bidders from the highest bid price (lowest yield in the case of a bond) to the lower ones (higher yield in the case of a bond) until the entire issue is allocated. For example, suppose that an issuer is offering $500 million of a bond issue, and nine bidders submit the following yield bids:

Bidder	Amount (in millions)	Bid
A	$150	5.1%
B	110	5.2
C	90	5.2
D	100	5.3
E	75	5.4
F	25	5.4
G	80	5.5
H	70	5.6
I	85	5.7

The first four bidders—A, B, C, and D—will be allocated the amount for which they bid because they submitted the lowest-yield bids. In total, they will receive $450 million of the $500 million to be issued. That leaves $50 million to be allocated to the next-lowest bidders. Both E and F submitted the next lowest yield bid, 5.4%. In total, they bid for $100 million. Since the total they bid for exceeds the remaining $50 million, they will receive an amount proportionate to the amount for which they bid. Specifically, E will be allocated three-quarters ($75 million divided by $100 million) of the $50 million or $37.5 million, and F will be allocated one-quarter ($25 million divided by $100 million) of the $50 million or $12.5 million.

The next question concerns the yield that all of the six winning bidders—A, B, C, D, E, and F—will have to pay for the amount of the issue allocated to them. One way in which a competitive bidding can occur is all bidders pay the highest winning yield bid (or, equivalently, the lowest winning price). In our example, all bidders would buy the amount allocated to them at 5.4%. This type of auction is referred to as a *single-price auction* or a **Dutch auction**. Another way is for each bidder to pay whatever each one bid. This type of auction is called a *multiple-price auction*. Historically both procedures have been used in the auctioning of U.S. Treasury securities.

Using an auction allows corporate issuers to place newly issued debt obligations directly with institutional investors rather than follow the indirect path of using an underwriting firm. Internet auctions of municipal originations to underwriters began during 1997. One method of issuing municipal securities (i.e., securities issued by state and local governments and their authorities) is via a competitive bidding process. During November 1997, MuniAuction auctioned over the Internet $70 million City of Pittsburgh municipal bonds despite the opposition of some major Wall Street traditional, competitive bond underwriters. In 1999, the City of Pittsburgh used MuniAuction to offer bonds directly to institutional investors, allowing them to bypass traditional underwriters. By late 2000, MuniAuction reported it had conducted more than 250 municipal auctions totaling $13.4 billion. As of late November 2000, 14% of all competitive municipal bond underwritings were conducted over the MuniAuction system. By contrast, with the exception of two corporate bonds sales (Dow Chemical and Deutsche Bank), the corporate bond market had not adopted electronic bidding for new issues.

Investment bankers' response to the practice of direct purchase of publicly registered securities is that, as intermediaries, they add value by searching their institutional client base, which increases the likelihood that the issuer will incur the lowest cost, after adjusting

for the underwriting fees. By dealing with just a few institutional investors, investment bankers argue, issuers cannot be sure of obtaining funds at the lowest cost. In addition, investment bankers say that they often play another important role: They make a secondary market in the securities they issue. This market improves the perceived liquidity of the issue and, as a result, reduces the cost to issuers. The question whether or not investment bankers can obtain lower-cost funding (after accounting for underwriting fees) to issuers, by comparison to the cost of funding from a direct offering, is an interesting empirical question.

Preemptive Rights Offering

A corporation can issue new common stock directly to existing shareholders via a **preemptive rights offering**. A preemptive right grants existing shareholders the right to buy some proportion of the new shares issued at a price below market value. The price at which the new shares can be purchased is called the *subscription price*. A rights offering ensures that current shareholders may maintain their proportionate equity interest in the corporation. In the United States, the practice of issuing common stock via a preemptive rights offering is uncommon. In other countries, it is much more common; in some countries, it is the only means by which a new offering of common stock may be sold.

For the shares sold via a preemptive rights offering, the underwriting services of an investment banker are not needed. However, the issuing corporation may use the services of an investment banker for the distribution of common stock that is not subscribed to. A **standby underwriting arrangement** will be used in such instances. This arrangement calls for the underwriter to buy the unsubscribed shares. The issuing corporation pays a **standby fee** to the investment banking firm.

To demonstrate how a rights offering works, the effect on the economic wealth of shareholders, and how the terms set forth in a rights offering affect whether or not the issuer will need an underwriter, we will use an illustration. Suppose that the market price of the stock of XYZ Corporation is $20 per share and that there are 30,000 shares outstanding. Thus, the capitalization of this firm is $600,000. Suppose that the management of XYZ Corporation is considering a rights offering in connection with the issuance of 10,000 new shares. Each current shareholder would receive one right for every three shares owned. The terms of the rights offering are as follows: For three rights and $17 (the subscription price) a new share can be acquired. The subscription price must always be less than the market price or the rights will not be exercised. In our illustration, the subscription price is 15% ($3/20) below the market price.[7]

In addition to the number of rights and the subscription price, there are two other elements of a rights offering that are important. First is the choice to transfer the rights. This is done by selling the right in the open market. This is critical since, as we will see, the right has a value and that value can be captured by selling the right. The second element is the time when the right expires (that is, when it can no longer be used to acquire the stock). Typically, the time period before a right expires is short.

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[7] Note that the same results can be achieved by issuing one right per share but requiring three rights plus the subscription price for a new share (except for rounding-off problems and implications for the value of one right discussed in the following text).

The value of a right can be found by calculating the difference between the price of a share before the rights offering and the price of a share after the rights offering.[8] That is,

$$\text{Value of a right} = \text{Price before rights offering} - \text{Price after rights offering}$$

Or, equivalently,

$$\text{Value of a right} = \text{Share price rights on} - \text{Share price ex rights}$$

Table 1 shows the impact of the rights offering on the price of a share. The price after the rights offering will be $19.25. Therefore, the value of a right is $0.75($20 − $19.25).

The difference between the price before the rights offering and after the rights offering expressed as a percentage of the original price is called the *dilution effect of the rights issue.* In the present case, the dilution effect is $0.75/$20, or 3.75%. The larger the dilution is, the larger the ratio of old and new shares is, and the larger the discount is.[9]

The last section of Table 1 shows the net gain or loss to the initial shareholder as a result of the rights offering. The loss per share due to dilution is $0.75, but that is exactly equal to the value of a right which, if the shareholder desires, can be sold in the market. This result is important because it shows that the rights offering as such will not affect the sum of the value of the share without rights (referred to as ex rights) plus the value of the rights the

I. *Before rights issue*	
1. Capitalization	$600,000
2. Number of shares	30,000
3. Share price (rights on)	$20.00
II. *After issuance of shares via rights offering*	
4. Number of shares	40,000 (= 30,000 + 10,000)
5. Capitalization	$770,000 (= $600,000 + 10,000 × $17)
6. Share price (ex rights)	$19.25 (= $770,000/40,000)
7. Value of one right	$0.75 (= $20.00 − $19.25)
III. *Net gain or loss to initial shareholder*	
8. Loss per share due to dilution	$0.75 (= 3.75% × $20)
9. Gain per share from selling 1 existing right	$0.75
10. Net gain or loss	$ 0

[8] Alternatively, the value of a right can be found as follows:

$$\frac{\text{Price after rights offering} - \text{Subscription price}}{\text{Number of rights required to buy a share}}$$

[9] Specifically,

$$\text{Dilution effect} = \frac{\text{Discount \%}}{1 + (\text{Ratio of old to new shares})}$$

In our illustration, the discount is 15% and the ratio of old to new shares is 30,000/10,000 or 3, so the dilution effect is 15%/4, or 3.75%.

shareholder receives, no matter how much the dilution or the initial discount offered is. This is because a larger dilution is exactly compensated by the increase in the value of the rights.[10]

Key Points That You Should Understand Before Proceeding

1. There are variations in the traditional underwriting process.
2. In a bought deal, a lead manager or a group of managers offers a potential issuer of debt securities a firm bid to purchase a specified amount of a security.
3. An offering of a new security can be made by means of an auction process.
4. A corporation can offer existing shareholders new shares in a preemptive rights offering, and using a standby underwriting arrangement, the corporation can have an investment banking firm agree to distribute any shares not subscribed to.

PRIVATE PLACEMENT OF SECURITIES

In addition to underwriting securities for distribution to the public, securities may be placed with a limited number of institutional investors such as insurance companies, investment companies, and pension funds. **Private placement**, as this process is known, differs from the public offering of securities that we have described so far. Life insurance companies are the major investors in private placements.

Public and private offerings of securities differ in terms of the regulatory requirements that the issuer must satisfy. The Securities Act of 1933 and the Securities Exchange Act of 1934 require that all securities offered to the general public must be registered with the SEC, unless there is a specific exemption.

The Securities Acts allow three exemptions from federal registration. First, intrastate offerings—that is, securities sold only within a state—are exempt. Second, there is a small-offering exemption (Regulation A). Specifically, if the offering is for $1 million or less, the securities need not be registered. Finally, Section 4(2) of the 1933 act exempts from registration "transactions by an issuer not involving any public offering." At the same time, the 1933 act does not provide specific guidelines to identify what is a private offering or placement.

In 1982, the SEC adopted Regulation D, which sets forth the guidelines that determine if an issue is qualified for exemption from registration. The guidelines require that, in general, the securities cannot be offered through any form of general advertising or general solicitation that would prevail for public offerings. Most importantly, the guidelines restrict the sale of securities to "sophisticated" investors. Such "accredited" investors are defined as those who (1) have the capability to evaluate (or who can afford to employ an advisor to evaluate) the risk and return characteristics of the securities, and (2) have the resources to bear the economic risks.[11]

The exemption of an offering does not mean that the issuer need not disclose information to potential investors. In fact, the issuer must still furnish the same information deemed

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[10] For a further discussion of why the size of the discount and dilution is relevant for the welfare of the stockholders and the factors that will affect the success of a rights offering, see Frank J. Fabozzi and Franco Modigliani, *Capital Markets: Institutions and Instruments* (Englewood Cliffs, N.J.: Prentice Hall, 1996), pp. 133–136.

[11] Under the current law, an accredited investor is one who satisfies either a net worth test (at least $1 million excluding automobiles, home, and home furnishings) or an annual income test (at least $200,000 for a single individual, $300,000 for a couple for the past two years, with expectations of such income to continue for the current year).

material by the SEC. The issuer supplies this information in a private placement memorandum, as opposed to a prospectus for a public offering. The distinction between the private placement memorandum and the prospectus is that the former does not include information deemed by the SEC "nonmaterial," if such information is required in a prospectus. Moreover, unlike a prospectus, the private placement memorandum is not subject to SEC review.

Investment banking firms assist in the private placement of securities in several ways. They work with the issuer and potential investors on the design and pricing of the security. Often, it has been in the private placement market that investment bankers first design new security structures. Field testing of many of the innovative securities that we describe in this book occurred in the private placement market.

The investment bankers may be involved with lining up the investors as well as designing the issue. Or, if the issuer has already identified the investors, the investment banker may serve only in an advisory capacity. An investment banker can also participate in the transaction on a best efforts underwriting arrangement.

Rule 144A

In the United States, one restriction imposed on buyers of privately placed securities is that they may not be resold for two years after acquisition. Thus, there is no liquidity in the market for that time period. Buyers of privately placed securities must be compensated for the lack of liquidity, which raises the cost to the issuer of the securities.

In April 1990, however, SEC Rule 144A became effective. This rule eliminates the two-year holding period by permitting large institutions to trade securities acquired in a private placement among themselves without having to register these securities with the SEC.

Private placements are now classified as Rule 144A offerings or non–Rule 144A offerings. The latter are more commonly referred to as traditional private placements. Rule 144A offerings are underwritten by investment bankers.

Rule 144A encourages non–U.S. corporations to issue securities in the U.S. private placement market for two reasons. First, it will attract new large institutional investors into the market that were unwilling previously to buy private placements because of the requirement to hold the securities for two years. Such an increase in the number of institutional investors may encourage non–U.S. entities to issue securities. Second, foreign entities were unwilling to raise funds in the United States prior to establishment of Rule 144A because they had to register their securities and furnish the necessary disclosure set forth by U.S. securities laws. Private placement requires less disclosure. Rule 144A also improves liquidity, reducing the cost of raising funds.

Key Points That You Should Understand Before Proceeding

1. A private placement is the distribution of shares to a limited number of institutional investors rather than through a public offering.
2. The SEC specifies the conditions that must be satisfied to qualify for a private placement.
3. Investment bankers will typically work with issuers in the design of a security for a private placement and line up the potential investors.
4. SEC Rule 144A improves the liquidity of securities acquired by certain institutional investors in a private placement.

SUMMARY

The primary market involves the distribution to investors of newly issued securities. Investment bankers perform one or more of three functions: (1) advising the issuer on the terms and the timing of the offering, (2) buying the securities from the issuer, and (3) distributing the issue to investors. The second function is referred to as the underwriting function. Investment banking activities are performed by commercial banks and securities houses.

The SEC is responsible for regulating the issuance of new securities, with the major provisions set forth in the Securities Act of 1933. The act requires that the issuer file a registration statement for approval by the SEC. Rule 415, the shelf registration rule, permits certain issuers to file a single registration document indicating that they intend to sell a certain amount of a certain class of securities at one or more times within the next two years.

Variations in the underwriting process include the bought deal for the underwriting of bonds, the auction process for both stocks and bonds, and a rights offering coupled with a standby arrangement for underwriting common stock.

A private placement is different from the public offering of securities in terms of the regulatory requirements that must be satisfied by the issuer. If an issue qualifies as a private placement, it is exempt from the more complex registration requirements imposed on public offerings. Rule 144A has contributed to the growth of the private placement market by improving the liquidity of securities issued in this market.

