

The information in this chapter was last updated in 1993. Since the money market evolves very rapidly, recent developments may have superseded some of the content of this chapter.

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## **Chapter 6**

### **REPURCHASE AND REVERSE REPURCHASE AGREEMENTS**

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#### **INTRODUCTION**

The terms repurchase agreement (repo or RP) and reverse repurchase agreement refer to a type of transaction in which a money market participant acquires immediately available funds by selling securities and simultaneously agreeing to repurchase the same or similar securities after a specified time at a given price, which typically includes interest at an agreed-upon rate. Such a transaction is called a repo when viewed from the perspective of the supplier of the securities (the party acquiring funds) and a reverse repo or matched sale-purchase agreement when described from the point of view of the supplier of funds.

In general, whether a given agreement is termed a repo or a reverse depends largely on which party initiated the transaction, but there are a few exceptions. RP transactions between a dealer and a retail customer or between a dealer and the Federal Reserve, for example, are usually described from the dealer's perspective. Thus, a retail investor's purchase of securities and commitment to resell to a dealer is termed a repo because the dealer has sold the securities under an agreement to repurchase. Similarly, when the Federal Reserve temporarily supplies funds to the market by buying securities from dealers with a commitment to resell, the transaction is called a repo; the converse transaction, in which specific securities are sold from the System's portfolio for immediate delivery and simultaneously repurchased for settlement on the desired date, is called a matched sale-purchase agreement (MSP). (When the Fed is involved, the term "reverse repo" generally is not used, although MSPs produce the reverse effect on reserves as RPs.)

In many respects, repos are hybrid transactions that combine features of both secured loans and outright purchase and sale transactions but do not fit cleanly into either classification. The use of margin or haircuts in valuing repo securities, the right of repo borrowers to substitute collateral in term agreements, and the use of mark-to-market provisions are examples of repo features that typically are characteristics of secured lending arrangements but are rarely found in outright purchase and sale transactions. The repo buyer's right to trade the securities during

the term of the agreement, by contrast, represents a transfer of ownership that typically does not occur in collateralized lending arrangements.

## **CHARACTERISTICS OF RP AGREEMENTS**

**Maturities** RP agreements usually are arranged with short terms to maturity—overnight or a few days. Longer-term repos are arranged for standard maturities of one, two, and three weeks and one, two, three, and sometimes six months. Other fixed-term, multi-day contracts are negotiated occasionally and repos also may be arranged on an "open" or continuing basis. Continuing contracts resemble a series of overnight repos; they are renewed each day with the repo rate or the amount of funds invested adjusted to reflect prevailing market conditions. If, for example, the market value of the securities being held as collateral were to fall below an agreed-upon level, the borrower would be asked to return funds or provide additional securities. Continuing contracts usually may be terminated on demand by either party.

**Principal Amounts** RP transactions are usually arranged in large dollar amounts. Overnight contracts and term repos with maturities of a week or less are often arranged in amounts of \$25 million or more, and blocks of \$10 million are common for longer-maturity term agreements. Although a few repos are negotiated for amounts under \$100,000, the smallest customary amount for transactions with securities dealers is \$1 million.

**Yields** The lender or buyer in an RP agreement is entitled to receive compensation for use of the funds provided to its counterparty. In some agreements, this is accomplished by setting the negotiated repurchase price above the initial sale price, with the difference between the two representing the amount of interest owed to the lender. It is more typical, however, for the sale and repurchase prices to be the same, with an agreed-upon rate of interest to be paid separately by the borrower on the settlement date. It should be noted, however, that the provider of funds in a standard repo transaction earns only the agreed-upon rate of return. If a coupon payment is made on the underlying securities during the term of the agreement, it is common practice for the repo borrower to receive the payment.

**Determinants of RP Rates** The interest rate paid on RP funds, the repo rate of return, is negotiated by the repo counterparties and is set independently of the coupon rate or rates on the underlying securities. In addition to factors related to the terms and conditions of individual repo arrangements, repo interest rates are influenced by overall money market conditions, the competitive rates paid for comparable funds in related markets, and the availability of eligible collateral.

Repurchase agreements are close substitutes for federal funds borrowings, so the activities of institutions that have direct access to both markets should keep the rates on RP and federal funds transactions in close relationship to each other. In addition to commercial banks, these institutions are savings and loan associations, mutual savings banks, credit unions, and federally related credit agencies such as the Federal Home Loan Banks. For example, when the demand for reserves is high relative to the existing supply, depository institutions bid more aggressively for federal funds, thereby putting upward pressure on the federal funds rate. As the funds rate rises, some institutions will turn to the RP market to raise funds, which also puts upward pressure on the RP rate. Both rates will continue to rise until the demand and supply for reserves in the banking system are again in balance.

