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PRIMER

“REPO” OR REPURCHASE AGREEMENTS MARKET

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Introduction

Recent problems in the U.S Treasury securities market has raised some questions about the role of exchange traded futures (primarily the CBOT futures contracts) and repurchase agreements in the Treasury market. The Primer is designed to help understand the repo market for Treasury securities. Although the existence of this market is not widely known, and an appreciation of its importance is even more rare, it is nonetheless a critical part of the U.S. financial system. The repo market plays an important role in the Treasury auction process (hence the ability of the federal government to raise money), the pricing of Treasury securities (the determination of the benchmark yield curve), money management for financial and non-financial corporations and highly leverage speculation in the fixed income market.

Another indication of the important of repo transactions is the size of the market. The Federal Reserve estimates that the amount of outstanding repo transaction at \$5 trillion. However the amount outstanding is small in comparison to the trading volume. The repo clearing house, which does not clear all repo transactions, reported that it cleared \$359.3 trillion in trades in 2004 – approximately \$1.4 trillion on average each trading day.

Definition

“Repo” is the name commonly used to refer to a repurchase agreement. Under a repurchase agreement, one party to the transaction, referred to as the repo side, borrows money by posting government securities as collateral. The counterparty, referred to as the reverse repo side, lends money secured by the collateral. The reverse repo party has use of the collateral for the term of the repo while the repo party retains claim to any coupon payments or price appreciation.

A repo consists of two legs or transactions. The start leg of the repo consists of the repo party transferring securities to and receiving funds from the reverse party; and the close leg consists of the reverse party transferring securities to and receiving principal and interest from the repo party. Based on these characteristics, repos are considered loans collateralized by government securities (and in some cases Fannie Mae or Freddie Mac securities). Federal regulators including the SEC, OCC and Federal Reserve Board treat repos as financing transactions, i.e. loans, although courts in some bankruptcy cases have treated them as securities transactions.

The interest rate charged for the loan is called the repo rate and with the exception of repurchase agreements on "special" collateral, the repo rate is priced consistently with other short-term interest rates in the money market. The maturity of a repo can range from overnight to a year or more. The bulk of repo transactions are overnight, a substantial share of term repos are for three months or less, and there is a thinner market for terms greater than three months.

The repo market consists of brokers, dealers, customers or end-users, and clearing institutions, and it is divided into the market for general collateral repos and special collateral repos.

Brokers

There are several inter-dealer brokers (IDBs) who act as brokers between the repo dealers. IDBs neither hold an inventory of securities nor otherwise take a position in the market. Instead they earn a brokerage commission by connecting buying dealers with selling dealers. Brokerage commissions have fallen sharply in the past several years from five basis points to one or even less for volume discounts.

The largest IDBs maintain electronic trading platforms where their clients' bid and offer prices on various repos are posted anonymously. All major dealers have access to each of these IDB screens and thus can observe all prices in the market. Dealers then communicate by telephone or electronically with an IDB in order to either post a bid or offer or to execute a trade by hitting a bid or lifting an offer.¹ Some IDBs focus on a smaller, more specialized segment of the market that is not electronically posted.

¹ A recent report by Celent estimated that 40% of IDB volume will trade electronically by 2007.

Brokering in the repo market has undergone a major change with the introduction of multilateral clearing arrangements. Until 1996, the standard practice was for the broker to protect the identities of the counterparties as they anonymously negotiated the repo rate, collateral, maturity and size of the transaction. Once these terms were agreed upon, then the counterparties would "give-up" their identities so that each could determine their counterparty credit risk. If either counterparty were unsuitable, then the entire deal would collapse unless some form of risk premium was negotiated between the parties.

The advent of multilateral clearing through FICC has changed the nature of brokering repos. Bids and offers posted on broker screens indicate whether the deal can be cleared multilaterally. FICC cleared repos are cleared through novation² and guaranteed by the clearing house and thus have the same credit risk.³ For those deals, counterparty identities need never be disclosed, and thus can be "blind" brokered.

Dealers

The second tier of the repo market is comprised of dealers. They are the clients of the IDBs. The major repo dealers are the 37 primary dealers in the Treasury securities market plus another dozen or so which act as major dealers in repos but who have chosen not to formally register as a primary dealer in Treasury securities. The major repo dealers are made up of the money center banks and the largest securities broker-dealers. In all, FICC lists about 100 members of its clearing house, likely including all of the major repo dealers. In addition, there are approximately 120 additional firms that have been granted dealer status by other dealers or inter-dealer brokers. These dealers are made up of regional banks, foreign banks and smaller securities firms.

