Why Is the U.S. Treasury Contemplating Becoming a Lender of Last Resort for Treasury Securities?

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Abstract
The U.S. Treasury announced in August 2005 that it is exploring whether to provide a backstop securities lending facility for U.S. Treasury securities. This paper examines the conceptual basis for such a facility by analogizing the market for borrowing and lending Treasury securities with the market for borrowing and lending money prior to the founding of the Federal Reserve System in 1914. An inelastic supply of currency in the nineteenth century led to periodic suspensions of convertibility of bank deposits; Congress authorized a system of Federal Reserve Banks to address the problem. A similarly inelastic supply of Treasury securities has led to several recent episodes of chronic settlement fails. A backstop lending facility would mitigate the fails problem by allowing the Treasury to act as a lender of last resort of Treasury securities during periods of unusual market stress.

Key words: securities lending, repurchase agreements, Federal Reserve, Treasury securities, settlement fails

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1. Introduction

On Wednesday, August 3, 2005, Timothy Bitsberger, the Assistant Secretary of the Treasury for Financial Markets, announced that the Department of the Treasury was exploring the idea of a backstop securities lending facility. In broad terms, the facility would make available to private market participants additional supplies of Treasury securities, over and above the amounts originally issued, on a temporary basis during periods of unusual market stress.

The idea of a backstop lending facility reflects a significant evolution in the role of Treasury securities in the American financial system. Until recently, it was a virtually universal understanding that the Treasury issued securities to finance the federal deficit and refinance maturing debt. The securities might be short-term bills intended to be attractive to corporate treasurers, or they might be long-term bonds attractive to pension funds, but they were always a consequence of the government’s need for cash. A backstop lending facility would turn this understanding on its head: the Treasury would be issuing securities not because it needs money, but because market participants need securities.

This paper explores our view of why the Treasury is contemplating such a novel facility. The touchstone of the analysis is that the Treasury would become a lender of last resort of Treasury securities much as the Federal Reserve Banks were empowered by Congress nearly a century ago to be lenders of last resort of money.

In the second half of the 19th century, credit was intermediated in the United States through a banking system based on gold and currency. It has long been appreciated that an inelastic supply of currency, as well as limitations on the short-run elasticity of the supply of gold, exacerbated the liquidity strains that plagued the country from time to time and contributed to periodic suspensions of convertibility of bank deposits. Those suspensions were examples of “market failures.” Even at high rates of interest, public demand to convert bank deposits to gold

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and currency exceeded the ability of the banks to honor their obligations. In 1913, Congress authorized a system of Federal Reserve Banks and charged the Banks with providing a more elastic currency.

Nineteenth century bank suspensions have an analog in the modern Treasury securities market: chronic settlement fails. A settlement fail is a securities transaction that does not settle as initially scheduled, i.e., the securities are not delivered by the seller (and, consequently, are not paid for by the buyer) on the date originally specified by the two parties. Isolated and sporadic fails are commonplace in the Treasury market and are quickly resolved; they are of little concern to market participants. However, there have been several recent episodes of widespread and persistent, or chronic, fails, including after the terrorist attacks on September 11 (Fleming and Garbade, 2002) and in the second half of 2003 (Fleming and Garbade, 2004). When fails become chronic, securities lenders are unable to obtain their securities for prolonged periods of time, just as depositors were sometimes unable to convert their bank deposits to gold or currency in the 19th century. We suggest that chronic fails are—like suspensions of convertibility of bank deposits—examples of market failure, and we suggest that making

\[\text{Huther (2004) also characterized chronic settlement fails as market failures. We do not suggest that recent episodes of chronic fails have had anything like the devastating impact of 19th century banking crises. However, they did lead to risks that were hardly trivial \textit{ex ante}. The collapse of a major market participant with a large quantity of unsettled trades on its books could have triggered a chain of defensive actions and impaired liquidity in the Treasury market. It should be noted that similar concerns motivated the Federal Reserve Bank of New York to take remedial action when Drysdale Government Securities, Inc. collapsed in May 1982. See Committee on Banking, Housing, and Urban Affairs (1982, pp. 26 and 36, testimony of Anthony Solomon, President, Federal Reserve Bank of New York, that “uncertainty about clearing and financing arrangements seemed to be building. There was concern that investors and traders would pull away from the markets because of uncertainty about the magnitude of the problem, and that major securities firms would be threatened with losses that could jeopardize their ability to function” and that “you could have had the beginning of a ripple effect; you might say the beginnings of the seizing up of the market …”). The New York Fed reminded market participants that it stood ready “as lender of last resort” to help commercial banks meet “unusual credit demands related to market problems” (“A Dealer in Bonds Defaults on Debt,” \textit{New York Times}, May 19, 1982, p. A1.). To facilitate settlements of transactions in Treasury securities, the Fed temporarily...}
securities available through a backstop lending facility is analogous to a central bank acting as a money lender of last resort.