KEY TERMS

- Best efforts
- Bought deal
- Competitive bidding underwriting
- Due diligence
- Dutch auction
- Firm commitment
- Gross spread (underwriter discount)
- Initial public offering (IPO)
- Investment bankers
- Preemptive rights offering
- Primary market
- Private placement
- Prospectus
- Red herring
- Registration statement
- Rule 144A
- Secondary common stock offering
- Selling group
- Shelf registration rule
- Standby fee
- Standby underwriting arrangement
- Syndicate
- Underwriting
- Underwriter discount
- Waiting period

QUESTIONS

1. a. What are the three ways in which an investment banking firm may be involved in the issuance of a new security?
   b. What is meant by the underwriting function?
2. What is the difference between a firm commitment underwriting arrangement and a best efforts arrangement?
3. a. What is meant by a bought deal?
   b. Why do bought deals expose investment banking firms to greater capital risk than traditional underwriting?
4. A corporation is issuing a bond on a competitive bidding basis. The corporation has indicated that it will issue $200 million of an issue. The following

yield bids and the corresponding amounts were submitted:

Bidder	Amount (in millions)	Bid
A	$20	7.4%
B	40	7.5
C	10	7.5
D	50	7.5
E	40	7.6
F	20	7.6
G	10	7.7
H	10	7.7
I	20	7.8
J	25	7.9
K	28	7.9
L	20	8.0
M	18	8.1

a. Who are the winning bidders?
b. How much of the security will be allocated to each winning bidder?
c. If this auction is a single-price auction, at what yield will each winning bidder be awarded the security?
d. If this auction is a multiple-price auction, at what yield will each winning bidder be awarded the security?

a. What is a preemptive right?
b. What is a preemptive rights offering?
c. Is a preemptive rights offering common in the United States?

6. The market price of the stock of the Bernstein Corporation is $50 per share and there are one million shares outstanding. Suppose that the management of this corporation is considering a rights offering in connection with the issuance of 500,000 new shares. Each current shareholder would receive one right for every two shares owned. The terms of the rights offering are as follows: For two rights and $30 (the subscription price), a new share can be acquired.
   a. What would the share price be after the rights offering?
   b. What is the value of one right?
   c. Demonstrate the effect on the economic well-being of the initial shareholders as a result of the rights offering.
7. What is a registration statement?
8. What is meant by the waiting period?
9. An underwriter is responsible for performing due diligence before offering a security to investors. What does due diligence mean?
10. The following statements come from the December 24, 1990, issue of *Corporate Financing Week*:

> As in the public market, growth in the private placement market was slowed this year by a rise in interest rates that pushed many issuers to the sidelines, by the Mideast crisis and by a flight to quality by investors. . . . Foreign private placements saw a marked increase due to Rule 144A.

a. What are the key distinctions between a private placement and a public offering?
b. What is Rule 144A?
c. Why do you think Rule 144A has increased foreign private placements?

Secondary Markets

14 of *Foundations of Financial Markets and Institutions*, 4/e. Frank J. Fabozzi. Franco Modigliani. Frank J. Jones.
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Secondary Market

LEARNING OBJECTIVES

After reading this chapter, you will understand

- the definition of a secondary market
- the need for secondary markets for financial assets
- the difference between a continuous and a call market
- the requirements of a perfect market
- frictions that cause actual financial markets to differ from a perfect market
- why brokers are necessary
- the role of a dealer as a market maker and the costs associated with market making
- what is meant by the operational efficiency of a market
- what is meant by the pricing efficiency of a market
- the implications of pricing efficiency
- the different forms of pricing efficiency
- the implications of pricing efficiency for market participants

Financial markets can be divided into primary and secondary markets. It is in the secondary market where already issued financial assets are traded. The key distinction between a primary market and a secondary market is that, in the secondary market, the issuer of the asset does not receive funds from the buyer. Rather, the existing issue changes hands in the secondary market, and funds flow from the buyer of the asset to the seller.

In this chapter, we explain the various features of secondary markets. These features are common to the trading of any type of financial instrument. We take a closer look at individual markets in later chapters.

FUNCTION OF SECONDARY MARKETS

It is worthwhile to review once again the function of secondary markets. In the secondary market, an issuer of securities—whether it is a corporation or a governmental unit—may obtain regular information about the value of the asset. The periodic trading of the asset reveals to the issuer the consensus price that the asset commands in an open market. Thus, firms can discover what value investors attach to their stocks, and firms or noncorporate issuers can observe the prices of their bonds and the implied interest rates investors expect and demand from them. Such information helps issuers assess how well they are using the funds acquired from earlier primary market activities, and it also indicates how receptive investors would be to new offerings. The other service that a secondary market offers issuers is the opportunity for the original buyer of an asset to reverse the investment by selling it for cash. Unless investors are confident that they can shift from one financial asset to another as they may feel necessary, they would naturally be reluctant to buy any financial asset. Such reluctance would harm potential issuers in one of two ways: Either issuers would be unable to sell new securities at all, or they would have to pay a higher rate of return, as investors would increase the discount rate in compensation for expected illiquidity in the securities.

Investors in financial assets receive several benefits from a secondary market. Such a market obviously offers them liquidity for their assets as well as information about the assets' fair or consensus values. Furthermore, secondary markets bring together many interested parties and, thereby, reduce the costs of searching for likely buyers and sellers of assets. Moreover, by accommodating many trades, secondary markets keep the cost of transactions low. By keeping the costs of both searching and transacting low, secondary markets encourage investors to purchase financial assets.

Key Points That You Should Understand Before Proceeding

1. Secondary markets help the issuer of securities to track their values and required returns.
2. Secondary markets benefit investors by providing liquidity.

TRADING LOCATIONS

One indication of the usefulness of secondary markets is that they exist throughout the world. Here, we give just a few examples of these markets.

In the United States, secondary trading of common stock occurs in a number of trading locations. Many shares are traded on major national **stock exchanges** (the largest of which is the New York Stock Exchange) and regional stock exchanges, which are organized and somewhat regulated markets in specific geographical locations. Additional significant trading in stock takes place on the so-called **over-the-counter (OTC) market**, which is a geographically dispersed group of traders linked to one another via telecommunication systems. The dominant OTC market for stocks in the United States is Nasdaq. Some bonds are

traded on exchanges, but most trading in bonds in the United States and throughout the world occurs in the OTC market.

MARKET STRUCTURES

Many secondary markets are **continuous markets**, which means that prices are determined continuously throughout the trading day as buyers and sellers submit orders. For example, given the order flow at 10:00 A.M., the market clearing price of a stock on some organized stock exchange may be $70; at 11:00 A.M. of the same trading day, the market-clearing price of the same stock, but with different order flows, may be $70.75. Thus, in a continuous market, prices may vary with the pattern of orders reaching the market and not because of any change in the basic situation of supply and demand. We will return to this point later.

A contrasting market structure is the **call market**, in which orders are batched or grouped together for simultaneous execution at the same price. That is, at certain times in the trading day (or possibly more than once in a day), a market maker holds an auction for a stock. The auction may be oral or written. In either case, the auction will determine or fix[1] the market clearing price at a particular time of the trading day.

Key Points That You Should Understand Before Proceeding

1. The basic features of the call method of trading.
2. What a continuous market is.
3. Some markets conduct the day's initial trades with a call method and most other trades in a continuous way.

PERFECT MARKETS

In order to explain the characteristics of secondary markets, we first describe a perfect market for a financial asset. Then, we can show how common occurrences in real markets keep them from being theoretically perfect.

In general, a perfect market results when the number of buyers and sellers is sufficiently large, and all participants are small enough relative to the market so that no individual market agent can influence the commodity's price. Consequently, all buyers and sellers are price-takers, and the market price is determined where there is equality of supply and demand. This condition is more likely to be satisfied if the commodity traded is fairly homogeneous (for example, corn or wheat). But a market is not perfect only because market agents are price-takers. A perfect market is also free of transactions costs and any impediment to the interaction of supply and demand for the commodity. Economists refer to these various costs and impediments as **frictions**. The costs associated with frictions generally result in buyers paying more than in the absence of frictions and/or in sellers receiving less.

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[1] This use of the word fix is traditional, and not pejorative or suggestive of illegal activity. For example, the *Financial Times* reports on the activities of the London gold bullion market, which is a call market, and records prices set at the "morning fix" and the "afternoon fix." These fixes take place at the two call auctions, which are held daily.

In the case of financial markets, frictions would include:

- commissions charged by brokers
- bid–ask spreads charged by dealers
- order handling and clearance charges
- taxes (notably on capital gains) and government-imposed transfer fees
- costs of acquiring information about the financial asset
- trading restrictions, such as exchange-imposed restrictions on the size of a position in the financial asset that a buyer or seller may take
- restrictions on market makers
- halts to trading that may be imposed by regulators where the financial asset is traded

An investor who expects that the price of a security will increase can benefit from buying that security. However, suppose that an investor expects that the price of a security will decline and wants to benefit should the price actually decline. What can the investor do? The investor may be able to sell the security without owning it. How can this happen? There are various institutional arrangements that allow an investor to borrow securities so that the borrowed security can be delivered to satisfy the sale.

This practice of selling securities that are not owned at the time of sale is referred to as *selling short*. The security is purchased subsequently by the investor and returned to the party that lent it. In this way, the investor covers a short position. A profit will be realized if the purchase price is less than the price at which the issuer sold short the security.

The ability of investors to sell short is an important mechanism in financial markets. In the absence of an effective short-selling mechanism, security prices will tend to be biased toward the view of more optimistic investors, causing a market to depart from the standards of a perfect price-setting situation. In fact, many large and developed securities markets allow short selling, although regulatory bodies tend to monitor this practice more closely than other features of markets. Nonetheless, the prevalence of short selling is clear evidence of its usefulness to the price-setting function of securities markets.

Key Points That You Should Understand Before Proceeding

1. A market can be perfect, in a theoretical sense, only if it meets many conditions regarding number of participants, flow of information, freedom from regulation, and freedom from costs that hinder trading.
2. Market imperfections are called frictions.
3. A perfect market must also permit short selling, which is the sale of borrowed securities.

ROLE OF BROKERS AND DEALERS IN REAL MARKETS

Common occurrences in real markets keep them from meeting the theoretical standards of being perfect. Because of these occurrences, **brokers** and dealers are necessary to the smooth functioning of a secondary market.

Brokers

One way in which a real market might not meet all the exacting standards of a theoretically perfect market is that many investors may not be present at all times in the marketplace. Furthermore, a typical investor may not be skilled in the art of the deal or completely

informed about every facet of trading in the asset. Clearly, most investors in even smoothly functioning markets need professional assistance. Investors need someone to receive and keep track of their orders for buying or selling, to find other parties wishing to sell or buy, to negotiate for good prices, to serve as a focal point for trading, and to execute the orders. The broker performs all these functions. Obviously, these functions are more important for the complicated trades, such as the small or large trades, than for simple transactions or those of typical size.

A broker is an entity that acts on behalf of an investor who wishes to execute orders. In economic and legal terms, a broker is said to be an *agent* of the investor. It is important to realize that the brokerage activity does not require the broker to buy and sell or hold in inventory the financial asset that is the subject of the trade. (Such activity is termed *taking a position* in the asset, and it is the role of the dealer, another important financial market participant discussed in the following text.) Rather, the broker receives, transmits, and executes investors' orders with other investors. The broker receives an explicit commission for these services, and the commission is a *transactions cost* of the securities markets. If the broker also provides other services, such as research, recordkeeping, or advising, investors may pay additional charges.

Dealers as Market Makers

A real market might also differ from the perfect market because of the possibly frequent event of a temporary imbalance in the number of buy and sell orders that investors may place for any security at any one time. Such unmatched or unbalanced flow causes two problems. One is that the security's price may change abruptly, even if there has been no shift in either supply or demand for the security. Another problem is that buyers may have to pay higher than market-clearing prices (or sellers accept lower ones) if they want to make their trade immediately.

An example can illustrate these points. Suppose that the consensus price for ABC security is $50, which was determined in several recent trades. Now, suppose that a flow of buy orders from investors who suddenly have cash arrives in the market, but there is no accompanying supply of sell orders. This temporary imbalance could be sufficient to push the price of ABC security to, say, $55. Thus, the price has changed sharply even though there has been no change in any fundamental financial aspect of the issuer. Buyers who want to buy immediately must pay $55 rather than $50, and this difference can be viewed as the price of **immediacy**. By immediacy, we mean that buyers and sellers do not want to wait for the arrival of sufficient orders on the other side of the trade, which would bring the price closer to the level of recent transactions.

The fact of imbalances explains the need for the dealer or market maker, who stands ready and willing to buy a financial asset for its own account (to add to an inventory of the financial asset) or sell from its own account (to reduce the inventory of the financial asset). At a given time, dealers are willing to buy a financial asset at a price (the bid price) that is less than what they are willing to sell the same financial asset for (the ask price).

In the 1960s, two economists, George Stigler[2] and Harold Demsetz,[3] analyzed the role of dealers in securities markets. They viewed dealers as the suppliers of immediacy—the

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[2] George Stigler, "Public Regulation of Securities Markets," *Journal of Business* (April 1964), pp. 117–134.
[3] Harold Demsetz, "The Cost of Transacting," *Quarterly Journal of Economics* (October 1968), pp. 35–36.

ability to trade promptly—to the market. The bid–ask spread can be viewed in turn as the price charged by dealers for supplying immediacy together with short-run price stability (continuity or smoothness) in the presence of short-term order imbalances. There are two other roles that dealers play: providing reliable price information to market participants, and, in certain market structures, providing the services of an auctioneer in bringing order and fairness to a market.[4]

The price stabilization role follows from our earlier example of what may happen to the price of a particular transaction in the absence of any intervention when there is a temporary imbalance of orders. By taking the opposite side of a trade when there are no other orders, the dealer prevents the price from materially diverging from the price at which a recent trade was consummated.

Investors are concerned not only with immediacy, but also with being able to trade at prices that are reasonable, given prevailing conditions in the market. While dealers do not know with certainty the true price of a security, they do have a privileged position in some market structures with respect not just to the flow of market orders but also to **limit orders**, which are special orders that can be executed only if the market price of the asset changes in a specified way. For example, the dealers of the organized markets, called *specialists*, have just such a privileged position from which they get special information about the flow of market orders.

Finally, the dealer acts as an auctioneer in some market structures, thereby providing order and fairness in the operations of the market. For example, the market maker on organized stock exchanges in the United States performs this function by organizing trading to make sure that the exchange rules for the priority of trading are followed. The role of a market maker in a call market structure is that of an auctioneer. The market maker does not take a position in the traded asset, as a dealer does in a continuous market.