The overnight federal funds rate generally exceeds the overnight RP rate, reflecting the compensation investors require for lending unsecured in the federal funds market rather than investing in a collateralized RP agreement. The spread between the federal funds rate and the RP rate has varied substantially over time, generally widening during periods of rapid increases in the funds rate and narrowing as the funds rate has stabilized or declined, regardless of the overall level of rates. Movements in the spread also tend to reflect changes in the availability of eligible collateral and in the perceived riskiness of RP investments. A decline in the volume of securities held in dealers' inventories, for example, would typically be associated with a widening in the spread, as the reduced demand for RP financing by dealers would tend to exert downward pressure on the RP rate relative to the funds rate. By contrast, the RP rate has tended to rise relative to the federal funds rate when net borrowing in the RP market by dealers has increased sharply. At times, the additional financing burden has contributed to chronically tight and sometimes negative spreads between federal funds and RP rates.<sup>1</sup> The spread also has narrowed considerably when the security of the RP agreement itself has been called into question, most often as a result of failures of government securities dealers.

**Calculation of RP Returns** RP rates are quoted on an investment basis with a bank discount annualization factor.

The dollar amount of interest earned on funds invested in an RP is determined as follows:

$$\text{Interest earned} = \text{funds invested} \times \text{RP rate} \times (\text{number of days}/360).$$

For example, a \$1 million overnight RP investment at a 5.75 percent rate would yield an interest return of \$159.72:

$$\$1,000,000 \times .0575 \times (1/360) = \$159.72.$$

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<sup>1</sup> The spread was negative over much of 1991 and 1992, perhaps reflecting the inability or unwillingness of banks to engage in arbitrage transactions to eliminate the differential.

If the funds were invested in a ten-day term agreement at the same rate of 5.75 percent, the investor's interest earnings would look as follows:

$$\$1,000,000 \times .0575 \times (10/360) = \$1,597.22.$$

As a final example, suppose that the investor had entered into a continuing contract with the borrower at an initial rate of 5.75 percent, but withdrew from the arrangement after a period of five days. Assuming RP rates changed as indicated below, the investor's return over the period would be \$802.22:

Day	RP Rate	Calculation	Interest
First day	5.75	$\$1,000,000 \times .0575 \times (1/360) =$	\$159.72
Second day	5.80	$\$1,000,000 \times .0580 \times (1/360) =$	\$161.11
Third day	5.83	$\$1,000,000 \times .0583 \times (1/360) =$	\$161.94
Fourth day	5.78	$\$1,000,000 \times .0578 \times (1/360) =$	\$160.56
Fifth day	5.72	$\$1,000,000 \times .0572 \times (1/360) =$	<u>\$158.89</u>
Total interest earned:			\$802.22

If the investor had entered into a five-day term agreement at the rate of 5.75 percent prevailing on the first day, he would have earned only \$798.60 in interest. Thus, in this hypothetical example, the movement in rates worked to the investor's advantage.

**Valuation of Collateral** Although most repo transactions involve the exchange of U.S. Treasury and federal agency securities, including mortgage-backed pass-through securities, and other instruments with real or perceived low credit risk, the agreements themselves are not risk-free. RPs, especially longer-term contracts, entail both interest rate risk and credit risk, which must be taken into account when an RP contract is negotiated. Typically, the securities used as collateral are valued at the current market price, plus accrued interest calculated to the maturity date of the agreement when coupon-bearing issues are used, less a margin of overcollateralization or "haircut" for term agreements.

**Taking Margin and Marking to Market** Normally, the initial RP price is less than the market value of the underlying securities, which reduces the lender's exposure to market risk. Government securities dealers, for example, frequently take such a haircut on reverses arranged with nondealer customers to cover their exposure on the funds transferred.

Inasmuch as the size of the haircut should be adequate to guard against the potential loss from adverse price movements during the repo term, haircuts tend to be larger the greater the price volatility of the underlying securities with respect to a given change in interest rates. Hence, haircuts tend to increase as the term to maturity of the repo securities lengthens, and haircuts for discount

bonds typically exceed those of premium bonds. Haircuts also tend to increase with credit risk, so those taken on private money market instruments typically exceed those of comparable maturity Treasury securities.