Dealers trade with each other as well as their customers. Their profit comes from capturing their bid-ask spreads and by taking proprietary speculative positions on the term structure of interest rates in the repo market. Most dealers operate a matched book, which means that they have the same amount of borrowing through repos as they have lending through reverse repos. Although the amounts of their assets and liabilities match, dealers can take a position on the market (i.e. a proprietary speculative position on the term structure of interest rates) by structuring the term of their assets

2 The term novation in this context means to recreate or rewrite the transaction contract anew, thus creating a new identical contract but with the clearing house instead of the original counterparty.

3 In the event of a major financial failure, however, FICC rules call for a distribution of losses to clearing house members according to the proportion of trades with failed counterparties. Thus, even with GSCC novation, there is less than complete mutualization of credit risks.

differently from that on their liabilities. By borrowing long and lending short, the dealer is betting that overnight repo rates rise, and vice versa.

Customers

This group of repo end users consists of institutional money managers, insurance companies, pension funds, mutual funds, regional banks, foreign banks, hedge funds and other speculators, and non-financial corporations who are more actively managing their cash balances.

End-users look to the repo market for returns on their cash balances that are higher and safer than those found on other money market instruments. The repo market is also liquid and flexible. Flexibility enables borrowers and lenders to closely manage funds by specifying the start and repayment date of the loan. Repos are safe because there is little credit risk associated with a loan that is collateralized at a rate of 102% or higher with Treasury securities. Other end-users go to the repo market in order to borrow at a cheap interest rate "repoing out" their holdings of Treasury securities.

The customers do not have direct access to IDBs electronic broker screens and thus cannot observe all the quotes available in the market. Instead they must contact a dealer by telephone in order to ask for current dealer quotes. By placing a series of these calls, a customer can garner an estimate of the market for repo rates.

A few dealers actually offer dealer screens to their customers so that they can continually observe that dealer's bids and offers on repos. These electronic screens are usually proprietary pages transmitted over the Bloomberg network. These dealer screens, however, do not contain the same information as IDB screens. The rates quoted by dealers to customers generally differ from those in the inter-dealer market because the dealers charge a larger bid/ask spread to their customers.

Clearing

Repo transactions are cleared in either of two ways: bilaterally between counterparties or multilaterally through a clearing house. Until 1996, all repo transactions were cleared bilaterally between the two counterparties. Today, roughly one-half are cleared in this manner.

Bilateral clearing requires a transfer of funds for collateral in both the "open" and "close" leg of a repo. In the opening leg of the repo, the repo party transfers securities to the reverse repo party who transfers cash to the repo party. This is accomplished by the repo party instructing its clearing bank to transfer the securities, which is conducted over the Fed wire as a delivery-versus-payment (DVP), into the account of the counterparty. Meanwhile, the reverse party instructs its clearing bank to make the funds available for payment on the securities. Hence each leg of the repo will involve transactions fees for both parties. However if both counterparties were to use the same clearing bank, thus keeping the securities and funds within the custodial accounts of the clearing bank, then the securities and funds would be transferred without use of the Fedwire. In either case, the

clearing bank will charge a fee for the clearing services. This bilateral clearing method is still used for repos between non-FICC members, or for repos with non-standard features.

Bilateral clearing leaves each party holding the counterparty risk of the other. Although repo lending is highly collateralized (the benchmark rate of collateral is 102% of the loan principal), there is still the risk that a counterparty will fail on the contract. A substantial change in the value of the collateral or the present value of the repo itself would increase the likelihood of failure due to the inability of one party to perform or the potential benefit to one party from defaulting. Moreover, outright bankruptcy might prevent one party from fulfilling the terms of the contract.

Another type of risk in the repo market arises from the practice of counterparties temporarily “failing” to perform the close leg of the contract. The reverse repo party might “fail” on the close end of the repo by not promptly returning the collateral because of a substantial appreciation of the price of the collateral or difficulty in reacquiring the specific issue. The master trading agreement for repos stipulates that such a “fail” will result in the repo side not paying any interest on the days for which the collateral is not returned. Alternatively, the repo side might try to drop out of the transaction if the value of the collateral were to depreciate substantially. However the holder of the security, in this case the reverse repo party, can usually “put it to” the repo party in a DVP transfer and thereby force payment.