What factors determine the price dealers should charge for the services they provide? Or equivalently, what factors determine the *bid–ask spread*? One of the most important is the order processing costs incurred by dealers. The costs of equipment necessary to do business and a dealer's administrative and operations staff are examples. The lower these costs, the narrower the bid–ask spread. With the reduced cost of computing and better-trained personnel, these costs have declined since the 1960s.

Dealers also have to be compensated for bearing risk. A **dealer's position** may involve carrying inventory of a security (a *long position*) or selling a security that is not in inventory (a *short position*). There are three types of risks associated with maintaining a long or short position in a given security. First, there is the uncertainty about the future price of the security. A dealer who has a net long position in the security is concerned that the price will decline in the future; a dealer who is in a net short position is concerned that the price will rise.

The second type of risk has to do with the expected time it will take the dealer to unwind a position and its uncertainty. And this, in turn, depends primarily on the thickness of the market for the security. Finally, while a dealer may have access to better information about order flows than the general public, there are some trades where the dealer takes the risk of trading with someone who has better information.[5] This results in the better-informed

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[4] For a more detailed discussion, see Chapter 1 in Robert A. Schwartz, *Equity Markets: Structure, Trading, and Performance* (New York: Harper & Row Publishers, 1988), pp. 389–397.

[5] Walter Bagehot, "The Only Game in Town," *Financial Analysts Journal* (March–April 1971), pp. 12–14, 22.

trader obtaining a better price at the expense of the dealer. Consequently, a dealer in establishing the bid–ask spread for a trade will assess whether or not the trader might have better information.[6]

Key Points That You Should Understand Before Proceeding

1. The relationship between a broker and an investor.
2. How a dealer makes a profit when making a market.
3. The benefits that a market derives from the actions of dealers.

MARKET EFFICIENCY

The term *efficient* capital market has been used in several contexts to describe the operating characteristics of a capital market. There is a distinction, however, between an **operationally (or internally) efficient market** and a **pricing (or externally) efficient capital market.**[7]

Operational Efficiency

In an operationally efficient market, investors can obtain transaction services as cheaply as possible, given the costs associated with furnishing those services. For example, in national equity markets throughout the world the degree of operational efficiency varies. At one time, brokerage commissions in the United States were fixed, and the brokerage industry charged high fees and functioned poorly. But that began to change in May 1975, as the American exchanges adopted a system of competitive and negotiated commissions. Non–U.S. markets have been moving toward more competitive brokerage fees. France, for example, adopted a system of negotiated commissions for large trades in 1985. In its "Big Bang" of 1986, the London Stock Exchange abolished fixed commissions. The Japanese version of the Big Bang began during 1996. One of its many goals was the liberalization of commissions.

Commissions are only part of the cost of transacting, as we noted above. The other part is the dealer spread. The minimum bid–offer spreads in the stock market have declined significantly in recent years. The minimum spread was one-eighths ("eighths") until 1997, a vestige of the early days of stock trading. The NYSE and other markets began trading in one-sixteenths ("teenies") on June 24, 1997. Effective August 24, 2000, the minimum spread was reduced to one cent ("decimals"), with trades on all stocks in decimals beginning on August 9, 2001. Bid–offer spreads for bonds vary by type of bond. For example, the bid–ask spread on U.S. Treasury securities is much smaller than for other bonds such as mortgage-backed bonds and derivative mortgage-backed instruments, which are key topics in later chapters. Even within the U.S. Treasury securities market, certain issues have a narrower bid–ask spread than other issues.

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[6] Some trades can be viewed as informationless trades. This means that the dealer knows or believes that a trade is being requested to accomplish an investment objective that is not motivated by the potential future price movement of the security.

[7] Richard R. West, "Two Kinds of Market Efficiency," *Financial Analysts Journal* (November–December 1975), pp. 30–34.

Pricing Efficiency

Pricing efficiency refers to a market where prices at all times fully reflect all available information that is relevant to the valuation of securities. That is, investors quickly adjust the demand and supply schedules for a security when new information about it becomes available, and those actions quickly impound the information into the price of the security.

A price efficient market has implications for the investment strategy that investors may wish to pursue. There are various active strategies employed by investors. In an active strategy, investors seek to capitalize on what they perceive to be the mispricing of a security or securities. In a market that is price efficient, active strategies will not consistently generate a return after taking into consideration transactions costs and the risks associated with a strategy of frequent trading. The other strategy, in a market which seems to be price efficient, is simply to buy and hold a broad cross section of securities in the market. Some investors pursue this strategy through **indexing**, which is a policy that has the goal of matching the performance of some financial index from the market. It is in this market where the greatest amount of empirical evidence exists.

Key Points That You Should Understand Before Proceeding

1. What makes a market operationally or internally efficient.
2. The key characteristic of a market that has pricing or external efficiency.

ELECTRONIC TRADING

Historically, financial markets had physical locations where buyers and sellers (or their agents) met and negotiated the price of a security. Today, information technology has removed the necessity for a physical location and allowed the creation of a virtual marketplace. Electronic trading of stocks, bonds, and derivatives continues to replace physical markets. Here, we describe electronic bond trading.

Electronic Bond Trading

Traditionally, bond trading has been based on broker-dealer trading desks, which take principal positions to fill customer buy and sell orders. In recent years, however, there has been an evolution away from traditional bond trading toward electronic trading. This evolution toward electronic trading is likely to continue.

There are several related reasons for the transition to the electronic trading of bonds. Because the bond business has been a principal rather than an agency business, the capital of the market makers is critical. Whereas the amount of capital of the broker-dealers has increased during the past several years, the amount of capital of U.S. institutional investors (pension funds, mutual funds, insurance companies, and commercial banks) and international customers has increased much more, and the size of the orders has increased significantly. As a result, making markets in bonds has become more risky for the market makers.

In addition, the increase in the volatility of bond markets has increased the capital required of bond broker-dealers. Finally, the profitability of bond market making has

declined since many of the products have become more commodity-like and their bid–offer spreads have decreased.

The combination of the increased risk and the decreased profitability of bond market making has induced the major market markets to deemphasize this business in the allocation of capital. Broker-dealer firms have determined that it is more efficient to employ their capital in other activities such as underwriting, asset management, and other agency-type brokerage businesses than in principal-type market-making businesses. As a result, the liquidity of the traditionally principal-oriented bond markets has declined, and this decline in liquidity has opened the way for other market-making mechanisms.

This retreat by traditional market-making firms opened the door for electronic trading. In fact, as indicated below, the same Wall Street firms that have been the major market makers in bonds have also been the supporters of electronic trading in bonds.

Electronic trading in bonds has helped fill this developing vacuum and provided liquidity to the bond markets. The growth of electronic trading will necessarily continue. Among the overall advantages of electronic trading are (1) providing liquidity to the markets, (2) price discovery (particularly for less liquid markets), (3) utilization of new technologies, and (4) trading and portfolio management efficiencies. As an example of the last advantage, portfolio managers can load their buy/sell orders onto a website, trade from these orders, and then clear these orders.

There are a variety of types of electronic trading systems for bonds. The two major types of electronic trading systems are the *dealer-to-customer systems* and the *exchange systems.*

Dealer-to-customer systems can be a *single-dealer system* or *multiple-dealer system.* Single-dealer systems are based on a customer dealing with a single, identified dealer over the computer. The single-dealer system simply computerizes the traditional customer–dealer market making mechanism. Multi-dealer systems provide some advancement over the single-dealer method. A customer can select from any of several identified dealers whose bids and offers are provided on a computer screen. The customer knows the identity of the dealer and the transaction is cleared through the dealer's procedures.

The exchange system is quite different and has potentially significantly greater value added. According to the exchange system, dealer and customer bids and offers are entered into the system on an anonymous basis, and the clearing of the executed trades is done through a common process. As a result, a common clearinghouse and common membership criteria based on the credit acceptability of the members have to be developed. This mechanism requires a much more onerous structure than the dealer-to-customer systems. Although there is a common clearinghouse for common stocks (Depository Trust Company [DTC]), there is none for bonds. Thus, the development of an open architecture system for bonds will be more difficult than for stocks.

Two different major types of exchange systems are those based on continuous trading and call auctions, described previously in this chapter. Continuous trading permits trading at continuously changing market determined prices throughout the day and is appropriate for liquid bonds, such as Treasury and agency securities. Call auctions provide for fixed price auctions (that is, all the transactions or exchanges occur at the same "fixed" price) at specific times during the day and are appropriate for less liquid bonds such as corporate bonds and municipal bonds. Table 1 summarizes the major issues in electronic bond trading.

There are currently three active multiple-dealer-to-customer systems: TradeWeb, MarketAxess, and Bloomberg.

pp. 30–34.

	Dealer to Customer—Multiple Dealer	Exchange Systems
Characteristics	Customer and dealer know the identity of the counterparty	Counterparties are anonymous
	Clearing through specific dealer's clearing system	Common clearing through same system
	Counterparty credit determined by individual broker-dealer and customer	Counterparty credit determined by common clearing organization
	Large trades done as block trades through individual dealers	Large trades done as block trades through individual dealers
Typical products	Liquid, tradable type products: Treasuries, agencies, and MBS	Inventory-type products: CMOs, ABS, corporate bonds, municipal bonds, other less liquid products
Examples	TradeWeb (Sponsors: CSFB, Goldman Sachs, Salomon Smith Barney, Merrill Lynch, Morgan Stanley Dean Witter, Bloomberg, and MarketAxess)	None currently

SUMMARY

A secondary market in financial assets is one where existing or outstanding assets are traded among investors. A secondary market serves several needs of the firm or governmental unit that issues securities in the primary market. The secondary market provides the issuer with regular information about the value of its outstanding stocks or bonds, and it encourages investors to buy securities from issuers because it offers them an ongoing opportunity for liquidating their investments in securities.

Investors also get services from the secondary market: The market supplies them with liquidity and prices for the assets they are holding or want to buy, and the market brings interested investors together, thereby reducing the costs of searching for other parties and of making trades.

Secondary markets for financial securities exist around the world. Such markets may be continuous, where trading and price determination go on throughout the day as orders to buy and sell reach the market. Some markets are call markets: Prices are determined by executions of batched or grouped orders to buy and sell at a specific time (or times) within the trading day. Some secondary markets combine features of call and continuous trading.

Even the most developed and smoothly functioning secondary market falls short of being perfect in the economically theoretical meaning of the term. Actual markets tend to have numerous frictions that affect prices and investors' behavior. Some key frictions are transactions costs, which include commissions, fees, and execution costs.

Because of imperfections in actual markets, investors need the services of two types of market participants: dealers and brokers. Brokers aid investors by collecting and transmitting orders to the market, by bringing willing buyers and sellers together, by negotiating prices, and by executing orders. The fee for these services is the broker's commission.

Dealers perform three functions in markets: (1) They provide the opportunity for investors to trade immediately rather than waiting for the arrival of sufficient orders on the

other side of the trade (immediacy), and they do this while maintaining short-run price stability (continuity); (2) they offer price information to market participants; and (3) in certain market structures, dealers serve as auctioneers in bringing order and fairness to a market. Dealers buy for their own account and maintain inventories of assets, and their profits come from selling assets at higher prices than the prices at which they purchased them.

A market is operationally efficient if it offers investors reasonably priced services related to buying and selling. A market is price efficient if at all times prices fully reflect all available information that is relevant to the valuation of securities. In such a market, active strategies pursued will not consistently produce superior returns after adjusting for risk and transactions costs.

Electronic bond trading has improved the liquidity of the bond market, as the commitment to bond trading by dealers has not kept pace with the liquidity needs of institutional investors. The two major types of electronic trading systems are the dealer-to-customer systems (single- and multiple-dealer systems) and the *exchange systems*. In exchange systems, dealer and customer bids and offers are entered into the system on an anonymous basis, and the clearing of the executed trades is done through a common process. There are continuous trading and call auction exchange-trading systems.

KEY TERMS

- Active strategy
- Auctioneer
- Broker
- Call market
- Continuous market
- Dealer
- Dealer's position
- Fix
- Frictions
- Immediacy
- Indexing
- Limit order
- Operational (internal) efficient ma
- Over-the-counter (OTC) market
- Perfect market
- Pricing (external) efficient capital market
- Stock exchange

QUESTIONS

1. Consider two transactions. The Norwegian government sells bonds in the United States. The buyer of one of those bonds is an insurance company, which, after holding the bond for a year, sells it to a mutual fund. Which of these transactions occurs in the primary market and which in the secondary market? Does the Norwegian government get any proceeds from the sale between the insurance company and the mutual fund?
2. Some years ago, Japan's four largest brokerage firms (Yamaichi Securities Co., Nomura Securities Co., Daiwa Securities Co., and Nikko Securities Co.) formally asked their government to lift bans that restrict their freedom to invest in stocks. One of those bans prevents a brokerage firm from trading for its own account (that is, buying and selling for itself rather than for clients) during certain times of the trading day. The other ban restricts a brokerage firm participating in more than 30% of the trading of any one stock within a month. Consider these restrictions in terms of the role of dealers in financial markets and the requirements for operational and price efficiency in a market. Do you think that lifting the restrictions would help the