Because both parties in a term repo arrangement are exposed to interest rate risk, it is a fairly common practice to have the collateral value of the underlying securities adjusted daily ("marked to market") to reflect changes in market prices and to maintain the agreed-upon margin. Accordingly, if the market value of the repo securities declines appreciably, the borrower may be asked to provide additional collateral. Then again, if the market value of the securities rises substantially, the lender may be required to return the excess collateral to the borrower.

***Treatment of Accrued Interest*** Prior to the failure of Drysdale Government Securities in May 1982, it was common practice in the RP market to ignore the value of accrued interest in pricing RPs using coupon-bearing securities. This practice enabled Drysdale to acquire a substantial amount of "undervalued" securities, despite its limited capital base. Drysdale used the securities it had reversed in to make short sales to a third party for an amount that included the accrued interest. Using the surplus cash generated, Drysdale was able to raise working capital and to make interest payments to its other repo counterparties. The strategy worked adequately until May 17, 1982, when cumulative losses on Drysdale's interest rate bets caused it to be unable to pay the interest on securities it had borrowed.

This episode illustrated the risk to repo borrowers of not including accrued interest in the initial price of the repo security. Later that year, in response to the weaknesses exposed by the Drysdale affair, full accrual pricing, in which accrued interest is included in full in the initial purchase and resale prices, was adopted as standard market practice, largely at the impetus of the Federal Reserve Bank of New York.

## **LEGAL STATUS OF RP AGREEMENTS**

The bankruptcy of Lombard-Wall, Inc. in August 1982, the result of the firm's inability to return funds it had obtained in overvalued long-term RPs, generated considerable uncertainty about the legal status of repos and the contractual rights of the counterparties when one of them files for protection under federal bankruptcy laws. Prior to Lombard-Wall's bankruptcy, repo market participants operated under the assumption that the purchaser of repo securities was entitled to liquidate them if the seller was unable to fulfill the terms of the agreement at settlement. The validity of this assumption was tested in the proceedings following Lombard-Wall's bankruptcy filing. Federal Bankruptcy Judge Edward J. Ryan initially froze all securities that Lombard-Wall had sold under repurchase agreements. After permitting a number of counterparties to sell off their

securities, he ruled in September 1982 that the RP agreements Lombard-Wall had negotiated with a particular bank were secured loans and, therefore, subject to the "automatic stay" provisions of the Bankruptcy Code, which block any efforts of a creditor to make collections or to enforce a lien against the property of a bankrupt estate. According to this interpretation, even if the lender had acquired actual title to the securities, the borrower would be deemed under the law to have an equitable interest in the securities. Although this last ruling dealt specifically with only one bank, it was viewed as a precedent.

At the urging of primary government securities dealers and some prompting by the Federal Reserve Bank of New York, Congress amended Title 11 of the U.S. Code to exempt certain repurchase agreements from the automatic stay provisions of the Bankruptcy Code when it enacted the Bankruptcy Amendments Act of 1984 in June of that year. Coverage is limited to overnight RPs and term agreements up to a year in Treasury and agency securities and selected money market instruments. The legislation does not resolve the question of whether an RP agreement is a secured lending arrangement or a purchase and sale transaction, but it enables lenders to liquidate any repo securities in their possession under either interpretation.

The legislation, however, left open the question of the rights of repo counterparties who are not in possession of the repo collateral at the time of a bankruptcy filing. This question was soon raised in 1985 with the failures of a few unregistered nonprimary government securities dealers, most notably E.S.M. Government Securities, Inc. and Bevill, Bresler, and Schulman Asset Management Corp. Investors dealing with these firms failed to take adequate steps to protect against custodial risk. Failure to establish appropriate safeguards resulted in sizable losses for a number of the repo counterparties of E.S.M. and Bevill, Bresler, and Schulman when the firms filed for bankruptcy in 1985. In some instances, investors reportedly were sold nonexistent securities, while in others, the same securities were "sold" under repo to a number of investors.

At issue in the bankruptcy proceedings was the question of whether the repo counterparties had a priority legal interest in the securities under the control of the bankruptcy trustee or whether they were general unsecured creditors of the bankrupt estate. This depended to a large extent on whether the repos in question were secured loans or purchases and sales. In reviewing the circumstances of the Bevill, Bresler, and Schulman case, the Bankruptcy Court ruled in October 1986 that because the basic custom in the market is to treat repo transactions as consummated sales and contracts to repurchase, the same characterization should be applied in the event of the default and subsequent bankruptcy of one party. Hence, the repo counterparties to Bevill, Bresler, and Schulman were judged to qualify as customers under the Securities Investor Protection Act and thus were entitled to preferred status in distribution of the firm's assets and up to \$500,000 in SIPC insurance.