To provide a framework for our analysis, we begin by describing (in section 2) banking before the advent of the Federal Reserve. Section 3 presents an overview of the role of Treasury securities in 21st century capital markets and section 4 describes how current practices in the markets for borrowing and lending Treasury securities can lead to market failures analogous to bank suspensions in the 19th century. Section 5 concludes.

2. Banking in the Second Half of the 19th Century

There were three major classes of participants in the post-Civil War banking system: *borrowers*, *depositors* who held, in addition to bank deposits, gold coin (“specie”) and currency (collectively known as “base money”), and *banks* that accepted deposits and made loans.

Currency consisted of Treasury currency and national bank notes. Treasury currency included gold and silver certificates (essentially warehouse receipts for bullion deposited with the Treasury), United States notes (“greenbacks”), and Treasury notes issued pursuant to the Sherman Silver Purchase Act of 1890. National bank notes were issued by nationally chartered banks and were redeemable on demand – at the bank of issue or at the Treasury in Washington – in specie or Treasury currency. An issuing bank had to pledge Treasury bonds against its notes and had to maintain a balance at the Treasury to facilitate redemption.

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suspended limits on loans of Treasury securities from the System Open Market Account and it announced that, contrary to previous policy, it would lend securities to finance short positions (Committee on Banking, Housing, and Urban Affairs, 1982, pp. 28 and 40-41). This led to a ten-fold increase in securities lending by the Fed (Committee on Banking, Finance, and Urban Affairs, 1983, p. 21).

3 Office of the Secretary of the Treasury (1960).

4 Friedman and Schwartz (1963, pp. 20-23) treat national bank notes *pari passu* with Treasury currency and include them in base money. National bank notes could not be used to satisfy reserve requirements of national banks, nor could they be used to satisfy adverse clearing balances at the New York clearing house. They could, however, be used to satisfy reserve requirements of state-chartered banks, as well as adverse clearing balances at clearing houses outside of New York. Friedman and Schwartz (1963, pp. 21-22).
Depositors held bank deposits as well as specie and currency because deposits were less susceptible to theft and because it was usually cheaper to make payments at distant points by check. Most check payments nevertheless required the use of base money for final settlement. For example, suppose A made a payment to B by writing a check. If A and B were customers of different banks in the same city, the payment had to be settled with a transfer of base money from A’s bank to B’s bank through the local clearing house. If the banks were in different cities, the payment was likely to be settled by a transfer of specie or Treasury currency through the New York clearing house from the New York correspondent of A’s bank to the New York correspondent of B’s bank.5

With one important exception, bank loans were generally for fixed terms and could not be liquidated easily prior to maturity. (The exception was overnight call loans on New York Stock Exchange securities. Call loans were highly liquid because they were one-day loans backed by high-quality collateral.) The mismatch (in both maturity and liquidity) between demand liabilities and term loans made banks relatively fragile institutions. Banks mitigated their fragility by keeping some of their assets in the form of base money, i.e., reserves, and some in overnight call loans, and by financing assets with equity capital as well as with deposits. Reserves provided the primary means of satisfying depositor withdrawals; call loans provided a secondary source of liquidity. Equity provided a buffer against loan losses and asset liquidation costs stemming from unexpectedly heavy withdrawals.

The Money Market

One useful way to think about banking in the second half of the 19th century is to examine the demand for, and supply of, base money. On the demand side, individuals and businesses held base money to make hand-to-hand payments. There was also a strong seasonal demand for base money to pay field hands and to move the grain and cotton crops to market each

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5 Canon (1910, chap. 6 and 7 and pp. 64-68).
fall. In addition, most banks were required to hold a specified fraction of their deposit liabilities in the form of base money, and typically held some excess above the required amount.