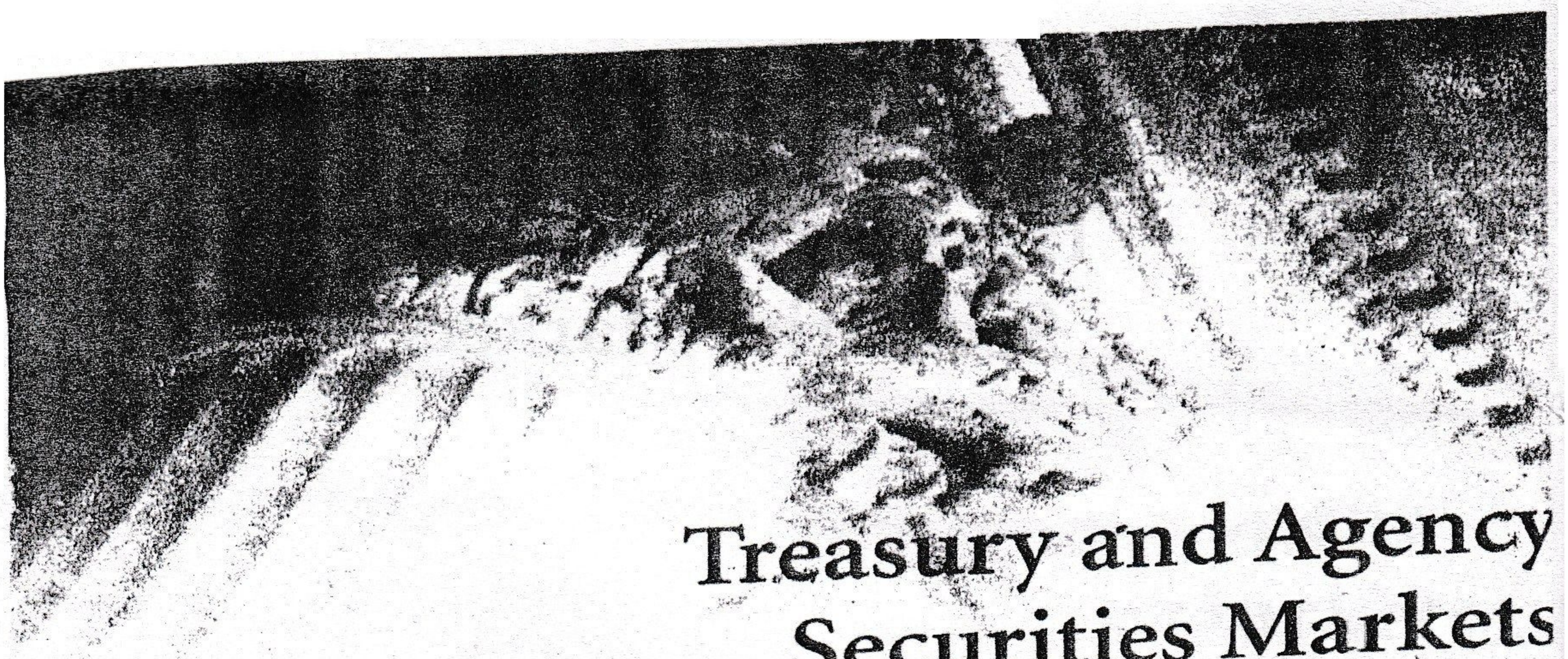
Tokyo Stock Exchange to be more efficient with regard to price and operations?

3. The residential real estate market boasts many brokers but very few dealers. What explains this situation?
4. Some years ago, legislators in a state claimed that speculation on land was driving prices to too high a level. They proposed to pass a law that would require the buyer of any piece of land in the state to hold the land for at least three years before he or she could resell it.
   a. Analyze this proposal in terms of perfect markets and possible frictions that have been described in this chapter.
   b. If that proposal had passed, do you think land prices would have risen or fallen?
5. What is meant by the statement that "dealers offer both immediacy and price continuity to investors"?
6. In 1990, a trader on the Paris *Bourse* claimed to one of the authors of this book that "now, we are just like New York; everything is continuous." Do you think that the *Bourse*'s change from a call market to a continuous market, which took place in the 1980s, could have improved either price or operational efficiency in that market enough to warrant this assertion?
7. If a security is highly liquid, explain whether it would be more advantageous to develop a trading system with continuous trading or call auction.
8. Outline the problems associated with fixed brokerage commissions.
9. Indicate whether or not you agree with the following statement: "The minimum bid-offer spread on common stock is in terms of one-eighths."
10. Assume that UND stock normally has a bid–offer spread of three-eighths, or $0.375. What do you think would happen to that spread on a day when the stock market begins to fall very sharply? Explain your answer. Also, what would happen to the spread if the company announced that it was buying back 20% of its outstanding shares and would complete that repurchase within three months? Explain your view.
11. Suppose the federal government imposed a tax of $0.10 on each stock-buying transaction. Would stock prices in general rise or fall on such news? Explain your answer.
12. What are the reasons for the development of electronic bond trading?

B.Fabozzi 4th-20(A)

Treasury and Agency Securities Markets

From Chapter 15 of *Foundations of Financial Markets and Institutions*, 4/e. Frank J. Fabozzi. Franco Modigliani. Frank J. Jones.
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Treasury and Agency Securities Markets

LEARNING OBJECTIVES

After reading this chapter, you will understand

- the importance of the Treasury market
- the different types of securities issued by the Treasury
- the operation of the primary market for Treasury securities
- the role of government dealers and government brokers
- the secondary market for Treasury securities
- how Treasury securities are quoted in the secondary market
- how government dealers use the repurchase agreement market
- the zero-coupon Treasury securities market
- the difference between government-owned corporations and government-sponsored enterprises
- the major issuers in the federal agency securities market
- non–U.S. government bond markets

Treasury securities are issued by the U.S. Department of the Treasury and are backed by the full faith and credit of the U.S. government. Consequently, market participants view them as having no credit risk. Historically, interest rates on Treasury securities have been the benchmark interest rates throughout the U.S. economy. At the end of this chapter, we discuss non–U.S. government bond markets.

MARKET FOR TREASURY SECURITIES[1]

Two factors account for the prominent role of U.S. Treasury securities: volume (in terms of dollars outstanding) and liquidity. The Department of the Treasury is the largest single issuer of debt in the world. The large volume of total debt and the large size of any single issue have contributed to making the Treasury market the most active and hence the most liquid market in the world. The spread between bid and ask prices is considerably narrower than in other sectors of the bond market, and most issues can be traded easily. Many issues in the corporate and municipal markets are illiquid by contrast and cannot be traded readily.

Treasury securities are available in book-entry form at the Federal Reserve Bank. This means that the investor receives only a receipt as evidence of ownership instead of an engraved certificate. An advantage of book-entry is ease in transferring ownership of the security. Interest income from Treasury securities is subject to federal income taxes but is exempt from state and local income taxes.

Types of Treasury Securities

There are two categories of government securities: **discount** and **coupon securities**. The fundamental difference between the two types lies in the form of the stream of payments that the holder receives, which is reflected in turn in the prices at which the securities are issued. Coupon securities pay interest every six months, plus principal at maturity. Discount securities pay only a contractually fixed amount at maturity, called maturity value or face value. Discount instruments are issued below maturity value, and return to the investor the difference between maturity value and issue price.

Current Treasury practice is to issue all securities with maturities of one year or less as discount securities. These securities are called **Treasury bills**. All securities with maturities of two years or longer are issued as coupon securities. Treasury coupon securities issued with original maturities between two and 10 years are called **Treasury notes**; those with original maturities greater than 10 years are called **Treasury bonds**. While there is therefore a distinction between Treasury notes and bonds, in this chapter we refer to both as simply Treasury bonds.

Treasury Inflation Protection Securities

On January 29, 1997, the U.S. Department of the Treasury issued for the first time Treasury securities that adjust for inflation. These securities are popularly referred to as **Treasury inflation protection securities (TIPS)**. (The Treasury refers to these securities as Treasury inflation indexed securities [TIIS].) The Treasury has issued TIPS that are notes and bonds. TIPS work as follows. The coupon rate on an issue is set at a fixed rate. That rate is determined via the auction process described later in this section. The coupon rate is called the "real rate" since it is the rate that the investor ultimately earns above the inflation rate. The inflation index that the government has decided to use for the inflation adjustment is the nonseasonally adjusted U.S. City Average All Items Consumer Price Index for All Urban Consumers (CPI-U).

The adjustment for inflation is as follows. The principal on which the Treasury Department will base both the dollar amount of the coupon payment and the maturity value is adjusted semiannually. This is called the inflation-adjusted principal. For example, suppose that the coupon rate for a TIPS is 3.5% and the annual inflation rate is 3%. Suppose further

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[1] Portions of this section are adapted from Chapter 3 in Frank J. Fabozzi, *Bond Portfolio Management* (New Hope, PA: Frank J. Fabozzi Associates, 2001) and in other published writings by Frank J. Fabozzi.

that an investor purchases on January 1 $100,000 of par value (principal) of this issue. The semiannual inflation rate is 1.5% (3% divided by 2). The inflation-adjusted principal at the end of the first six-month period is found by multiplying the original par value by the semiannual inflation rate. In our example, the inflation-adjusted principal at the end of the first six-month period is $101,500. It is this inflation-adjusted principal that is the basis for computing the coupon interest for the first six-month period. The coupon payment is then 1.75% (one-half the real rate of 3.5%) multiplied by the inflation-adjusted principal at the coupon payment date ($101,500). The coupon payment is, therefore, $1,776.25.

Let us look at the next six months. The inflation-adjusted principal at the beginning of the period is $101,500. Suppose that the semiannual inflation rate for the second six-month period is 1%. Then, the inflation-adjusted principal at the end of the second six-month period is the inflation-adjusted principal at the beginning of the six-month period ($101,500) increased by the semiannual inflation rate (1%). The adjustment to the principal is $1,015 (1% times $101,500). So, the inflation-adjusted principal at the end of the second six-month period (December 31 in our example) is $102,515 ($101,500 + $1,015). The coupon interest that will be paid to the investor at the second coupon payment date is found by multiplying the inflation-adjusted principal on the coupon payment date ($102,515) by one-half the real rate (i.e., one-half of 3.5%). That is, the coupon payment will be $1,794.01.

As can be seen, part of the adjustment for inflation comes in the coupon payment since it is based on the inflation-adjusted principal. However, the U.S. government has decided to tax the adjustment each year. This feature reduces the attractiveness of TIPS as an investment in the accounts of tax-paying entities.

Because of the possibility of disinflation (i.e., price declines), the inflation-adjusted principal at maturity may turn out to be less than the initial par value. However, the Treasury has structured TIPS so that they are redeemed at the greater of the inflation-adjusted principal and the initial par value.

An inflation-adjusted principal must be calculated for a settlement date. The inflation-adjusted principal is defined in terms of an index ratio, which is the ratio of the reference CPI for the settlement date to the reference CPI for the issue date. The reference CPI is calculated with a three-month lag. For example, the reference CPI for May 1 is the CPI-U reported in February. The U.S. Department of the Treasury publishes and makes available on its website (http://www.publicdebt.treas.gov) a daily index ratio for an issue.

The Primary Market

The primary market is the market for the issuance of newly issued Treasury securities.

Auction Cycles

The U.S. Department of the Treasury makes the determination of the procedure for auctioning new Treasury securities, when to auction them, and what maturities to issue. There have been occasional changes in the auction cycles and the maturity of the issues auctioned. Currently, there are weekly three-month and six-month bill auctions, and one-year bill auctions every four weeks. For coupon securities, there are monthly two-year note and five-year note auctions, and quarterly auctions for the 10-year note and 30-year bond (the "refunding" auction).[2]

[2] At one time, the U.S. Department of the Treasury offered three-year, four-year, and seven-year Treasury notes and 15-year and 20-year Treasury bonds.

On the announcement day, the Treasury announces the amount of each issue to be auctioned, the auction date, and maturities to be issued. Occasionally, an outstanding issue is reopened issue (that is, the amount of an outstanding note is increased) at an auction instead of a new issue auctioned. In recent years, the Department of the Treasury has reopened the ten-year note several times.

Determination of the Results of an Auction

The auction for Treasury securities is conducted on a competitive bidding basis. Competitive bids must be submitted on a yield basis. Noncompetitive tenders may also be submitted for up to a $1 million face amount. Such tenders are based only on quantity, not yield.

The auction results are determined by first deducting the total noncompetitive tenders and nonpublic purchases (such as purchases by the Federal Reserve itself) from the total securities being auctioned. The remainder is the amount to be awarded to the competitive bidders. The bids are then arranged from the lowest-yield bid to the highest-yield bid. This is equivalent to arranging the bids from the highest price to the lowest price. Starting from the lowest-yield bid, all competitive bids are accepted until the amount to be distributed to the competitive bidders is completely allocated. The highest yield accepted by the Treasury is referred to as the **stop yield**, and bidders at that yield are awarded a percentage of their total tender. Bidders higher in yield than the stop yield are not distributed any of the new issue. Such bidders are said to have "missed" or were "shut out."

At what yield is a winning bidder awarded the security? All U.S. Treasury auctions are single-price auctions. In a single-price auction, all bidders are awarded securities at the highest yield of accepted competitive tenders (i.e., the stop yield). This type of auction is called a "Dutch auction." Historically, the Treasury auctioned securities through multiple-price auctions. With multiple-price auctions, the Treasury still accepted the lowest-yielding bids up to the yield required to sell the amount offered (less the amount of noncompetitive bids), but accepted bids were awarded at the particular yields bid, rather than at the stop-out yield. In September 1992, the Treasury started conducting single-price auctions for the two- and five-year notes. In November 1998, the Treasury adopted the single-price method for all auctions.

Competitive bids must typically be submitted by 1:00 P.M. eastern time on the day of the auction. Noncompetitive bids must typically be submitted by noon on the day of the auction. The results of the auction are announced within an hour following the 1:00 P.M. auction deadline. When the results of the auction are announced, the Treasury provides the following information: the stop yield, the associated price, the proportion of securities awarded to those investors who bid exactly the stop yield, the quantity of noncompetitive tenders, the median yield bid, and the bid-to-cover ratio. The **bid-to-cover ratio** is the ratio of the total par amount of competitive and noncompetitive bids by the public divided by the total par amount of the securities awarded to the public. Some market observers consider this ratio to be an indicator of the bidding interest and, consequently, some barometer of the success of the auction. The higher the bid-to-cover ratio, the greater is the success of the auction.

Figure 1 shows the August 1, 2007, announcement by the U.S. Treasury of the August 2007 quarterly financing. The announcement explains that the U.S. Treasury is going to

Figure 1 Treasury Offering Announcement

DEPARTMENT OF THE TREASURY

TREASURY NEWS

OFFICE OF PUBLIC AFFAIRS • 1500 PENNSYLVANIA AVENUE, N.W. • WASHINGTON, D.C. • 20220 • (202) 622-2960

CONTACT: Office of Financing
202/504-3550

EMBARGOED UNTIL 9:00 A.M.
August 1, 2007

TREASURY AUGUST QUARTERLY FINANCING

The Treasury will auction $13,000 million of 10-year notes and $9,000 million of 29-year 9-month bonds to refund $62,639 million of publicly held securities maturing on August 15, 2007, and to pay down approximately $40,639 million.