The Court made other important rulings under Article 8 of the Code, including the finding that a broker-dealer has "effective possession" of securities in the possession of its clearing bank that permits it to make deliveries to its customers, but that such possession is limited to only those securities held for the broker-dealer in a segregation account; the clearing bank retains a contractual lien in those securities remaining in the broker-dealer's general clearing account. (The distinction between a segregation account and general account is explained below.)

## **REPO CUSTODIAL ARRANGEMENTS**

Usually, when an RP is arranged, the underlying securities are transferred against payment over the Federal Reserve's securities wire ("Fedwire"). At maturity, the RP collateral is returned over Fedwire against payment. Direct access to the Federal Reserve's securities and payments transfer systems is restricted, however, to depository institutions and selected special entities, including foreign central banks and federally sponsored agencies that are statutory fiscal principals. Consequently, transfers of repo securities usually are processed by means of Reserve Bank credits and debits to the securities and clearing accounts of depository institutions acting as clearing agents for their customers. Transfers of physical securities also typically involve clearing agents.

The transaction costs associated with the payment for and delivery of repo securities include some combination of securities clearance fees, wire-transfer charges for securities in book-entry form, custodial fees, and account-maintenance fees. The exact charges can vary considerably from case to case depending on the type of securities involved and the actual method of delivery. Fedwire charges for securities transfers are slightly higher, for example, for transfers of agency securities than for Treasury securities. In any case, the total transaction costs to process transfers of securities from the borrower to the lender are higher the greater the number of intermediate transactions. Although these costs are often inconsequential for longer-maturity transactions in large dollar amounts, they can add significantly to the overall costs of other transactions.

In order to avoid some of these costs and to increase the investor's net yield, dealers offer their repo counterparties a number of collateral arrangements that do not involve the actual delivery of collateral to the lender and concomitant transfer over Fedwire. Not surprisingly, the rates available to investors in such non-possessory repos are higher than rates offered on standard two-party RPs with collateral delivery. Of course, the risks may be greater as well.

Among the least expensive options for holding repo collateral is the "duebill" or letter repo. Under a letter repo, the borrower, typically a securities dealer, merely sends a transaction confirmation to the lender. Although specific securities might be named as collateral, the lender does not have control of the

securities and relies for the most part on the integrity and creditworthiness of the dealer for protection. Letter repo arrangements are used most often in overnight arrangements involving small par amounts or in transactions with nonwireable securities. Compared with most other common repo arrangements, letter repo arrangements give a dealer greater control over the underlying collateral, enabling the dealer to make last-minute substitutions at low cost if specific securities previously designated as collateral are needed to satisfy other commitments.

A common letter repo arrangement is the "hold-in-custody" repo in which the borrower retains possession of the repo securities but either transfers them internally to a customer account or delivers them to a bulk segregation account or a bulk repo custody account at its clearing bank. The extent to which the investor's interest in the pledged securities is protected depends on the type of custody arrangement. If the borrower acts as both custodian and principal in the transaction, the lender again relies mostly on the borrower's integrity and creditworthiness. Even when a clearing bank is involved, if the securities are held in a bulk segregation account, the bank has no direct obligations to the dealer's individual repo customers; the dealer's customers are identified only in the dealer's own accounting records and not in those of its clearing bank. This contrasts with a bulk repo custody arrangement in which the bank performs some policing functions and also provides some form of direct confirmation to the repo customers.

In situations involving nondelivery of RP collateral, lenders can best protect their claim to repo securities by using "safekeeping" arrangements involving a clearing bank/custodian acting solely in their behalf or jointly as agent for both repo counterparties. The most popular of these arrangements is the "tri-party repo" in which a custodian becomes a direct participant in the repo transaction with the borrower and lender. Tri-party agreements usually are arranged between dealers and major customers with the dealer's clearing bank acting as custodian. The clearer/custodian ensures that exchanges of collateral and funds occur simultaneously and that appropriate operational controls are in place to safeguard the investor's interest in the underlying collateral during the term of the contract. When the repo is arranged, the clearing bank protects the investor's interest in the collateral by making an entry in its internal records transferring the securities from the dealer's general account ("box") to a segregation account. When the repo is unwound at maturity, the clearing bank returns the securities to the dealer's general account and wires the loan repayment to the lender. This typically occurs around 9:00 a.m. ET.