On the supply side, the stock of Treasury currency other than gold certificates was, as a practical matter, fixed in the short run. National banks had room to vary the quantity of bank notes outstanding, but chose not to do so – at least over short intervals of time. The domestic gold stock was more elastic, varying directly with domestic interest rates and inversely with foreign interest rates. The gold stock also varied as a function of the balance of payments. For example, a crop failure in Europe would lead to an expansion of U.S. agricultural exports, a rise in the value of the dollar against other currencies, and (once it became cheaper to ship gold to the U.S. than to buy dollars) an increase in the U.S. gold stock.

Short-term interest rates moved to balance supply and demand for base money. If demand exceeded supply, short-term rates rose, attracting gold from abroad. Higher interest rates also led depositors to replace bank deposits with direct loans, producing a parallel contraction of loans and deposits on bank balance sheets that released previously required reserves. The market-clearing role of short-term interest rates was particularly evident in the regular autumnal increase in short rates associated with the seasonal expansion in the demand for base money to move the crops.

Liquidity Strains

Liquidity strains appeared when depositors wanted to shift money balances from bank deposits to base money in amounts comparable to or greater than what could be accommodated

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6 Noyes (1910, p. 1) and Kemmerer (1910).
7 Office of the Secretary of the Treasury (1960) and Friedman and Schwartz (1963, p. 24).
8 Friedman and Schwartz (1963, p. 23), Noyes (1910, p. 9), and Kemmerer (1910, pp. 152-153).
9 Friedman and Schwartz (1963, pp. 98, 107, and 140-141).
10 Kemmerer (1910, chap. 2).
from bank reserves in excess of reserve requirements and whatever gold could be attracted from abroad.\textsuperscript{11} Liquidity strains typically appeared when the banking system was in a seasonally fragile state (due to demand for base money to move the crops) and were triggered by, for example, bank failures (sometimes due to management fraud and sometimes due to loan losses) and gold exports (stemming from an adverse balance of payments). They were sometimes amplified by precautionary deposit withdrawals by individuals and businesses fearful of prospective suspensions of convertibility of bank deposits.

Unusually severe strains in 1873, 1893, and 1907 led banks to suspend convertibility of their deposits. Suspension disrupted settlements between banks in the same city and crippled settlements between banks in different cities. Disruption of the payments system led to a contraction in trade, inventory back-ups, and, ultimately, a broad decline in economic activity.\textsuperscript{12}

\textbf{Relieving Liquidity Strains}

The fundamental reason for liquidity strains was well-understood by 19\textsuperscript{th} century bankers: no more than a small fraction of depositors could convert a significant portion of their deposits to base money at the same time.\textsuperscript{13} Efforts aimed at preventing and mitigating liquidity strains thus focused on schemes to “liquefy” the banking system in times of financial stress. There were two basic devices for liquefying the banking system: (1) private production of substitutes for base money and (2) action by the Treasury to supply additional base money. The first approach led to the development of clearing house loan certificates – a predecessor of

\begin{enumerate}
\item Call loans provided ample liquidity for an individual bank when the bank had to meet adverse clearings with other banks, because the loans could be shifted to, or refinanced at, banks with more favorable clearings. Call loans provided much less liquidity to the banking system as a whole when depositors in aggregate wanted to hold a materially larger fraction of their money balances in the form of base money. Sprague (1910, pp. 24 and 84-85).
\item Sprague (1910, pp. 38-40, 71-74, 200, 202-203, and 206).
\item Baxter and Sommer (2000) provide an interesting view of this problem in a contemporary context.
\end{enumerate}
Federal Reserve discount window loans; the second led to a forerunner of open market operations.

A clearing house loan certificate was an interest-bearing claim for the future payment of base money issued under the auspices of a clearing house association. Upon deposit of acceptable collateral and approval of a clearing house committee, a member bank could draw certificates in an amount equal to 75 percent of the value of the collateral and use the certificates to settle claims on itself. Later, after market stresses had subsided, the bank would redeem the certificates and reclaim its collateral by paying current holders the face amount of the certificates plus accrued interest in base money.