Tenders for 29-year 9-month Treasury bonds to be held on the book-entry records of Legacy Treasury Direct will not be accepted. However, tenders for 29-year 9-month Treasury bonds to be held on the book-entry records of TreasuryDirect will be accepted.

In addition to the public holdings, Federal Reserve Banks, for their own accounts, hold $13,082 million of the maturing securities, which may be refunded by issuing additional amounts of the new securities.

Up to $1,000 million in noncompetitive bids from Foreign and International Monetary Authority (FIMA) accounts bidding through the Federal Reserve Bank of New York will be included within the offering amount of each auction. These noncompetitive bids will have a limit of $100 million per account and will be accepted in the order of smallest to largest, up to the aggregate award limit of $1,000 million.

Treasury Direct customers have scheduled purchases of approximately $112 million into the 10-year note.

The auctions being announced today will be conducted in the single-price auction format. All competitive and noncompetitive awards will be at the highest yield of accepted competitive tenders. The allocation percentage applied to bids awarded at the highest yield will be rounded up to the next hundredth of a whole percentage point, e.g., 17.13%.

The securities being offered today are eligible for the STRIPS program.

This offering of Treasury securities is governed by the terms and conditions set forth in the Uniform Offering Circular for the Sale and Issue of Marketable Book-Entry Treasury Bills, Notes, and Bonds (31 CFR Part 356, as amended).

Details about the securities are given in the attached offering highlights.

oOo

Attachment

(Continued)

HIGHLIGHTS OF TREASURY OFFERINGS TO THE PUBLIC
AUGUST 2007 QUARTERLY FINANCING

August 1, 2007

Offering Amount	$13,000 million	$9,000 million
Maximum Award (35% of Offering Amount)	$ 4,550 million	$3,150 million
Maximum Recognized Bid at a Single Yield	$ 4,550 million	$3,150 million
NLP Reporting Threshold	$ 4,550 million	$3,150 million
Description of Offering:		
Term and type of security	10-year notes	29-year 9-month bonds
Series	E-2017	Bonds of May 2037
CUSIP number	912828 HA 1	912810 PU 6
Auction date	August 8, 2007	August 9, 2007
Issue date	August 15, 2007	August 15, 2007
Dated date	August 15, 2007	May 15, 2007
Maturity date	August 15, 2017	May 15, 2037
Interest rate	Determined based on the highest accepted competitive bid	Determined based on the highest accepted competitive bid
Yield	Determined at auction	Determined at auction
Interest payment dates	February 15 and August 15	November 15 and May 15
Minimum bid amount and multiples	$1,000	$1,000
Accrued interest payable by investor	None	Determined at auction
Premium or discount	Determined at auction	Determined at auction
STRIPS Information:		
Minimum amount required	$1,000	$1,000
Corpus CUSIP number	912820 PX 9	912803 DA 8
Due date(s) and CUSIP number(s) for additional TINT(s)	Not applicable	See chart below

29-year 9-month bond due dates and CUSIP numbers for additional TINTS:

	May 15	November 15
2030	---	912833 7N 4
2031	912833 7P 9	912833 7Q 7
2032	912833 7R 5	912833 7S 3
2033	912833 7T 1	912833 7U 8
2034	912833 7V 6	912833 7W 4
2035	912833 X8 8	912833 X9 6
2036	912833 Y2 0	912833 Y3 8
2037	912833 Y4 6	---

The following rules apply to all securities mentioned above:

Submission of Bids:

Noncompetitive bids: Accepted in full up to $5 million at the highest accepted yield.

Foreign and International Monetary Authority (FIMA) bids: Noncompetitive bids submitted through the Federal Reserve Banks as agents for FIMA accounts. Accepted in order of size from smallest to largest with no more than $100 million awarded per account. The total noncompetitive amount awarded to Federal Reserve Banks as agents for FIMA accounts will not exceed $1,000 million. A single bid that would cause the limit to be exceeded will be partially accepted in the amount that brings the aggregate award total to the $1,000 million limit. However, if there are two or more bids of equal amounts that would cause the limit to be exceeded, each will be prorated to avoid exceeding the limit.

Competitive bids:

(1) Must be expressed as a yield with three decimals, e.g., 7.123%.
(2) Net long position (NLP) for each bidder must be reported when the sum of the total bid amount, at all yields, and the net long position equals or exceeds the NLP reporting threshold stated above.
(3) Net long position must be determined as of one-half hour prior to the closing time for receipt of competitive tenders.
(4) Competitive bids from Treasury Direct customers are not allowed.

Receipt of Tenders:

Noncompetitive tenders..... Prior to 12:00 noon eastern daylight saving time on auction day
Competitive tenders..... Prior to 1:00 p.m. eastern daylight saving time on auction day

PUBLIC DEBT NEWS
Department of the Treasury • Bureau of the Public Debt • Washington, DC 20239

TREASURY SECURITY AUCTION RESULTS
BUREAU OF THE PUBLIC DEBT - WASHINGTON DC

FOR IMMEDIATE RELEASE
August 08, 2007

CONTACT: Office of Financing
202-504-3550

RESULTS OF TREASURY'S AUCTION OF 10-YEAR NOTES

Interest Rate:	4 3/4%	Issue Date:	August 15, 2007
Series:	E-2017	Dated Date:	August 15, 2007
CUSIP No:	912828HA1	Maturity Date:	August 15, 2017

High Yield: 4.855% Price: 99.175936

All noncompetitive and successful competitive bidders were awarded securities at the high yield. Tenders at the high yield were allotted 53.43%. All tenders at lower yields were accepted in full.

AMOUNTS TENDERED AND ACCEPTED (in thousands)

Tender Type	Tendered	Accepted
Competitive	$ 29,740,500	$ 12,844,723
Noncompetitive	155,327	155,327
FIMA (noncompetitive)	0	0
SUBTOTAL	29,895,827	13,000,050 1/
Federal Reserve	7,000,000	7,000,000
TOTAL	$ 36,895,827	$ 20,000,050

Median yield 4.829%: 50% of the amount of accepted competitive tenders was tendered at or below that rate. Low yield 4.740%: 5% of the amount of accepted competitive tenders was tendered at or below that rate.

Bid-to-Cover Ratio = 29,895,827 / 13,000,050 = 2.30

1/ Awards to TREASURY DIRECT = $140,150,000

auction two Treasury coupon securities: a 10-year note and a 29-year nine-month bond. Figure 2 shows the results of the 10-year note auction. Note the following:

- The high yield or stop yield was 4.855%, the yield at which all winning bidders were awarded securities.
- The coupon rate on the issue was set at 4.75%.
- Given the yield of 4.855%, a coupon rate of 4.75%, and a maturity of 10 years, the price that all winning bidders paid was $99.175936 (per $100 par value).
- For those bidders who bid the high yield of 4.855, they were allocated 53.43% of the amount that they bid.
- Because the total amount of bids by both competitive and noncompetitive bidders was $29,895,827,000 and the total amount awarded was $13,000,050,000, the bid-to-cover ratio was 2.30 ($29,895,827,000/$13,000,050,000).

Primary Dealers

Any firm can deal in government securities, but in implementing its open market operations, the Federal Reserve will deal directly only with dealers that it designates as **primary dealers** or *recognized dealers.* Basically, the Federal Reserve wants to be sure that firms requesting status as primary dealers have adequate capital relative to positions assumed in Treasury securities and do a reasonable amount of volume in Treasury securities.

When a firm requests status as a primary dealer, the Federal Reserve requests first that the applying firm informally report its positions and trading volume. If these are acceptable to the Federal Reserve, it gives the firm status as a *reporting dealer.* This means that the firm will be put on the Federal Reserve's regular reporting list. After the firm serves for some time as a reporting dealer, the Federal Reserve will make it a primary dealer if it is convinced that the firm will continue to meet the criteria established.

Submission of Bids

Until 1991, primary dealers and large commercial banks that were not primary dealers would submit bids for their own account and for their customers. Others who wished to participate in the auction process could only submit competitive bids for their own account, not their customers. Consequently, a broker-dealer in government securities that was not a primary dealer could not submit a competitive bid on behalf of its customers. Moreover, unlike primary dealers, nonprimary dealers had to make large cash deposits or provide guarantees to ensure that they could fulfill their obligation to purchase the securities for which they bid.

Well-publicized violations of the auction process by Salomon Brothers in the summer of 1991 forced Treasury officials to more closely scrutinize the activities of primary dealers and also reconsider the procedure by which Treasury securities are auctioned.[3] Specifically, the Treasury announced that it would allow qualified broker-dealers to bid for their customers at Treasury auctions. If a qualified broker-dealer establishes a payment link with the Federal Reserve system, no deposit or guaranty is required. Moreover, the auction is no longer handled by the submission of hand-delivered sealed bids to the Federal Reserve. The new auction process is a computerized auction system, which can be electronically accessed by qualified broker-dealers.

The Secondary Market

The secondary market for Treasury securities is an over-the-counter market where a group of U.S. government securities dealers offer continuous bid and ask prices on outstanding Treasuries.[4] There is virtual 24-hour trading of Treasury securities. The three primary trading locations are New York, London, and Tokyo. The normal settlement period for Treasury securities is the business day after the transaction day ("next day" settlement).

The most recently auctioned issue of a given maturity is referred to as the *on-the-run issue* or the *current issue.* Securities that are replaced by the on-the-run issues are called *off-the-run issues.* Issues that have been replaced by several on-the-run issues are said to be "well off-the-run issues."

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[3] Salomon Brothers admitted that it repeatedly violated a restriction that limited the amount that any one firm could purchase at the Treasury auction. The firm also admitted that it submitted unauthorized bids for some of its customers.

[4] Some trading of Treasury coupon securities does occur on the New York Stock Exchange, but the volume of these exchange-traded transactions is very small when compared to over-the-counter transactions.

When-Issued Market

Treasury securities are traded prior to the time they are issued by the Treasury. This component of the Treasury secondary market is called the **when-issued market**, or **wi market**. When-issued trading for both bills and coupon securities extends from the day the auction is announced until the issue day.

Government Brokers

Government dealers trade with the investing public and with other dealer firms. When they trade with each other, it is through intermediaries known as *interdealer brokers or* **government brokers**. Dealers leave firm bids and offers with interdealer brokers who display the highest bid and lowest offer in a computer network tied to each trading desk and displayed on a monitor. Dealers use interdealer brokers because of the speed and efficiency with which trades can be accomplished.

Bid and Offer Quotes on Treasury Bills

The convention for quoting bids and offers is different for Treasury bills and Treasury coupon securities. Bids and offers on Treasury bills are quoted in a special way. Unlike bonds that pay coupon interest, Treasury bill values are quoted on a bank discount basis, not on a price basis. The **yield on a bank discount basis** is computed as follows:

$$Y = \frac{D}{F} \times \frac{360}{t}$$

where

Y = annualized yield on a bank discount basis (expressed as a decimal)
D = dollar discount, which is equal to the difference between the face value and the price
F = face value
t = number of days remaining to maturity

As an example, a Treasury bill with 100 days to maturity, a face value of $100,000, and selling for $97,569 would be quoted at 8.75% on a bank discount basis:

$$\begin{aligned} D &= \$100{,}000 - \$97{,}569 \\ &= \$2{,}431 \end{aligned}$$

Therefore,

$$\begin{aligned} Y &= \frac{\$2{,}431}{\$100{,}000} \times \frac{360}{100} \\ &= 8.75\% \end{aligned}$$

Given the yield on a bank discount basis, the price of a Treasury bill is found by first solving the formula for Y for the dollar discount as follows:

$$D = Y \times F \times t/360$$

The price is then

$$\text{Price} = F - D$$

For the 100-day Treasury bill with a face value of $100,000, if the yield on a bank discount basis is quoted as 8.75%, D is equal to

$$D = 0.0875 \times \$100{,}000 \times 100/360$$
$$= \$2{,}431$$

Therefore,

$$\text{Price} = \$100{,}000 - \$2{,}431$$
$$= \$97{,}569$$

The quoted yield on a bank discount basis is not a meaningful measure of the return from holding a Treasury bill for two reasons. First, the measure is based on a face value investment rather than on the actual dollar amount invested. Second, the yield is annualized according to a 360-day rather than 365-day year, making it difficult to compare Treasury bill yields with Treasury notes and bonds, which pay interest on a 365-day basis. Despite its shortcomings as a measure of return, this is the method dealers have adopted to quote Treasury bills.

Regulation of the Secondary Market

In the stock market, congressional and SEC actions have resulted in movement toward a consolidated tape for reporting trades on exchanges and the over-the-counter market, with a composite quotation system for the collection and display of bid and ask quotations. In the Treasury market, however, despite the fact that trading activity is concentrated in the over-the-counter market, and that daily trading volume exceeds $100 billion, reporting of trades does not exist. Nor is there a display of bid and ask quotations that provides reliable price quotes at which the general public can transact. Such quotations do exist, as we explained earlier, in the interdealer market on government broker screens. While nonprimary dealers can subscribe to the government broker screens, the information that they can obtain on these screens is limited. In particular, the government dealers that permit access to their screens provide information on only the best bid and offer quotation but not the size of the transaction.

Moreover, the rules for the sale of U.S. government securities have been exempt from most SEC provisions and rules.[5] Thus, government broker-dealers are not required to disclose the bid–ask spread on the Treasury securities that they buy from or sell to customers. There are guidelines established by the National Association of Security Dealers for reasonable bid–ask spreads, but lack of disclosure to customers makes it difficult for customers to monitor the pricing practice of a broker-dealer.

Dealer Use of the Repurchase Agreement Market

Suppose a government securities dealer has purchased $10 million of a particular Treasury security. Where does the dealer obtain the funds to finance that position? Of course, the dealer can use its own funds or borrow from a bank. Typically, however, the dealer uses the *repo* market to obtain financing. In the repo market, the dealer can use the $10 million of Treasury security purchased as collateral for a loan. The term of the loan and the interest rate

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[5] Broker-dealers who sell government securities are always subject to the general fraud provisions of the Securities Act of 1933.

that the dealer agrees to pay (called the *repo rate*) are specified. When the term of the loan is one day, it is called an overnight repo; a loan for more than one day is called a term repo.