In 1996, the Government Securities Clearing Corporation (GSCC), which had been created initially by securities dealers and brokers to clear cash trades in government securities, began clearing repo transactions multilaterally. In 2003, the GSCC was merged into the Fixed Income Clearing Corporation (FICC) as a subsidiary of the Depository Trust and Clearing Corporation. Today there are about 100 members of FICC although membership is sometimes limited to comparison (confirming) transactions while others are full repo netting members.

Data from FICC offers some indication of the size of the market. In 2004, they cleared \$23.5 million transactions in Treasury securities and repurchase agreements with a value of \$710 trillion. The repo portion of this was \$359.3 trillion or slightly over half of the value of trading volume. General collateral fund (GCF) repo made up another \$172.2 trillion. In sum, this is a very large market in terms of the value of transactions although the number of transactions compares to the major securities and futures exchanges.

The FICC starts the clearing process by confirming repo trades. Confirming trades through a third-party reduces uncertainty in the market and is especially important for forward starting repos because it prevents traders from disavowing losing trades.

In the next step in the clearing process, FICC clears through novation by imposing itself as the counterparty to every transaction. In place of the contract brought to it by the counterparties or their broker, FICC substitutes

two new contracts between it and each of the counterparties. The result is that the clearing house assumes the counterparty credit risk for the repos that it clears. Although each clearing dealer thus faces almost identical credit risk for all trades made between clearing dealers (inter-dealer broker screens indicate whether the bid/offer is eligible for clearing through FICC), FICC does not distribute the risk of clearing house losses in a perfectly mutual manner. Instead the losses are distributed amongst members according to the volume of business previously conducted with the bankrupt clearing members.

Another important feature of FICC clearing is the netting of cash payments and securities transactions. Repo dealers make a large number of deals or transactions that result in enormous gross obligations to make or take cash payments on one hand and to deliver or receive securities on the other hand. Consider the example of a dealer making 10 repos on the 2-year note of \$100 million each and as many reverse repos of the same size on the same security. That amounts to \$2 billion in gross transactions. If these transactions were netted, then the cash payments would net to zero and the securities transfers too would net to zero because they would be in the same security issue. If the repos were on the 2-year note and the reverse repos were on the 5-year note, there would be no netting of securities holdings and the dealer would be required to deliver the 2-year notes and take delivery of the 5-year notes. The cash payments would nonetheless be netted. FICC estimates that netting reduces settlement obligations by more than 83% of total volume in cash and repo trading.

Multilateral clearing, which includes the novation and netting of contracts, has had a profound impact on the market. Prior to the netting of repo obligations, repo dealers, whether they were banks or broker-dealers, faced tremendous costs associated with the expansion of their balance sheets with repo trades. Netting has reduced the amount of repos reported on balance sheets and thereby it has been credited with encouraging greater trading volume and reducing the effects on trading volume caused by end-of-quarter reporting.

Special versus General Collateral Repos

The repo market for repurchase agreements is divided into repos based on general collateral and those based on specific or "special" collateral. The repo rate for general collateral repos is negotiated without reference to the use of any specific security as collateral. Broker screens list bid and offer rates for general collateral repos as repos based on government securities with less than 10 years maturity (or in some cases less than 30 maturity). Any issue within these broad classes will satisfy the repo contract. Securities used for general collateral repos are usually older "seasoned" issues that are no longer on-the-run and are less heavily traded. What is more, many general collateral repo contracts contain provisions for substitutability.

Substitutability allows the repo side to replace its posted collateral with any other qualifying securities during the term of the repo. The reverse side

of the transaction does not know prior to delivery which issue they will receive as collateral. Without the knowledge of the particular issue to be used as collateral, the negotiation of the repo rate cannot reflect the particular supply and demand conditions for the particular issue. Actual and expected changes in the value of the security therefore will not, in fact can not, be factored into the repo rate.

The repo rate for general collateral repos is determined in the market as the interest rate on a highly collateralized loan, and this rate competes against that on CDs, commercial paper, the Fed funds and other money market instruments.⁴ The demand for loans in the repo market comes from securities dealers who need to finance their securities inventories, and from others who are attracted to the repo market because it is cheaper than alternative sources of credit. Borrowers who own government securities can use them, without loss of coupon payments or price appreciation, to obtain loans more cheaply than through banks, the commercial paper market or other means. The supply of loans in the repo market comes from those with cash balances who want to earn a higher and safer return than can be found elsewhere. The interaction of these supply and demand forces determine the market repo rate.