The rates available to investors in tri-party repos are lower than those available on nonsegregated RPs without collateral delivery, but higher than the rates offered on standard two-party RPs with delivery. In general, there is a trade-off between risk and return in the RP market: the greater the control the RP investor (lender) has over his collateral, the lower is his return.

## **PARTICIPANTS IN THE RP MARKET**

**Investors** A variety of institutional investors, including banks and thrift institutions, nonfinancial corporations, mutual funds, pension funds, and state and local government authorities and other public bodies, derive benefits from RPs and reverse RPs with dealers. RPs enable investors to earn a return above the risk-free rate on Treasury securities without sacrificing liquidity. RPs also offer greater flexibility than other money market instruments because their maturities can be tailored precisely to meet diverse investment needs. In contrast, CDs have minimum maturity at issue of seven days, and commercial paper is seldom written with maturities as short as a day.

Repos are attractive investments for participants subject to "prudent investor" or other types of asset restrictions. Many public bodies, for example, are required by law to invest tax receipts and the proceeds from note and bond sales in Treasury or federal agency issues until the funds are to be disbursed. They regularly invest in repos collateralized by government securities rather than buying the securities outright, and they record the ownership of the securities rather than the repos on their books. The ability to custom-tailor repo maturities and to adjust the amounts invested on a day-to-day basis make repos well suited to the irregular cash flow patterns experienced by these entities. School districts and other local public authorities tend to arrange RP transactions with local banks or smaller dealers, while at the state level, larger dealers and money center banks tend to be the usual counterparties.

Money market mutual funds also are major participants in the RP market. Many funds restrict their repo investments to instruments issued or guaranteed by the U.S. government or federal agencies, but others enter into RPs in any securities in which they are authorized to invest directly. Because RPs are deemed to be loans under the Investment Company Act of 1940 and carry risks not typically associated with direct security investments, mutual funds often limit their RP investments to RPs with maturities of seven days or less that are arranged with member banks of the Federal Reserve System or dealers on the Federal Reserve Bank of New York's list of reporting dealers. Some funds further restrict their agreements to banks above a certain asset size or to institutions whose securities the fund considers eligible to purchase directly.

**Dealers** Dealers historically have tended to be net borrowers in the RP market, especially in overnight transactions. In some instances, however, dealers have been net lenders of RP funds, the result of shorting securities that were obtained under repo.

**Financing** Major dealers and large money center banks finance the bulk of their holdings of Treasury and agency securities with RP transactions. Most of these transactions are arranged on a short-term basis (overnight or continuing

contracts) via direct contact with major customers, typically banks, public entities, pension funds, money market mutual funds, and other institutional investors. Early each morning, a dealer's financing desk contacts major customers to arrange repo financing to replace maturing RPs and to meet expected additions to the firm's securities inventory; the financing desk also arranges reverse RPs to cover known or planned short sales and to meet specific customer demands. The bulk of these arrangements are negotiated by 10:00 a.m. ET.<sup>2</sup>

If at the end of the day, a dealer is still in need of funds, it may borrow funds from its clearing bank through a box loan, which is a loan collateralized by any securities in the dealer's general account that have not been allocated to other uses. Such loans are expensive, so dealers use them only as a last resort. A less expensive option for a dealer faced with unexpected financing needs late in the day is to obtain a "position" loan from another bank. When the agreement is finalized, the lending bank wires the specified funds to the dealer's clearing bank, which, in turn, segregates the required amount of the dealer's securities as collateral for the loan and acts as custodian for the lender. The securities are released to the box at the start of business on the following trading day and the loan is repaid.

***Reverse RPs and Matched Book Transactions*** Major dealers commonly use reverse RPs to establish or cover short positions and to obtain specific issues for delivery to customers. This practice is similar to securities borrowing arrangements in which the dealer obtains securities in exchange for funds, other securities, or a letter of credit. Reverses are typically cheaper, however, and provide greater flexibility in the use of collateral, in that they can be arranged for fixed maturities while borrowing arrangements usually may be terminated on a day's notice at the option of the securities lender.