The second approach to mitigating liquidity strains was to supply additional base money during times of stress. The Treasury used two methods for adding base money to the economy. Prior to the early 1890s it bought or redeemed outstanding Treasury bonds in operations that anticipated modern open market operations, making significant purchases in 1873 and 1890. The Treasury paid for its purchases with specie and currency that had accumulated (during periods of budget surpluses) in its vaults in Washington and at subtreasurys around the country. After 1887 the Treasury began to make direct deposits in Treasury accounts at national banks. The deposits, like the earlier bond purchases, were effected with base money that had accumulated in Treasury vaults.

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14 Clearing house loan certificates were first issued in the fall of 1860 by the New York Clearing House Association to alleviate financial stresses engendered by the onset of the Civil War. Loan certificate programs were renewed by the New York clearing house, and adopted by clearing houses in other cities, during subsequent liquidity strains in 1873, 1884, 1890, 1893, and 1907. Cannon (1910, chap. 10 and 11). Certificates were initially limited to settling clearing house balances and were not negotiable except between clearing house members. Beginning in 1893, clearing house associations outside of New York began to authorize member banks to pay out to their depositors small-denomination certificates as substitutes for base money in hand-to-hand transactions. Cannon (1910, pp. 76 and 109-112).

15 Sprague (1910, pp. 26, 40-42, 135-139, and 149-151) and Kinley (1910, p. 237).

16 Kinley (1910, pp. 119-146, 187, 256-257, and 278-281).
An exceptionally severe liquidity strain in 1907 demonstrated to the satisfaction of most observers that something more was needed to prevent and mitigate liquidity strains. The Aldrich-Vreeland Act, passed by Congress in 1908, provided for the National Monetary Commission that helped lay the foundation for the Federal Reserve System.17

4. The Role of Treasury Securities in 21st Century Capital Markets

The key to appreciating why the Treasury might want to become a lender of last resort of Treasury securities is understanding the central role of Treasury securities in managing interest rate risk and how the use of Treasury securities in risk management has fostered the development of, and is dependent on, a market for borrowing and lending those securities.

A variety of market participants actively manage their exposure to fluctuations in interest rates. Prior to 1975, investors typically mitigated risk by liquidating outstanding long positions. More recently, selling a liquid instrument short against relatively static (and less liquid) long positions has become increasingly important. Market participants hedge positions in intermediate- and long-term fixed income securities with on-the-run Treasury notes,18 Treasury futures contracts, and interest rate swaps. Box 1 describes some of the advantages and disadvantages of each of these instruments.

17 Less well known, the Aldrich-Vreeland Act also created a mechanism to enhance the elasticity of national bank note circulation. Specifically, the Act provided for the formation of “national currency associations” by groups of ten or more national banks. Upon pledge of commercial loans and approval of the Secretary of the Treasury, a bank that was a member of a national currency association could issue bank notes equal to 75 percent of the value of the pledged loans. Later, after market stresses had subsided, the bank could redeem the notes and reclaim its collateral by depositing specie or Treasury currency with the Treasury. Emergency bank notes were issued only once, following the initiation of hostilities at the beginning of World War I. Silber (forthcoming) describes the single resort to the emergency currency provisions of the Aldrich-Vreeland Act. See also Sprague (1914, 1915). Friedman and Schwartz (1963, p. 172) opined that “The availability of the emergency issue probably prevented … restriction of payments by the banking system” in 1914.

18 An on-the-run Treasury note is the more recently auctioned note in a particular series, e.g., the most recently auctioned 10-year note.
Treasury securities are important to managing interest rate risk for four reasons. First, as noted in Box 1, they are used directly for hedging less liquid securities. Second, they serve as the ultimate reference point for pricing Treasury futures contracts, which are also used for hedging less liquid instruments. Third, they are used by swap dealers as short-term swap hedges, and thus contribute to the efficiency of the swaps markets. Finally, market participants undertake spread trades against Treasury securities when they think a particular sector is mispriced; buying a security in a relatively cheap sector against selling a Treasury security short, or vice versa. Spread trades are important to keeping relative prices and yield spreads more stable than they might otherwise be, thereby reducing basis risk and facilitating hedging.