In contrast, the repo rate on special collateral repos is negotiated on the basis of the specific security issue that is to be used as collateral. When a repo is collateralized by a specific security issue and that issue comes under extraordinary demand relative to the available supply, then the interest rate negotiated on that repo will be lower than the rate on general collateral repos. The lower repo rate reflects the extra benefit garnered by the reverse repo party from the use of the collateral. A security that is "on special" is usually an on-the-run issue or an older, off-the-run issue that still has very high trading volume. The reverse side will accept a lower return on their cash in order to obtain use of the "special" collateral, and the repo side will expect to pay a lower rate on the cash loan in exchange for giving up use of the highly sought-after securities.

"Specialness" arises from the strong demand for a specific issue relative to its available supply. Strong demand comes from the need to use liquid securities to cover or create short positions. Securities dealers who sold forward in anticipation of winning bids as the Treasury auction will add strong demand pressures to the market if their bids fail. Corporate bond underwriters will also aggressively demand the on-the-run note as collateral in order to create a short position that hedges the interest rate risk on their inventory of bonds being brought to market.

Several factors contribute to low effective supply. Legal prohibitions, transactions costs, and opportunity costs reduce the supply available for use in the repo market. For example, legal barriers prohibit some firms, such as insurance companies, pension funds, mutual funds and certain other institutional investors, from direct participation in the repo market. In

4 Stigum, Marcia, 1990, *The Money Market*, 3rd Edition, Dow Jones-Irwin Publishers.

addition, certain financial contracts contain provisions that prevent the re-hypothecation of collateral. Moreover, outstanding commitments by dealers to deliver specific issues leads them on occasion to hold on to the specific issues prior to sale. This too reduces the available supply of specific issues to the repo market. Lastly, the practice of stripping coupon securities removes them from possible use as collateral.

Holders of certain specific collateral, acquired through a term reverse repo or bought outright, can benefit when the security goes "on special." When the special repo rate drops substantially below the general collateral rate, the holder of special collateral can use it to borrow (by repoing it out) at the special repo rate and then lend the borrowed funds (through a reverse repo) at the higher general collateral rate. The difference between the two rates is the special repo spread. Consider a dealer who uses a term reverse repo to obtain use of an on-the-run 10-year note prior to it going special. When the note becomes special and its repo rate falls below the general rate, then the dealer can borrow against the collateral at the special rate of say 2% and then turn around and lend out those borrowed funds by entering a reverse general collateral repo at say 5%. That 3% spread is earned on the principal of the repos for the remaining term of the repos. The capitalized value of this benefit would equal the present value of the spread for the length of time the collateral was expected to remain on special.

While "specialness" can be a benefit to holders of special collateral, it can be similarly a cost to those who have opened short positions in the issue by reverse repoing into the security on an overnight basis. Consider the case of an investor who has reversed overnight into a liquid on-the-run issue in order to sell it and thereby create a short position. This is a typical practice for an investor hedging the price exposure on its holdings of securities of similar maturity. For example, the interest rate risk on a ten-year corporate bond can be hedged by shorting the ten-year Treasury note. The cost of this hedge includes the basis risk (which would be small) and the transactions costs (also small). Another possibly larger cost might arise if the return on the reverse repo used to obtain the note were to fall below the opportunity cost or the alternative return from lending the funds out in the general collateral market. This is precisely what happens if the security were to go on special. The hedger would receive say 2% on the funds lent out in the reverse repo after having borrowed the funds in the general collateral market for 5%. Thus the cost of holding the short position open costs the 3% divided by 360 times the principal for each day the short position is held open. This daily spread on \$100 million of principal would cost over \$286,000 a day. Such a position held for two weeks would thus cost over \$4 million in lost interest.

One way to avoid the possibility of losing the "specialness" spread when a shorted security goes special is to use a term reverse repo in order to obtain the securities that are to be shorted.

RECOMMENDED READING

Jeffrey F. Ingber, *Gets Confusing Fast: A Review of the GCF Repo Service*, The RMA Journal (May 2003);

Kenneth D. Garbade and Jeffrey F. Ingber, *The Treasury Auction Process: Objectives, Structure, and Recent Adaptations*, Federal Reserve Bank of New York Current Issues in Economics and Finance, vol. 11, number 2 (February 2005).

Jeffrey F. Ingber, *A Decade of Repo Netting*, Futures and Derivatives Law Report, vol. 25, number 5 (July 2005).



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