In many instances, a dealer acts as intermediary in the repo market between ultimate borrowers and suppliers of funds. A dealer acts as principal on each side of such arrangements and not as agent, borrowing funds from one party (against the sale of securities) and relending the funds to another party (against the receipt of securities).<sup>3</sup> The combination of RPs and reverses in this fashion is termed a "repo book." A repo book in which an RP and a reverse RP in the same security have equal terms to maturity is referred to as a "matched book." Larger, better-

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<sup>2</sup> Dealers generally begin making tentative assignments of collateral to newly arranged RPs by midday, in anticipation of the actual receipt of incoming securities and based on past experience with customer constraints on acceptable collateral. Collateral assignments are subsequently adjusted to cover unanticipated cash trades and to accommodate specific customer needs, including activity of the Domestic Trading Desk of the Federal Reserve Bank of New York.

<sup>3</sup> Dealers engaging in lending arrangements of this sort generally obtain funds in the overnight market from nonfinancial corporate customers, and in turn they lend these funds in the term market to financial institutions.

capitalized dealers are able to profit through arbitrage in matched transactions between smaller dealers and nondealer customers because of the favorable rates at which they obtain RP funds and the differential in the margin taken on the collateral in the two sides of the transaction.

At times, a dealer may choose not to match the maturities of the RPs and reverses in its repo book in an effort to increase profits. If short-term interest rates are expected to rise in the very near term, for example, a dealer might arrange an RP with a longer term than the reverse RP in order to lock in prevailing borrowing rates. Conversely, in a declining rate environment, a longer-term reverse might be financed through a number of shorter-term RPs arranged at successively lower rates.

**Brokers** If a dealer has exhausted its regular customer base but still is in need of funds or specific collateral, it may contact a repo broker. The repo brokers' market is particularly important as a source of specific issues in short supply ("on special"). Most repo brokers maintain lists of a few hundred customers that are regular repo market participants that they use to satisfy customer requests for funds or collateral. Repo brokers, in contrast to their dealer customers, generally undertake transactions only as agent. Their profits are derived from commissions or spreads on completed transactions. Some brokers restrict their activities solely to agreements between dealers, while others also facilitate transactions between dealers and investors and between investors.

The terms available for transactions in the brokered repo market are displayed on brokers' pages on electronic data services. These screens provide brokers' customers with bid rates at which other repo market participants are prepared to reverse in securities (provide funds) for various lengths of time and offer rates at which they are willing to sell securities (borrow funds) for various lengths of time. A participant who wishes to do a repo can look at his broker's screen to see if there are any bids at the desired maturity for the securities he wishes to sell. If there are none he can have his offer placed on the screen. Similarly, someone who wants to reverse in certain securities can look for offers on the screen and can have his own bid shown on the screen if he sees none.

**Federal Reserve** In addition to its use as a short-term market for investing and lending funds, the repo market is the primary medium through which the Federal Reserve Bank of New York's Domestic Trading Desk (the Desk) conducts open market operations on behalf of the Federal Reserve System. The Federal Reserve's use of RPs can be traced to around 1917, when RPs were used to provide temporary funds to member banks. Operations with banks were discontinued a few years later and were not resumed until 1975, when bank dealers were included in the list of eligible counterparties. Throughout the 1920s and early 1930s, the Fed continued to conduct RPs with nonbank, dealer

counterparties, but the transactions were used infrequently. In the mid-1940s, RP operations ceased entirely when the Federal Open Market Committee terminated the Desk's authority to conduct RPs on behalf of the System.<sup>4</sup> RPs were not used again until mid-1949. System RP transactions were arranged at fixed rates until 1972, when the current system of competitive bidding for RP funds was implemented. The Fed's use of matched sale-purchase agreements to implement monetary policy directives was begun in July 1966. Currently, most open market operations by the System involve overnight or over-the-weekend RPs and matched sale-purchase transactions with dealers. The Fed's daily transactions frequently total about \$1.5 billion to \$6 billion.

When the Manager of the System Open Market Account needs to inject reserves into the banking system in a given period to offset a temporary shortage, the Desk enters into RP agreements with selected primary dealers. The initial purchase of securities by the System adds to the supply of nonborrowed reserves. The injection is only temporary, however, in that the extra reserves are subsequently drained when the transaction is unwound at maturity. These agreements usually are arranged overnight or for specified periods up to, but less than, 15 days and are collateralized by Treasury and federal agency securities. Dealers usually are given the option to terminate agreements before maturity.

When reserve projections indicate a need to drain reserves on a temporary basis, the Desk arranges matched sale-purchase agreements with primary dealers. The initial sale of securities by the System causes reserves to be drained from the banking system; the flow of reserves is subsequently reversed when the System repurchases the securities. Matched sale-purchase transactions typically are arranged in Treasury bills, using maturities in which the System has substantial holdings.