**Borrowing Treasury Securities**

To settle a short sale of Treasury notes, a seller has to borrow the notes that it sold short. Thus, the ability to borrow notes is vital for both hedgers and spread traders. There are today (and have been for several decades) markets for borrowing and lending Treasury securities. Borrowers pay lenders a fee for the use of their securities – either directly, or indirectly by accepting a rate of interest on money lent on special collateral reverse repurchase agreements below the rate on general collateral repos. (Repurchase agreements are described in Box 2.) Importantly, the investor that lends the securities accepts a claim on the borrower in exchange for the actual securities, just as a 19th century depositor accepted a claim on a bank in exchange for base money.

Demand and supply for borrowed securities come into equilibrium through changes in borrowing fees. A higher fee makes financing a short position more costly, reducing demand to

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19 For example, suppose a swap dealer agrees with a counterparty to receive fixed payments for ten years against making floating rate payments. If the dealer is unable to identify promptly another customer with a compatible trading interest, it may hedge its risk by selling 10-year Treasury notes short. The dealer will liquidate the hedge when it identifies an opportunity to offset its risk directly in the swaps market.
borrow the security. It also makes lending the security more rewarding, bringing out additional supply.

5. Strains in the Markets for Borrowing and Lending Treasury Securities

We observed earlier that 19th century bank liquidity strains appeared when depositors wanted to shift out of bank deposits and into base money in amounts comparable to or greater than what could be accommodated with bank reserves in excess of reserve requirements and whatever gold could be attracted from abroad. A similar situation can occur in the markets for borrowing and lending Treasury securities.

Suppose, for example, there is $20 billion of a ten-year Treasury note outstanding and that, initially, 75 percent of the holders of the note are willing to lend it. Ignoring settlement frictions, the outstanding supply can support a short base of up to $60 billion.\(^{20}\) If the fraction of investors willing to lend the note subsequently contracts to 60 percent, the outstanding supply can support a short base of only $30 billion.\(^{21}\) If the initial short base was greater than $30 billion, there would be no way to satisfy the demands of all of the lenders who want their securities returned.

The foregoing analysis ignores the market-clearing role of the note’s borrowing fee. It would certainly be reasonable to suppose that the borrowing fee would rise in response to the contraction in loan supply until there was a comparable contraction in loan demand. However, in some cases demand to borrow securities can not be rationed down by a higher borrowing fee.

\(^{20}\) If $60 billion of the note is held short, then there must be $80 billion of the note held long: the $60 billion from the short sellers, plus the $20 billion amount outstanding. If 75 percent of the longs are willing to lend, then $60 billion is available for lending. This just balances the amount the shorts need to borrow. More generally, if a fraction \(f\) of investors are willing to lend an issue of size \(Q\), then the issue can support a short base of \(S = f \times (S + Q)\), or \(S = \frac{f}{1 - f} \times Q\). \(S = \$60\) billion when \(f = 0.75\) and \(Q = \$20\) billion.

\(^{21}\) Using the notation of the previous footnote, \(S = \$30\) billion when \(f = 0.60\) and \(Q = \$20\) billion.
because the borrowing fee can not usually exceed the interest rate on general collateral repurchase agreements.

**The Upper Limit on Borrowing Fees**

The upper limit on borrowing fees for Treasury securities arises as a by-product of a market convention on a seemingly unrelated topic: settlement fails. Fails occur every business day because of miscommunication, clerical error, and – most commonly – failure to receive in securities (from unrelated purchases) that are needed for redelivery. No special stigma attaches to a fail (because fails usually occur for such innocuous reasons) and Treasury market participants have adopted the convention that a failing seller can make delivery after the initially scheduled settlement date at the original invoice price and without any explicit penalty.22

The absence of an explicit penalty on settlement fails does not imply that market participants are indifferent about settling transactions. A fail can impose significant *implicit* costs on a seller because it leaves the seller short of funds. For example, if a seller fails to deliver $100 million of securities, it will be left at the end of the day with $100 million less cash. It either has to borrow an additional $100 million (thereby incurring additional interest expenses) or it has $100 million less to lend (thereby suffering a reduction in interest earnings). If the interest rate on overnight general collateral repurchase agreements (the “GC” rate) is 4 percent, a seller will incur $11,111 in additional expenses – or foregone earnings – by failing for a single day ($11,111 = .04 \times (1/360) \times $100,000,000).