The transaction is referred to as a repurchase agreement because it calls for the sale of the security and its repurchase at a future date. Both the sale price and the purchase price are specified in the agreement. The difference between the purchase (repurchase) price and the sale price is the dollar interest cost of the loan.

Now, let's return to the dealer who needs to finance $10 million of a Treasury security. Suppose that the dealer plans to hold the bonds overnight. Suppose also that a customer of the dealer has excess funds of $10 million. (The customer might be a municipality with tax receipts that it has just collected, and no immediate need to disburse the funds.) The dealer would agree to deliver ("sell") $10 million of the Treasury security to the customer for an amount determined by the repo rate and buy ("repurchase") the same Treasury security from the customer for $10 million the next day. Suppose that the overnight repo rate is 6.5%. Then, the dealer would agree to deliver the Treasury securities for $9,998,194 and repurchase the same securities for $10 million the next day. The $1,806 difference between the "sale" price of $9,998,194 and the repurchase price of $10 million is the dollar interest on the financing. From the customer's perspective, the agreement is called a *reverse repo*.

The advantage to the dealer of using the repo market for borrowing on a short-term basis is that the rate is less than the cost of bank financing. From the customer's perspective, the repo market offers an attractive yield on a short-term secured transaction that is highly liquid.

Although the example illustrates financing a dealer's long position in the repo market, dealers can also use the market to cover a short position. For example, suppose a government dealer sold $10 million of Treasury securities two weeks ago and must now cover the position—that is, deliver the securities. The dealer can do a reverse repo (agree to buy the securities and sell them back). Of course, the dealer eventually would have to buy the Treasury security in the market in order to cover its short position.

There is a good deal of Wall Street jargon describing repo transactions. To understand it, remember that one party is lending money and accepting the security as collateral for the loan;[6] the other party is borrowing money and giving collateral to borrow money. When someone lends securities in order to receive cash (that is, to borrow money), that party is said to be *reversing out* securities. A party that lends money with the security as collateral is said to be *reversing in* securities. The expressions *to repo securities* and *to do repo* are also used. The former means that someone is going to finance securities using the security as collateral; the latter means that the party is going to invest in a repo. Finally, the expressions *selling collateral* and *buying collateral* are used to describe a party financing a security with a repo on the one hand, and lending on the basis of collateral, on the other.

It is important to note that both parties to the transaction are exposed to credit risk. The failure of a few small government securities dealer firms involved in repo transactions in the 1980s has made market participants more cautious about the creditworthiness of the counterparty to a repo. Repos are now more carefully structured to reduce credit risk exposure.[7]

There is no one repo rate; rates vary from transaction to transaction depending on factors such as the term of the repo and the availability of collateral. The more difficult it is to

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[6] The collateral in a repo is not limited to government securities. Money market instruments, federal agency securities, and mortgage-backed securities are also used.

[7] For a description of the procedures used to reduce credit risk, see Frank J. Fabozzi (ed.), *Securities Lending and Repurchase Agreements* (New Hope, PA: Frank J. Fabozzi Associates, 1997).

obtain the collateral, the lower the repo rate. To understand why this is so, remember that the borrower (or equivalently the seller of the collateral) has a security that is a **hot**, or **special, issue**. The party that needs the collateral will be willing to lend funds at a lower repo rate in order to obtain the collateral.

Although the factors given above determine the repo rate on a particular transaction, the federal funds rate determines the general level of repo rates. The repo rate will be slightly below the federal funds rate because a repo involves collateralized borrowing, while a federal funds transaction is unsecured borrowing.

Because it is used by dealer firms (investment banking firms and money center banks acting as dealers) to finance positions and cover short positions, the repo market has evolved into one of the largest sectors of the money market. Financial and nonfinancial firms participate in the market as both sellers and buyers, depending on the circumstances they face. Thrifts and commercial banks are typically net sellers of collateral (that is, net borrowers of funds); money market funds, bank trust departments, municipalities, and corporations are typically net buyers of collateral (that is, providers of funds).

Although a dealer firm uses the repo market as the primary means for financing its inventory and covering short positions, it will also use the repo market to run a matched book where it takes on repos and reverse repos with the same maturity. The firm will do so to capture the spread at which it enters into the repo and reverse repo agreements. For example, suppose that a dealer firm enters into a term repo of 10 days with a money market fund and a reverse repo rate with a thrift for 10 days in which the collateral is identical. This means that the dealer firm is borrowing funds from the money market fund and lending money to the thrift. If the rate on the repo is 7.5% and the rate on the reverse repo is 7.55%, the dealer firm is borrowing at 7.5% and lending at 7.55%, locking in a spread of 0.05% (five basis points).

A Note on Terminology in the Repo Market

The Federal Reserve conducts open market operations by the outright purchase or sale of government securities or, more often, by repurchase agreements. In these agreements, the Fed either purchases or sells collateral. By buying collateral (that is, lending funds), the Fed injects money into the financial markets, thereby exerting downward pressure on short-term interest rates. When the Fed buys collateral for its own account, this is called a *system repo*. The Fed also buys collateral on behalf of foreign central banks in repo transactions that are referred to as *customer repos*. It is primarily through system repos that the Fed attempts to influence short-term rates. By selling securities for its own account, the Fed drains money from the financial markets, thereby exerting upward pressure on short-term interest rates. This transaction is called a *matched sale*.

Note the language that is used to describe the transactions of the Fed in the repo market. When the Fed lends funds based on collateral, we call it a system or customer repo, not a reverse repo. Borrowing funds using collateral is called a matched sale, not a repo. The jargon is confusing, which is why we used the terms of *buying collateral* and *selling collateral* to describe what parties in the repo market are doing.

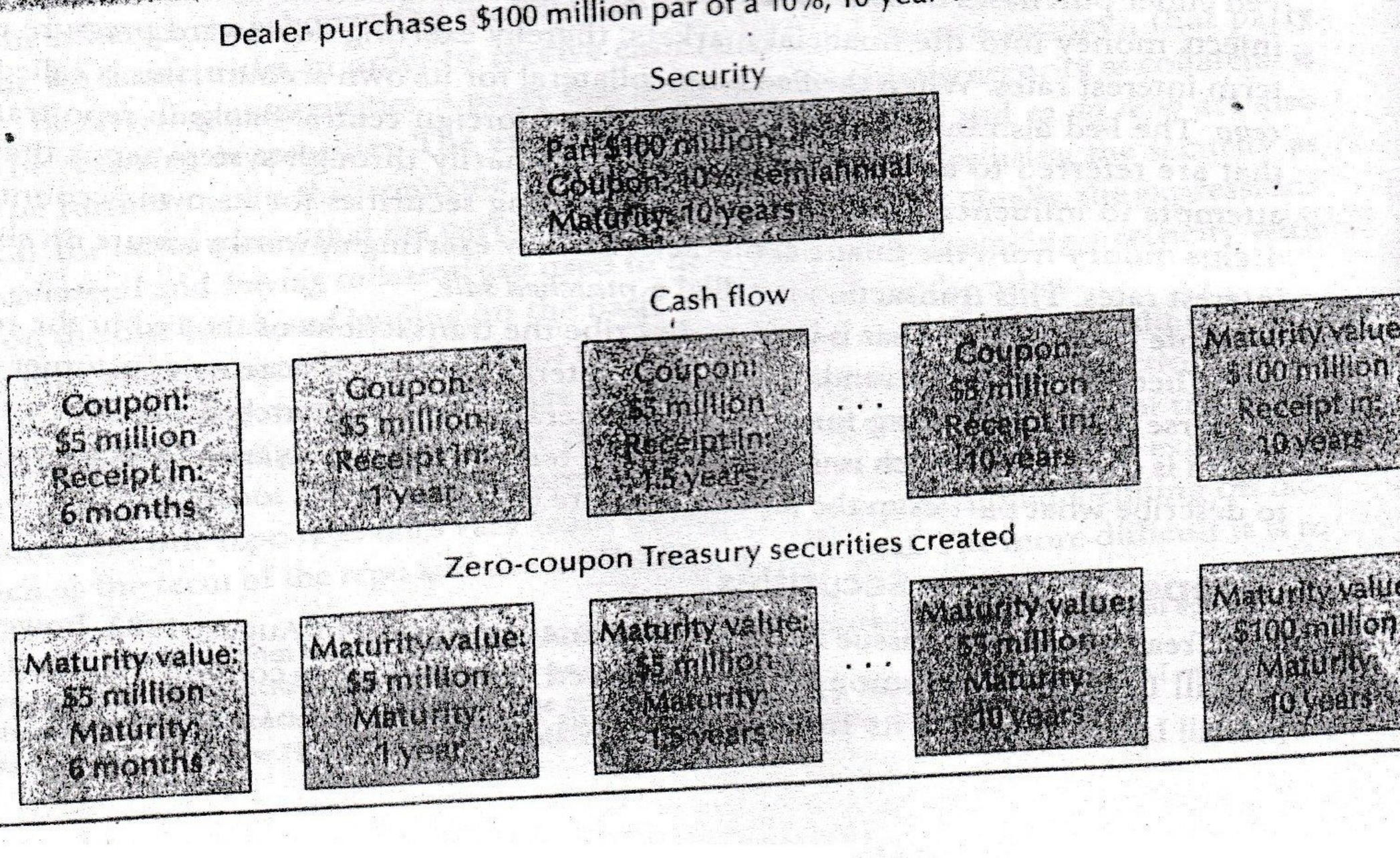
Stripped Treasury Securities

The Treasury does not issue zero-coupon notes or bonds. In August 1982, however, both Merrill Lynch and Salomon Brothers created synthetic zero-coupon Treasury receipts. Merrill Lynch marketed its Treasury receipts as Treasury Income Growth Receipts (TIGRs);

Salomon Brothers marketed its as Certificates of Accrual on Treasury Securities (CATS). The procedure was to purchase Treasury bonds and deposit them in a bank custody account. The firms then issued (that is, sold) receipts representing an ownership interest in each coupon payment on the underlying Treasury bond in the account and a receipt for ownership of the underlying Treasury bond's maturity value. This process of separating each coupon payment, as well as the principal (called the *corpus*), and selling securities against them is referred to as *coupon stripping*. Although the receipts created from the coupon-stripping process are not issued by the U.S. Treasury, the underlying bond deposited in the bank custody account is a debt obligation of the U.S. Treasury, so the cash flow from the underlying security is certain.

To illustrate the process, suppose $100 million of a Treasury bond with a 10-year maturity and a coupon rate of 10% is purchased to create zero-coupon Treasury securities. The cash flow from this Treasury bond is 20 semiannual payments of $5 million each ($100 million times 0.10 divided by 2) and the repayment of principal (corpus) of $100 million 10 years from now. This Treasury bond is deposited in a bank custody account. Receipts are then issued, each with a different single payment claim on the bank custody account. As there are 21 different payments to be made by the Treasury, a receipt representing a single payment claim on each payment is issued, which is effectively a zero-coupon bond. The amount of the maturity value for a receipt on a particular payment, whether coupon or corpus, depends on the amount of the payment to be made by the Treasury on the underlying Treasury bond. In our example, 20 coupon receipts each have a maturity value of $5 million, and one receipt, the corpus, has a maturity value of $100 million. The maturity dates for the receipts coincide with the corresponding payment dates by the Treasury. This is illustrated in Figure 3.

Figure 3 Coupon Stripping: Creating Zero-Coupon Treasury Securities



Other investment banking firms followed suit by creating their own receipts.[8] They all are referred to as **trademark zero-coupon Treasury securities** because they are associated with particular firms.[9] Receipts of one firm were rarely traded by competing dealers, so the secondary market was not liquid for any one trademark. Moreover, the investor was exposed to the risk—as small as it may be—that the custodian bank may go bankrupt.

To broaden the market and improve liquidity of these receipts, a group of primary dealers in the government market agreed to issue generic receipts that would not be directly associated with any of the participating dealers. These generic receipts are referred to as **Treasury receipts (TRs)**. Rather than representing a share of the trust as the trademarks do, TRs represent ownership of a Treasury security. A common problem with both trademark and generic receipts was that settlement required physical delivery, which is often cumbersome and inefficient.

In February 1985, the Treasury announced its **Separate Trading of Registered Interest and Principal of Securities** (STRIPS) program to facilitate the stripping of designated Treasury securities. Specifically, all new Treasury bonds and all new Treasury notes with maturities of ten years and longer are eligible. The zero-coupon Treasury securities created under the STRIPS program are direct obligations of the U.S. government. Moreover, the securities clear through the Federal Reserve's book-entry system.[10] Creation of the STRIPS program ended the origination of trademarks and generic receipts.

Today, **stripped Treasury securities** are simply referred to as *Treasury strips.* On dealer quote sheets and vendor screens, they are identified by whether the cash flow is created from the coupon (denoted "ci"), principal from a Treasury bond (denoted "bp"), or principal from a Treasury note (denoted "np"). Strips created from coupon payments are called *coupon strips* and those created from the principal are called *principal strips.* The reason why a distinction is made between coupon strips and the principal strips has to do with the tax treatment by non–U.S. entities, as discussed below.

A disadvantage of a taxable entity investing in Treasury strips is that accrued interest is taxed each year even though interest is not paid. Thus, these instruments are negative cash flow instruments until the maturity date. They have negative cash flow since tax payments on interest earned but not received in cash must be made. One reason for distinguishing between strips created from the principal and coupon is that some foreign buyers have a preference for the strips created from the principal (i.e., the principal strips). This preference is due to the tax treatment of the interest in their home country. Some country's tax laws treat the interest as a capital gain if the principal strip is purchased. The capital gain receives a preferential tax treatment (i.e., lower tax rate) compared to ordinary income.

Coupon Stripping and the Theoretical Value of Treasury Securities

Financial theory tells us that the theoretical value of a Treasury security should be equal to the present value of the cash flow where each cash flow is discounted at the appropriate theoretical spot rate. What we do not do in that chapter, however, is demonstrate what

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[8] Lehman Brothers offered "Lehman Investment Opportunities Notes" (LIONs); E.F. Hutton offered "Treasury Bond Receipts" (TBRs); and Dean Witter Reynolds offered "Easy Growth Treasury Receipts" (ETRs). There were also GATORs, COUGARs, and—you will like this one—DOGS (Dibs on Government Securities).