In addition to the transactions arranged in the market on behalf of the System Account, the System also provides a temporary pooled cash management facility for foreign official and international accounts. Using the funds in this facility, the Desk provides these accounts with temporary investments in Treasury securities by arranging RPs for them in the market or by arranging MSPs internally with the System Account.

## **SELECTED REPO ARRANGEMENTS**

Although standard overnight and term RP arrangements in Treasury and federally related agency securities are most prevalent, market participants sometimes alter various contract provisions in order to accommodate specific investment needs

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<sup>4</sup> Because of the time it takes to complete the accounting for RP transactions, RPs for the System actually are arranged for the account of the Federal Reserve Bank of New York, rather than directly for the System Account, which must be divided each business day among the 12 regional Federal Reserve Banks.

or to provide flexibility in the designation of collateral, particularly in longer-term agreements. Some RP contracts, for example, are negotiated to permit substitutions of the securities subject to the repurchase commitment. Dollar repurchase agreements ("dollar rolls"), in which the initial seller's obligation is to repurchase securities that are substantially similar, but not identical, to the securities originally sold, are included in this category. There are two main types. In a "fixed-coupon dollar roll" the seller agrees to repurchase securities that have the same coupon rate as those sold in the first half of the transaction. A "yield maintenance agreement" is a slightly different and less common variant in which the seller agrees to repurchase securities that provide roughly the same overall market return as the original securities. In each case, the maturity of the repurchased securities must be within an agreed-upon range, but need be only approximately the same as that of the original securities.

Dollar rolls usually are arranged using federally related mortgage-backed securities. For borrowers, typically savings and loan associations, dollar rolls are a low-cost financing vehicle. At the same time, dollar rolls provide the lenders of funds, usually securities dealers, with access to specific mortgage-backed securities for use in covering short sales or satisfying other commitments.

Unlike most coupon-bearing securities, which pay interest semiannually, mortgage-backed securities pay interest monthly, and there may also be unscheduled principal payments as a result of prepayments. These monthly cash flows must be addressed specifically in the contract terms when the maturity of a dollar roll extends beyond month-end. That is, the counterparties must negotiate which of them is to receive the monthly interest and principal payments. In a standard RP, it is common practice for the borrower to receive all coupon interest and final principal payments. In a dollar roll, however, the reverse tends to be true. Dollar rolls are typically structured so that the lender retains any principal and interest earned on the underlying mortgage-backed securities during the "roll" period. Roll periods generally range from 1 to 11 months, with most contracts written for 1 or 3 months.

Repo arrangements can also be structured to provide flexible terms to maturity. In a "reverse to maturity," for example, the initial seller's repurchase commitment is effectively eliminated altogether because the maturity of the agreement covers the remaining term to maturity of the underlying securities. Reverses to maturity typically involve coupon-bearing securities trading at a discount from their book value, the price at which the "seller" initially purchased them. An outright sale under these circumstances would result in a capital loss, which many institutional investors are reluctant to realize. A reverse to maturity overcomes this difficulty by enabling the seller to give up the overall long position in the securities and acquire funds to invest in higher-yielding assets, without having to actually sell the underwater securities outright. The total dollar amount of the seller's repurchase commitment in the transaction depends on the manner

in which the final principal payment on the underlying securities is handled. Usually, the purchaser retains the final payment of interest and principal, which is received directly from the issuer of the securities. This amount is then netted against the seller's repurchase obligation.

Another common repo arrangement with a flexible term to maturity is the so-called flex repo. A flex repo is a term agreement arranged between a dealer and a major customer, typically a corporation, or a municipality or similar authority, in which the customer buys securities from the dealer and may sell some of them back prior to the final maturity date. The funds invested in a flex repo often are intended for use in financing construction or similar projects to be completed in phases. When funds are needed for a given phase of the project, the customer sells the required amount of securities back to the dealer. Under some flex repos, there is a prearranged draw-down schedule, although the investor is not required to adhere to it rigidly. Usually, there is considerable uncertainty regarding the timing of withdrawals. As compensation for accepting the added interest rate risk associated with flex repos, the dealer pays a lower rate than for comparable term agreements. Flex repos usually are collateralized by government-issued or government-backed securities, but dealers are given broad leeway to substitute collateral.