The implicit cost of a fail – the GC rate – means that a seller has an economic incentive to borrow securities to avoid failing as long as the fee for borrowing the securities is less than the GC rate. Conversely, failing will be more attractive than delivering borrowed securities if the

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22 See, for example, Public Securities Association (1993, chap. 8, sect. C): “If securities are not delivered on the agreed upon settlement date, there is a fail. Regardless of the date the securities were actually delivered, the buyer of the securities pays the seller the original settlement date figures.”
borrowing fee exceeds the GC rate. Thus, short sellers will not usually pay more than the GC rate to borrow securities.\textsuperscript{23}

\textbf{Chronic Fails}

If the GC rate is low, the fee for borrowing a security may not be able to rise high enough to reduce demand sufficiently, or to stimulate enough supply, to clear the securities lending market before the fee hits the GC rate, whereupon the unsatisfied demand spills over into fails. Figure 1 shows two instances of chronic fails between 1991 and the end of 2003: following the attacks on September 11 and during the second half of 2003.\textsuperscript{24} The former episode was attributable to operational problems caused by the attacks (Fleming and Garbade, 2002). Figure 2 shows that the latter episode came when the Federal funds rate – a close proxy for the GC rate – was 1 percent. As described in Fleming and Garbade (2004), at the end of June 2003 market participants anticipated that interest rates would be rising in the near future and they sold short an unusually large quantity of Treasury securities to hedge long positions in other securities. The demand to borrow created by the short sales pushed the cost of borrowing several issues to the (low) GC rate and the excess demand spilled over into fails.

The extraordinary volume of settlement fails in the second half of 2003 evidenced a market failure: demand (to borrow securities) exceeded supply but borrowing fees could not rise to clear the excess demand. The market failure had two important consequences. First, buyers who failed to receive securities they had purchased, and lenders who failed to receive securities back when their loans matured, became \textit{involuntary} lenders. Involuntary lenders who wanted to sell but who did not want to fail themselves could not solicit bids from competing dealers

\textsuperscript{23} However, as noted by Fleming and Garbade (2004), borrowing fees can exceed the GC rate if there are ancillary costs to failing.

because they did not have securities to deliver. They were forced to bargain with their failing counterparts on a bi-lateral basis and settle for cash differences. This experience may lead them to withdraw as voluntary lenders of securities in the future if they begin to question whether securities will be returned as promised. That is, they may, as a precautionary matter, begin to “box,” or “lock up,” securities. This could amplify liquidity strains in the markets for borrowing securities just as precautionary withdrawals of bank deposits amplified liquidity strains in 19th century money markets.

The second importance consequence of the market failure in 2003 was that the parties to some of the unsettled transactions were exposed to credit risk. A buyer faced the risk that the price of a security would rise and the seller fail, forcing the buyer to replace the securities at a higher price. A seller faced the risk that the price of a security would fall and the buyer fail, forcing the seller to liquidate the securities at a lower price.

We suggest that the failure of the securities lending markets to clear in the summer and fall of 2003 was analogous to a 19th century bank suspension. Market participants who borrowed or sold securities were temporarily unable to deliver the securities, just as banks in 1873, 1893, and 1907 were temporarily unable to make good on their deposit liabilities.

6. Summary

This paper has suggested that the markets for borrowing and lending Treasury securities in the 21st century are broadly analogous to the 19th century market for borrowing and lending money. Dealers and other market participants today have short-term liabilities denominated in Treasury notes; 19th century banks had deposit liabilities. Additionally, there is limited elasticity in the supply of individual Treasury securities today, just as there was limited elasticity in the supply of base money in the 19th century. A backstop securities lending facility would enhance

25 The Federal Reserve’s securities lending program makes Treasury securities available at a borrowing fee in excess of a stipulated threshold to facilitate settlements and thereby provides some elasticity in the supply of those securities. See Fleming and Garbade (2002,
the elasticity of Treasury securities in the same way that the Federal Reserve Banks enhanced the
elasticity of currency a century ago. It would mitigate chronic settlement fails, just as the
Federal Reserve System mitigated suspensions of convertibility of bank deposits.