[9] They are also called "animal products" for obvious reasons.

[10] In 1987, the Treasury permitted the conversion of stripped coupons into book-entry form under its Coupons Under Book-Entry Safekeeping (CUBES) program.

economic force will assure that the actual market price of a Treasury security will not depart significantly from its theoretical value. Given our discussion of these instruments, we can now demonstrate the economic force that will move the actual price of a Treasury security toward its theoretical value.

To demonstrate this, we will use the Treasury yield curve as represented by the 20 hypothetical Treasury securities. The longest-maturity bond given in that table is the 10-year, 12.5% coupon issue selling at par and, therefore, with a yield to maturity of 12.5%. Suppose that a government dealer buys a 14%, 10-year Treasury security. Since this is a 10-year security, using the yield for 10-year instruments of 12.5% would suggest that this issue should sell to offer a yield of 12.5%. Table 1 shows the price of a 14%, 10-year Treasury issue if it is selling in the market to yield 12.5%. The present value of the cash flows when discounted at 12.5% is $108.4305 per $100 of par value.

Suppose that this issue is selling at that price. A government dealer can purchase that issue and strip it. The stripped Treasury securities should offer approximately the theoretical spot rate. Table 2 shows the theoretical value of the 14% coupon issue if the cash flows are discounted at the theoretical spot rates. The theoretical value is

Table 1 Price of a 10-Year, 14% Coupon Treasury Based on the 10-Year Yield of 12.5%

Maturity	Cash Flow per $100 Par	Required Yield of 0.125	Semiannual Yield	Present Val
0.5	$ 7	0.125	0.0625	$ 6.588
1.0	7	0.125	0.0625	6.200
1.5	7	0.125	0.0625	5.835
2.0	7	0.125	0.0625	5.492
2.5	7	0.125	0.0625	5.169
3.0	7	0.125	0.0625	4.865
3.5	7	0.125	0.0625	4.579
4.0	7	0.125	0.0625	4.309
4.5	7	0.125	0.0625	4.055
5.0	7	0.125	0.0625	3.817
5.5	7	0.125	0.0625	3.592
6.0	7	0.125	0.0625	3.381
6.5	7	0.125	0.0625	3.182
7.0	7	0.125	0.0625	2.995
7.5	7	0.125	0.0625	2.819
8.0	7	0.125	0.0625	2.653
8.5	7	0.125	0.0625	2.497
9.0	7	0.125	0.0625	2.350
9.5	7	0.125	0.0625	2.212
10.0	107	0.125	0.0625	31.822
Total				$108.432

Maturity	Cash Flow per $100 Par	Required Yield of 0.125	Semiannual Yield	Present Value
0.5				
1.0	7	0.08300	0.04150	6.4533
1.5				
2.0	7	0.09247	0.04624	5.8423
2.5				
3.0	7	0.09787	0.04894	5.2554
3.5				
4.0	7	0.10592	0.05296	4.6324
4.5				
5.0	7	0.11021	0.05511	4.0939
5.5				
6.0	7	0.11584	0.05792	3.5618
6.5				
7.0	7	0.11991	0.05996	3.0979
7.5				
8.0	7	0.12278	0.06139	2.6983
8.5				
9.0	7	0.13152	0.06576	2.2245
9.5				
10.0	107	0.13623	0.06812	28.6433
Total				$108.7889

$108.7889 per $100 par value. Thus, if a dealer purchased this issue for $108.4305, stripped it, and subsequently resold the zero-coupon instruments created at about the theoretical spot rates, the dealer would generate $108.7889 per $100 par value. This would result in an arbitrage profit of $0.3584 per $100 of par value. The only way to eliminate this arbitrage profit is for this security to sell for approximately $108.7889—its theoretical value as determined by the theoretical spot rates.

In this instance, coupon stripping shows that the sum of the parts is greater than the whole. Consider instead of a 10-year, 14% coupon Treasury one in which the coupor rate is 10%. The theoretical value for that issue based on the spot rates would be $85.35477. If the cash flows are instead discounted at the 12.5% yield for 10-year Treasury securities, it can be shown that the price would be $85.9491. Thus, if the market price was $85.9491 when the theoretical value based on spot rates indicated a value of $85.35477, a dealer would not want to strip this issue. The proceeds received by selling the zero-coupon instruments created would be less than the cost of purchasing the issue.

In such cases, a dealer can purchase in the market a package of zero-coupon stripped Treasury securities such that the cash flow of the package of securities replicates the cash flow of the mispriced coupon Treasury security. By doing so, the dealer will realize a yield

higher than the yield on the coupon Treasury security. By buying 20 zero-coupon bonds with maturity values identical to the cash flow for the 10%, 10-year Treasury, the dealer is effectively purchasing a 10-year Treasury coupon security at a cost of $85.35477 instead of $85.9491. This procedure to generate an arbitrage profit is referred to as **reconstitution.**

It is the process of coupon stripping and reconstituting that forces the price of a Treasury security to trade near its theoretical value based on spot rates.

Key Points That You Should Understand Before Proceeding

1. U.S. Treasury securities play a prominent role in global financial markets because they do not have credit risk.
2. Treasury securities are issued on an auction basis with regular cycles for securities of specific maturities.
3. In the secondary market, the most actively traded Treasury securities are the on-the-run issues, and government brokers are used as intermediaries for trading among primary dealers.
4. Securities dealers use the repo market to finance their position in Treasury securities.
5. Stripped Treasury securities are zero-coupon instruments that, while not issued by the U.S. government, are backed by Treasury securities from which they are created.
6. Why a Treasury security's price must reflect its theoretical value based on theoretical spot rates.

MARKET FOR FEDERAL AGENCY SECURITIES[11]

The U.S. Congress has chartered entities to provide funding support for the housing and agricultural sectors of the U.S. economy, as well as to provide funding for specific U.S. government projects. The market for the debt instruments issued by these government-chartered entities is called the federal **agency securities market.**

There are several types of government-chartered entities. One type is a **government-owned corporation.** Two examples are the Tennessee Valley Authority (TVA) and the U.S. Postal Service. However, the only government-owned corporation that is a frequent issuer of debt in the market is the TVA. Another type of government-chartered entity is a **government-sponsored enterprise (GSE).** GSEs are divided into two types. The first is a publicly owned shareholder corporation. There are three such GSEs: Fannie Mae, Freddie Mac, and the Federal Agricultural Mortgage Corporation. In early September 2008, Fannie Mae and Freddie Mac were taken over by the U.S. government. The other type of GSE is a funding entity of a federally chartered bank lending system. These GSEs include the Federal Home Loan Banks and the Federal Farm Credit Banks.

The GSEs issue two types of securities: debentures and mortgage-backed securities. Our focus here is on the debentures. The debentures issued by the TVA and the GSEs make up about 97% of the federal agency market. These securities are *not* backed by the full faith and credit of the U.S. government. The GSEs use a traditional selling group, syndicate, and auctions for pricing and the initial distribution of new issues. Because of credit risk and liquidity,

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[11] For a further discussion of the market for federal agency securities, see Frank J. Fabozzi and George P. Kegler, "Federal Agency Securities," in *The Handbook of Finance: Volume I* (Hoboken, NJ: John Wiley & Sons, 2008).

GSEs trade in the market at a yield premium (i.e., yield greater than) to comparable-maturity Treasury securities. The yield spread will differ for each issuing entity, the maturity, and structure of the security and the program through which it has been issued.

In the following paragraphs, we will describe the securities issued by the TVA and the GSEs, but it is important to know that there are smaller non–GSE federal agencies that were created by Congress to provide specific projects, and the debt of these entities carry either the full faith and credit of the U.S. government or a partial guarantee of the U.S. government. Examples of these entities are the Export-Import Bank, the Private Export Funding Corporation, Financing Corporation, and Small Business Administration. Many of these smaller entities have decided to limit or elected not to issue their own debt. Instead, they have utilized the Federal Financing Bank for their funding needs.

Tennessee Valley Authority

The TVA was established by Congress in 1933, primarily to provide flood control, navigation, and agricultural and industrial development, and to promote the use of electric power in the Tennessee Valley region. The TVA is the largest public power system in the United States. The TVA primarily finances its capital requirements through internally generated funds and by issuing debt.

The TVA issues a variety of debt securities in U.S. dollars and other currencies. The TVA issues securities that are issues targeted to individual investors (retail debt offerings) and institutional investors (nonretail offerings). The debt obligations issued by the TVA may be issued only to provide capital for its power program or to refund outstanding debt obligations. TVA debt obligations are not guaranteed by the U.S. government. However, the securities are rated AAA by Moody's and Standard & Poor's. The rating is based on the TVA's status as a wholly owned corporate agency of the U.S. government and the view of the rating agencies of the TVA's financial strengths. These strengths include (1) the requirements that bondholders of power bonds are given a first pledge of payment from net power proceeds, and (2) electricity rates charged by the TVA are sufficient to ensure both the full payment of annual debt service and operating and capital costs.

Fannie Mae

In the 1930s, Congress created a federally related institution, the Federal National Mortgage Association, popularly known as "Fannie Mae," which was charged with the responsibility to create a liquid secondary market for mortgages. Fannie Mae was to accomplish this objective by buying and selling mortgages. In 1968, Congress divided Fannie Mae into two entities: (1) the current Fannie Mae, and (2) the Government National Mortgage Association (popularly known as "Ginnie Mae"). Ginnie Mae's function is to use the "full faith and credit of the U.S. government" to support the market for government-insured mortgages. Although starting out as a federally related institution, today, Fannie Mae is a GSE and its official corporate name is Fannie Mae.

Fannie Mae issues Benchmark Bills, Benchmark Notes, Benchmark Bonds, Callable Benchmark Notes, Subordinated Benchmark Notes, Investment Notes, callable securities, and structured notes. Benchmark Notes and Benchmark Bonds are noncallable instruments. The minimum issue size is $4 billion for Benchmark Notes and $2 billion for Benchmark Bonds. Issued quarterly are two-, three-, five-, 10-, and 30-year maturities.

Fannie Mae, as well as Freddie Mac that we discuss next, issues bullet and callable medium-term notes (MTNs) and structured notes. There are securities denominated in U.S. dollars as well as issues denominated in a wide range of foreign currencies.

Freddie Mac

In 1970, Congress created the Federal Home Loan Mortgage Corporation (Freddie Mac). The reason for the creation of Freddie Mac was to provide support for conventional mortgages. These mortgages are not guaranteed by the U.S. government.

Freddie Mac issues Reference Bills, discount notes, medium-term notes, Reference Notes, Reference Bonds, Callable Reference Notes, Euro Reference Notes (debt denominated in euros), and global bonds. Reference Bills and discount notes are issued with maturities of one year or less. Reference Notes and Bonds have maturities of two to 30 years and Callable Reference Notes have maturities of two to 10 years. Freddie Mac will issue and/or reopen Reference Bills, Reference Notes, 30-year Reference Bonds, and Euro Reference Notes according to a published issuance calendar and within minimum issue size guidelines.

The Federal Agricultural Mortgage Corporation

The Federal Agricultural Mortgage Corporation (popularly known as "Farmer Mac") provides a secondary market for first mortgage agricultural real estate loans. It was created by Congress in 1998 to improve the availability of mortgage credit to farmers and ranchers as well as rural homeowners, businesses, and communities. It does so by purchasing qualified loans from lenders in the same way as Freddie Mac and Fannie Mae. Farmer Mac raises funds by selling debentures and mortgage-backed securities backed by the loans purchased. The latter securities are called **agricultural mortgage-backed securities**. The debentures that are issued include discount notes and medium-term notes.

Federal Home Loan Bank System

The Federal Home Loan Bank System (FHLBanks) consists of the 12 district Federal Home Loan Banks and their member banks.The Federal Home Loan Bank Board was originally responsible for regulating all federally chartered savings and loan associations and savings banks, as well as state-chartered institutions insured by the Federal Savings and Loan Insurance Corporation. These responsibilities have been curtailed since 1989.

The major source of debt funding for the Federal Home Loan Banks is the issuance of consolidated debt obligations, which are joint and several obligations of the 12 Federal Home Loan Banks. Consolidated FHLBank discount notes with maturities from one to 360 days are issued daily. The FHLBanks have several programs to facilitate the issuance of certain bond types. The TAP issue program aggregates FHLBank demand for six common (1.5-, two-, three-, five-, seven-, and 10-year) bullet maturities, and then offers them daily through competitive auctions. These issues feature standardized terms and are reopened via auction for three-month periods, enabling them to reach multibillion-dollar size. TAP issues can also be reopened as they roll down the curve. Callable bonds are issued daily, primarily as customized issues for institutional investors.

Federal Farm Credit Bank System

The purpose of the Federal Farm Credit Bank System (FFCBS) is to facilitate adequate, dependable credit and related services to the agricultural sector of the economy. The Farm Credit Bank System consists of three entities: the Federal Land Banks, Federal Intermediate Credit Banks, and Banks for Cooperatives. Prior to 1979, each entity issued securities in its own name. Starting in 1979, they began to issue debt on a consolidated basis as "joint and several obligations" of the FFCBS. All financing for the FFCBS is arranged through the Federal Farm Credit Banks Funding Corporation (FFCBFC), which issues consolidated obligations. The FFCBFC issues discount notes that are offered daily through posted rates. Calendar bonds of three- and six-month maturities are offered monthly. Designated bonds of typically two-year maturities can be offered twice monthly as either a new issue or reopening. Unscheduled Bonds are issued throughout the month in varying sizes and structures either by competitive bidding or based on requests from institutional investors. Master notes are issued as individually tailored daily investment agreements that are typically designed for a single investor.

Key Points That You Should Understand Before Proceeding

1. The federal agency securities market is the market for securities issued by U.S. government-chartered entities to provide funding support for the housing and agricultural sectors of the U.S. economy, as well as to provide funding for specific U.S. government projects.
2. A government-chartered entity is classified as either a government-owned corporation or a GSE.
3. The GSEs issue debentures and mortgage-backed securities and these securities are not backed by the full faith and credit of the U.S. government.
4. The major government-owned corporation that issues securities is the TVA.
5. GSEs include Fannie Mae, Freddie Mac, Federal Agricultural Mortgage Corporation, and Federal Home Loan Bank System.