Index repos are term agreements with an underlying interest rate that resets periodically as a function of the federal funds rate, LIBOR, or some other short-term rate. Most indexed repos resemble flex repos in the sense that they are term arrangements that enable the investor to sell securities back to the dealer or buy additional securities as needed. Index repos are used regularly to hedge or finance positions in securities such as floating-rate notes and floating-rate tranches of collateralized mortgage obligations that have rates indexed to the federal funds rate, LIBOR, or other short-term rates. For example, a company that has issued floating-rate debt to finance a pending renovation project can invest the proceeds in an RP agreement tied to the same underlying index. As a result, changes in interest rates during the life of the project will produce offsetting changes in the firm's interest rate expense and its interest earnings.

## **GROWTH AND DEVELOPMENT OF THE RP MARKET**

As a result of the continued growth in the types and volume of arrangements, the RP market has become by most accounts one of the largest and most liquid financial markets in the world. The exact size of the market in terms of total daily activity is unknown. Available data on the volume of activity consist mainly of reports of the repo activities of banks, thrifts, and primary government securities dealers; other market participants are not required to file regulatory reports. Although the reported figures provide only an incomplete picture of the absolute size of the RP market, they help to illustrate how rapidly the market has grown

in recent years. The average daily volumes of RPs and reverse RPs by primary dealers over the past 12 years are shown, respectively, in Tables 1 and 2. The data indicate that average daily activity in repos and reverses by major dealers has more than doubled since the mid-1980s and has increased roughly tenfold since 1981. The same is true of matched transactions, which are shown as memoranda items to the tables. The favorable financing rates, flexible maturities, and variety of terms and collateral arrangements available likely have led to a similar expansion in the use of repo transactions by other market participants as well.

TABLE 1  
**Volume of Repurchase Agreements**  
**by Term of Contract\***  
(millions of dollars)

Year	Overnight and Continuing†	Term Agreements†	Total†	Memorandum: Matched Book
1981	35,641	29,578	65,219	29,074
1982	51,725	43,495	95,220	47,942
1983	58,029	44,486	102,515	45,009
1984	75,836	57,248	133,084	63,153
1985	103,612	70,149	173,760	79,745
1986	141,943	102,459	244,402	120,390
1987	170,749	121,216	291,965	163,963
1988	172,720	137,046	309,766	191,164
1989	219,115	179,699	398,815	236,198
1990	236,958	185,210	422,168	272,666
1991	282,487	211,566	494,053	309,845
1992	346,359	282,954	629,313	398,235

\*Figures are obtained from reports submitted weekly to the Federal Reserve Bank of New York by the U.S. government securities dealers on its published list of primary dealers.

†Figures include matched agreements.

Note: Details may not add to totals because of rounding.

TABLE 2  
**Volume of Reverse Repurchase Agreements**  
**by Term of Contract\***  
(millions of dollars)

Year	Overnight and Continuing <sup>†</sup>	Term Agreements <sup>†</sup>	Total <sup>†</sup>	Memorandum: Matched Book
1981	14,667	32,016	46,683	28,341
1982	26,729	48,348	75,078	47,910
1983	29,275	52,650	81,925	46,533
1984	44,200	68,578	112,778	66,315
1985	68,100	80,650	148,750	83,186
1986	99,048	108,628	207,676	123,628
1987	126,700	148,310	275,010	168,348
1988	136,394	177,474	313,868	198,127
1989	157,926	225,184	383,110	246,213
1990	159,272	221,658	380,930	279,238
1991	181,288	235,841	417,129	311,508
1992	209,956	304,620	514,576	410,358

\*Figures are obtained from reports submitted weekly to the Federal Reserve Bank of New York by the U.S. government securities dealers on its published list of primary dealers.

<sup>†</sup>Figures include matched agreements.

Note: Details may not add to totals because of rounding.

## REFERENCES

Garbade, Kenneth D. *Securities Markets*. New York: McGraw-Hill, 1982.

Haberman, Gary, and Catherine Piche. "Controlling Credit Risk Associated with Repos: Know Your Counterparty," Federal Reserve Bank of Atlanta *Economic Review*, vol. LXX (September 1985), pp. 28-34.

Practising Law Institute. "Repurchase and Reverse Repurchase Agreements Revisited." New York: Practising Law Institute, 1984.

Ringsmuth, Don. "Custodial Arrangements and Other Contractual Considerations," Federal Reserve Bank of Atlanta *Economic Review*, vol. LXX (September 1985), pp. 40-48.

Stigum, Marcia. *The Repo and Reverse Markets*. Homewood, Ill.: Dow Jones-Irwin, 1989.

Yezer, Renee Raffini. "The Use of Repurchase Agreements by Broker-Dealers." Washington: Securities and Exchange Commission, Directorate of Economic and Policy Analysis, 1987.