2004). However, the Federal Reserve can not lend more securities than it owns. In some
cases it owns a negligible amount. For example, the Fed owned only $252 million of the
ten-year note maturing in May, 2013 that was in demand in the summer of 2003.
References


Box 1. **Hedging Interest Rate Risk**

Market participants hedge their exposure to fluctuations in interest rates with on-the-run Treasury notes, Treasury futures contracts, and interest rate swaps.

On-the-run notes trade in exceptionally liquid markets, so a hedge can be established and removed quickly with minimal market impact. However, a position hedged with Treasury notes remains exposed to the basis risk of changes in the spread between the yield on the securities held long and the yield on the notes sold short.

Treasury futures contracts are also highly liquid, but hedging with Treasury futures also leaves market participants exposed to basis risk. Additionally, since futures contracts provide for a range of delivery options, the price of a contract varies most closely with whatever security is currently “cheapest to deliver.” The identity of the cheapest-to-deliver can change over time, leading to change in the appropriate hedge ratio and in the exposure of a hedged position to change in the slope of the yield curve.

Interest rate swaps are widely used for managing interest rate risk because they reduce basis risk. However, due to somewhat higher transaction costs in offsetting swaps with non-current coupons and non-standard maturities, swaps are most useful for managing risk for relatively stable “core” positions in other securities.
Box 2. Repurchase Agreements

A repurchase agreement (repo or RP) is a sale of securities coupled with an agreement to repurchase the securities at a later date. A repo is similar to a collateralized loan. As shown below, a securities dealer might borrow $10 million overnight from a corporate treasurer at an effective interest rate of 3 percent per annum by selling Treasury securities valued at $10 million and simultaneously agreeing to repurchase the securities the following day for $10,000,833 ($833 = (1/360) \times 3\% \text{ of } $10,000,000). The lender of funds (the treasurer in the example) is said to enter into a reverse repurchase agreement.

Starting leg of dealer’s repurchase agreement and treasurer’s reverse repurchase agreement:

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Dealer

$10,000,000

Treasurer
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Closing leg (one day later):

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Dealer

$10,000,833

Treasurer
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Repurchase agreements come in two flavors: general collateral agreements and special collateral agreements. A general collateral repo is an RP in which the lender of funds is willing to accept any of a variety of securities as collateral. The lender is concerned primarily with earning interest on its money and having possession of assets that can be sold quickly in the event of a default by the borrower. Interest rates on general collateral RPs are usually quite close to rates on overnight loans in the federal funds market. This reflects the essential character of a general collateral RP as a device for borrowing and lending money.
A special collateral RP is a repo in which the lender of funds designates a particular security as the only acceptable collateral. Dealers and others lend money on special collateral repos in order to borrow specific securities. The interest rate on a special collateral RP is commonly called a “specials” rate. The owner of a Treasury security that a dealer wants to borrow may not have any particular interest in borrowing money, but can nevertheless be induced to lend the security if it is offered an opportunity to borrow money at a specials rate less than the general collateral rate. For example, if the rate on a special collateral RP is 2 percent and the general collateral rate is 3 percent, then – as shown below – an investor can earn a 100 basis point spread by borrowing money on the special collateral RP and relending the money on a general collateral RP.

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The difference between the general collateral RP rate and the specials rate for a particular security is a measure of the “specialness” of the security. If the demand to borrow the security is modest relative to the supply available for lending, a dealer borrowing the security will usually be able to lend its money at a rate no lower than about 15 to 25 basis points below the general collateral rate. If the demand to borrow is strong, or if the supply is limited, the specials rate for the security may be materially below the general collateral rate and the specialness spread correspondingly large.27

The specialness of a security – the difference between the interest rate on money lent against general collateral and the interest rate on money lent against the specific security – is the economic cost of borrowing the security.

27 Instances of extremely low specials rates are documented by Cornell and Shapiro (1989), Jordan and Jordan (1997, pp. 2058-2059), and Fleming (2000, pp. 229-231).
Figure 1.  Average Daily Settlement Fails
Figure 2. Overnight Federal Funds Rate