NON–U.S. GOVERNMENT BOND MARKETS

Sovereign debt is the obligation of a country's central government. Earlier in this chapter, we discussed the debt obligations of the U.S. government. The largest government bond market outside of the United States is the Japanese government bond market, followed by the markets in Italy, Germany, and France.

It was not until the early 1990s that a liquid government bond market in Continental Europe developed. The market grew throughout the decade. However, the Euro government bond market (excludes the bonds issued by the U.K. government, gilts) was characterized as a fragmented market and, as a result, could not develop the type of liquidity that characterized the U.S. Treasury market. The difference in the currency used by each country hindered that integrated market and liquidity.

In January 1999, the structure of the market changed with the start of the European Monetary Union (EMU). The EMU, combined with the decline in the U.S. Treasury issuance of securities at that time, resulted in the Euro government bond market

becoming the largest government bond market in the world in terms of size and number of issues.

By mid 2007, the European government market was the world's largest government bond market in terms of size (€3 trillion) and number of issues, representing about 40% of the world's outstanding government bonds. It is almost 50% larger than the Japanese government bond market and 65% larger than the U.S. Treasury market. The three largest government bond markets—those of Germany, Italy, and France—made up two-thirds of the European government bond market.[12]

Methods of Distribution of New Government Securities

We described the primary market for distribution of U.S. Treasury securities earlier in this chapter. There are four methods that have been used in distributing new securities of central governments:

- the regular calendar auction/Dutch-style system
- the regular calendar auction/minimum-price offering system
- the ad hoc auction system
- the tap system

In the **regular calendar auction/Dutch-style auction system**, there is a regular calendar auction and winning bidders are allocated securities at the yield (price) they bid.

In the **regular calendar auction/minimum-price offering system**, there is a regular calendar of offering. The price (yield) at which winning bidders are awarded the securities is different from the Dutch-style auction. Rather than awarding a winning bidder at the yield (price) they bid, all winning bidders are awarded securities at the highest yield accepted by the government (i.e., the stop-out yield). For example, if the highest yield or stop-out yield for a government issue at auction is 5.14% and someone bids 5.12%, that bidder would be awarded the securities at 5.12%. In contrast, with the minimum-price offering method, that bidder would be awarded securities at 5.14%, which means a lower price than at the bid price of 5.12%. We refer to this auction method as a single-price auction, and it is the auction method used in the U.S. government market. The regular calendar auction/minimum-price offering method is used in Germany and France.

In the **ad hoc auction system**, governments announce auctions when prevailing market conditions appear favorable. It is only at the time of the auction that the amount to be auctioned and the maturity of the security to be offered are announced. This is one of the methods used by the Bank of England in distributing British government bonds. From the issuing government's perspective, there are two advantages of an ad hoc auction system over a regular calendar auction. First, a regular calendar auction introduces greater market volatility than an ad hoc auction does because yields tend to rise as the announced auction date approaches and then fall afterward. Second, there is reduced flexibility in raising funds with a regular calendar auction.

In a **tap system**, additional bonds of a previously outstanding bond issue are auctioned. The government announces periodically that it is adding this new supply.

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[12] Antonio Villarroya, "The Euro Government Bond Market," Chapter 25 in Frank J. Fabozzi (ed.), *The Handbook of Finance: Volume I* (Hoboken, NJ: John Wiley & Sons, 2008).

Inflation-Indexed Bonds

In the United States, the U.S. Treasury issues fixed-rate bonds and bonds whose coupon rate is indexed to the rate of inflation (Treasury Inflation Protection Securities). Outside the United States, bond coupon rates are linked to the rate of inflation and are referred to as **linkers.**[13]

Table 3 shows the size of the inflation-linked government market by the major issuers in terms of local face value and market value as of September 30, 2005. The market value is U.S. $809.9 billion. The number of issues for each country is also shown. As can be seen, the United States is by far the largest issuer of inflation-linked government securities, followed by the United Kingdom and then France.

The indexes are typically linked to a consumer price index (CPI); however, within a country the index may differ. For example, in France there are bonds indexed to the French CPI (excluding tobacco) and to the Eurozone's Harmonised Index of Consumer Prices (HICP; excluding tobacco).

Sovereign Bond Ratings

Sovereign debt is the obligation of a country's central government. Whereas U.S. government debt is not rated by any nationally recognized statistical rating organization, the debt of other national governments is rated. For the reasons discussed subsequently, there are two sovereign debt ratings assigned by rating agencies: a **local currency debt rating** and a **foreign currency debt rating.**

Country	Face Value (local, millions)	Market Value (local, millions)	No. of Issues	Foreign Market Value (USD, millions)	Market Share (%)
Canada	19,725	34,292	4	29,547	3.65
France	81,454	100,271	9	120,891	14.93
United States	278,370	338,509	17	338,509	41.80
Greece	5,200	6,788	1	8,184	1.01
Italy	45,549	50,273	4	60,612	7.48

Source: *Prepared from data supplied by Robert Tzucker of Barclays Capital.*

[13] For comprehensive coverage of the use and analysis of linkers in the European bond market, see "European Inflation-Linked Bonds," Chapter 8 in Frank J. Fabozzi and Moorad Choudhry (eds.), *The Handbook of European Fixed Income Securities* (Hoboken, NJ: John Wiley & Sons, 2005).

Standard & Poor's, Moody's, and Fitch all assign ratings to sovereign bonds. The two general categories are economic risk and political risk. The former category is an assessment of the ability of a government to satisfy its obligations. Both quantitative and qualitative analyses are used in assessing economic risk. Political risk is an assessment of the willingness of a government to satisfy its obligations. A government may have the ability to pay but may be unwilling to pay. Political risk is assessed based on qualitative analysis of the economic and political factors that influence a government's economic policies.

The reason for distinguishing between local debt ratings and foreign currency debt ratings is that historically, the default frequency differs by the currency denomination of the debt. Specifically, defaults have been greater on foreign currency-denominated debt. The reason for the difference in default rates for local currency debt and foreign currency debt is that if a government is willing to raise taxes and control its domestic financial system, it can generate sufficient local currency to meet its local currency debt obligation. This is not the case with foreign currency-denominated debt. A national government must purchase foreign currency to meet a debt obligation in that foreign currency and therefore has less control with respect to its exchange rate. Thus, a significant depreciation of the local currency relative to a foreign currency in which a debt obligation is denominated will impair a national government's ability to satisfy such obligation.

The implication of this is that the factors S&P analyzes in assessing the creditworthiness of a national government's local currency debt and foreign currency debt will differ to some extent. In assessing the credit quality of local currency debt, for example, S&P emphasizes domestic government policies that foster or impede timely debt service. For foreign currency debt, credit analysis by S&P focuses on the interaction of domestic and foreign government policies. S&P analyzes a country's balance of payments and the structure of its external balance sheet. The areas of analysis with respect to its external balance sheet are the net public debt, total net external debt, and net external liabilities.

SUMMARY

The U.S. Treasury market is closely watched by all participants in the financial markets because interest rates on Treasury securities are the benchmark interest rates throughout the world. The Treasury issues three types of securities: bills, notes, and bonds. Treasury bills have a maturity of one year or less, are sold at a discount from par, and do not make periodic interest payments. Treasury notes and bonds are coupon securities. In 1997, the Treasury began issuing inflation protection securities.

Treasury securities are issued on a competitive bid auction basis, according to a regular auction cycle. The auction process relies on the participation of the primary government securities dealers, with which the Federal Reserve deals directly. The auction process has been revised to allow greater participation by eligible nonprimary dealers.

The secondary market for Treasury securities is an over-the-counter market, where dealers trade with the general investing public and with other dealers. In the secondary market, Treasury bills are quoted on a bank discount basis; Treasury coupon securities are quoted on a price basis.

Treasury dealers finance their position in the repo market. They also use the repo market to cover short positions.

Although the Treasury does not issue zero-coupon Treasury securities, government dealers have created these instruments synthetically by a process called coupon stripping. Zero-coupon Treasury securities include trademarks, Treasury receipts, and STRIPS. Creation of the first two types of zero-coupon Treasury securities has ceased; STRIPS now dominate the market. The ability to strip Treasury coupon securities and reconstitute stripped Treasury securities forces the market price of a Treasury security to sell at a price close to its theoretical value based on theoretical spot rates.

The federal agency securities market is the market for the debt instruments issued by government-chartered entities. They were created by Congress to provide assistance for certain borrowing sectors of the economy deemed to be important enough to warrant assistance. These sectors include housing and agriculture, as well as specific U.S. government projects. The primary issuers in this market are the TVA (a government-owned corporation) and five government-sponsored enterprises: Fannie Mae, Freddie Mac, the Federal Agricultural Mortgage Corporation, the Federal Home Loan Bank System, and the Federal Farm Credit Bank System. The securities issued by these entities are not guaranteed by the full faith and credit of the U.S. government.

Sovereign debt is the obligation of a country's central government. Ratings are assigned separately for local currency-denominated debt and foreign currency-denominated debt. The two general categories analyzed by rating companies in assigning ratings are economic risk and political risk.

KEY TERMS

- Ad hoc auction system
- Agency securities market
- Agricultural mortgage-backed securities
- Bid-to-cover ratio
- Coupon securities
- Discount securities
- Foreign currency debt rating
- Government-owned corporation
- Government-sponsored enterprise (GSE)
- Government brokers
- Hot (special) issue
- Linkers
- Local currency debt rating
- Overnight repo
- Primary dealers
- Regular calendar auction/Dutch-style auction system
- Regular calendar auction/minimum-price offering system
- Reconstitution
- Reopened issue
- Stop yield
- Stripped Treasury security
- Separate Trading of Registered Interest and Principle of Securities (STRIPS)
- Tap system
- Term repo
- Trademark zero-coupon Treasury securities
- Treasury bills
- Treasury bonds
- Treasury inflation protection security (TIPS)
- Treasury notes
- Treasury receipt (TR)
- When-issued (wi) market
- Yield on a bank discount basis

QUESTIONS

1. Why do government dealers use government brokers?
2. Consider the following Treasury auction and results:

   Total to be issued = $9.00 billion
   Noncompetitive bids = $3.44 billion

   Total competitive bids received:

Amount ($ billions)	Bid (yield %)
$0.20	7.55% (lowest yield/ highest price)
0.26	7.56
0.33	7.57
0.57	7.58
0.79	7.59
0.96	7.60
1.25	7.61
1.52	7.62 (stop or largest yield/ stop or lowest price)
2.00	7.63
1.12	7.64
1.10	7.65
No bids above 7.65%	

   a. How much is available to be awarded to competitive bidders?
   b. What is the stop yield?
   c. Which bidders will be awarded securities?
   d. At what yield will a winning bidder be awarded securities?
   e. If a bidder bid for $10 million at the stop yield, how much will be awarded to that bidder?
   f. What is the bid-to-cover ratio for this auction?
3. Suppose that the price of a Treasury bill with 90 days to maturity and a $1 million face value is $980,000. What is the yield on a bank discount basis?
4. Suppose a portfolio manager purchases $1 million of par value of a Treasury inflation protection security. The real rate (determined at the auction) is 3.2%.
   a. Assume that at the end of the first six months the CPI-U is 3.6% (annual rate). Compute (1) the inflation adjustment to principal at the end of the first six months, (2) the inflation-adjusted principal at the end of the first six months, and (3) the coupon payment made to the investor at the end of the first six months.
   b. Assume that at the end of the second six months the CPI-U is 4.0% (annual rate). Compute (1) the inflation adjustment to principal at the end of the second six months, (2) the inflation-adjusted principal at the end of the second six months, and (3) the coupon payment made to the investor at the end of the second six months.
5. a. What is the measure of the rate of inflation selected by the U.S. Treasury for determining the inflation adjustment for Treasury inflation protection securities?
   b. Suppose that there is deflation over the life of a Treasury inflation protection security resulting in an inflation-adjusted principal at the maturity date that is less than the initial par value. How much will the U.S. Treasury pay at the maturity date to redeem the principal?
   c. Why is it necessary for the U.S. Treasury to report a daily index ratio for each TIPS issue?
6. a. Does the U.S. Department of the Treasury use a single-price or multiple-price auction in the issuance of Treasury coupon securities?
   b. How is the yield of winning bidders determined in a Treasury auction?
7. a. What is the difference between a STRIP, a trademark Treasury zero-coupon security, and a Treasury receipt?
   b. What is the most common type of Treasury zero-coupon security?
8. a. How can a repurchase agreement be used by a dealer firm to finance a long position in a Treasury security?
   b. One party in a repo transaction is said to "buy collateral," the other party to "sell collateral." Why?
   c. When there is a shortage of a specific security for a repo transaction, will the repo rate increase or decrease?
9. Which rate should be higher: the overnight repo rate, or the overnight federal funds rate? Why?

10. What economic mechanism forces the actual market price of a Treasury security toward its theoretical value based on theoretical spot rates?
11. a. Based on a yield to maturity of 12.5% for 10-year Treasury securities, demonstrate that the price of a 13% coupon, 10-year Treasury would be $102.8102 per $100 par value if all cash flows are discounted at 12.5%.
    b. Based on the theoretical spot rates in Table 2, show that the theoretical value would be $102.9304 per $100 par value.
    c. Explain why the market price for this Treasury security would trade close to its theoretical value.
12. What is a government-sponsored enterprise?
13. Explain why you agree or disagree with the following statement: "The debt of government-owned corporations is guaranteed by the full faith and credit of the U.S. government, but that is not the case for the debt of government-sponsored enterprises."
14. Fannie Mae and Freddie Mac allow certain securities that they issue to be "stripped." What does that mean?
15. Fannie Mae and Freddie Mac issue both callable and noncallable debt. For comparable-maturity issues, which debt obligation would offer a higher yield, the callable or noncallable debt?
16. What are the different methods for the issuance of government securities?
17. Why do rating agencies assign both a local currency debt rating and a foreign currency debt rating?